Manufacturing & Products

Australian Government

Forest and Wood Products
Research and Development
Corporation

The Suitability of Plantation Thinnings as Vineyard Posts

Project No. PN02.3900

© 2005 Forest & Wood Products Research & Development Corporation
All rights reserved.

Publication: The Suitability of Plantation Thinnings as Vineyard Posts

The Forest and Wood Products Research and Development Corporation ("FWPRDC") makes no warranties or assurances with respect to this publication including merchantability, fitness for purpose or otherwise. FWPRDC and all persons associated with it exclude all liability (including liability for negligence) in relation to any opinion, advice or information contained in this publication or for any consequences arising from the use of such opinion, advice or information.

This work is copyright and protected under the Copyright Act 1968 (Cth). All material except the FWPRDC logo may be reproduced in whole or in part, provided that it is not sold or used for commercial benefit and its source (Forest and Wood Products Research and Development Corporation) is acknowledged. Reproduction or copying for other purposes, which is strictly reserved only for the owner or licensee of copyright under the Copyright Act, is prohibited without the prior written consent of the Forest and Wood Products Research and Development Corporation.

Project no: PN02.3900

Researchers:
K.J. McCarthy and L.J. Cookson
CSIRO Forestry and Forest Products
PO Box 10, Clayton South, VIC 3169

M. Mollah
Department of Primary Industries Victoria
PO Box 905, Mildura, VIC 3502

J. Norton
Horticulture & Forestry Science, Department of Primary Industries and Fisheries
PO Box 631, Indooropilly, QLD 4068

J. Hann
University of Melbourne
Water Street, Creswick, VIC 3363

Final report received by the FWPRDC in July 2005

Forest and Wood Products Research and Development Corporation
PO Box 69, World Trade Centre, Victoria 8005
Phone: 03 9614 7544 Fax: 03 9614 6822 Email: info@fwprdc.org.au
Web: www.fwprdc.org.au

The Suitability of Plantation Thinnings as Vineyard Posts

Prepared for the

Forest & Wood Products
Research & Development Corporation

by

K.J. McCarthy, L.J. Cookson, M. Mollah, J. Norton and J. Hann

The FWPRDC is jointly funded by the Australian forest and wood products industry and the Australian Government.

EXECUTIVE SUMMARY

Objective

The aim of this project was to investigate the suitability of thinnings from a range of plantation species for use as vineyard posts. The hardwood plantation species examined were *Eucalyptus grandis, E. globulus, E. pilularis, E. dunnii, E. cladocalyx* and *Corymbia maculata*, while *Acacia mearnsii* was obtained from natural regrowth. The softwood plantation species were *P. elliottii, P. radiata* and *Araucaria cunninghamii*. Variables examined included: three air drying regimes; microwave conditioning of *E. grandis* and *E. globulus*; two preservative treatments for hardwoods (alkaline copper quaternary compound (ACQ) and pigment emulsified creosote (PEC)); and two preservative treatments for softwood species (ACQ and, for *Pinus radiata* copper chromium arsenic (CCA)). A further aim was to install treated posts in commercial vineyards for demonstration purposes. From an earlier trial of three hardwood species treated with PEC, demonstration posts previously installed were also to be inspected annually for three years, and any movement of polycyclic aromatic hydrocarbons (PAH) from the posts monitored.

Key Results

- More than 70% of trees from the hardwood plantations of *E. grandis*, *E. pilularis, E. dunnii, E. cladocalyx* and *C. maculata,* and all softwood species, produced straight posts. About 80% of trees in the *E. globulus* plantation had small kinks, and care was needed to minimise this defect in posts. Only 40% of *A. mearnsii* trees were straight enough to produce posts.
- When debarking was performed by hand, posts were generally easy to debark on the day of harvesting. However, bark was difficult to remove after this time.
- Most hardwood posts air dried with bark-on (*E. dunnii* not tested) became more difficult to hand-debark when seasoned. However, bark was easy to remove, or fell off, after seasoning for *E. grandis* and *E. cladocalyx*.
- For posts treated with ACQ, splitting was greatest in *A. mearnsii*, *E. dunnii*, *E. globulus* and *E. pilularis*. Splitting was minimal in *E. grandis, C. maculata, E. cladocalyx, P. radiata, P. elliottii* and *A. cunninghamii*.
- Splitting in hardwoods was reduced by using PEC rather than ACQ, and by microwave conditioning (demonstrated in *E. globulus* posts). Gang-nails produced a moderate reduction in splitting in *A. mearnsii* and *E. globulus*. Because *E. grandis*, *E. cladocalyx* and *C. maculata* were generally not prone to splitting, little value was gained by attaching gang-nails. Similarly, no benefit could be detected from end sealing *P. elliottii* and *A. cunninghamii* posts, due to a lack of splitting in posts without end sealing.
- No benefit in reduced splitting was found in hardwood posts dried with bark-on. Splitting was actually worse in *A. mearnsii* posts dried with bark-on.
- Bark-on posts suffered from borer damage, which was greatest in *E. globulus*, *A. mearnsii* and *E. cladocalyx* posts. Strength was generally reduced by about 15% compared to posts debarked before seasoning, probably due to borer damage. *E. globulus* posts dried with bark-on were the weakest of all hardwood species. However, these posts were still stronger than CCA-treated *P. radiata* posts.
- None of the posts were rejected due to oversized knots.
- Microwave conditioning, examined in *E. grandis* and *E. globulus*, was calculated to cost 40 to 79 cents per post. This reduced the moisture content of the wood, and reduced splitting in *E. globulus*. Preservative uptake was little altered by microwave conditioning, probably because the posts already contained high proportions of sapwood that was treatable. Although, *E. globulus* absorbed more PEC after microwave conditioning. Strength was not affected by microwave conditioning.

- PEC treatment left the surface of hardwood posts drier than treatment with a creosote plus oil mixture.
- PAH emission into surface soil from ‘stage 1’ posts did not rise above the accepted level of 100 mg/kg in the soil during three years of exposure.
- Preservative impregnation at commercial treatment plant, which could not vary the concentration of their preservative stock solutions, produced a range of retentions depending upon timber species. The trend in both hardwoods and softwoods was that species with higher air dry density had lower preservative uptake.
- Virtually all hardwood posts met the H4 retention minimum requirement of 10% m/m creosote after Bethell (full cell) treatment. *E. grandis* and *E. globulus* were highly absorbent, and may be more suitably treated with creosote using a Lowry (empty cell) schedule, as is done commercially for *P. radiata*.
- Treatment with ACQ occurred at a softwood treatment plant, and produced mostly H4 (*A. cunninghamii*, *P. elliottii*) and H5 (*P. radiata*) retentions in softwoods. Some problems were encountered with penetration into ‘wet patches’ in *A. cunninghamii*, especially for posts dried in the shade.
- The highly absorbent hardwood species *E. grandis* and *E. globulus* were treated close to H4 requirements with ACQ. Retentions for *E. dunnii* and *E. pilularis* met H3 requirements, while *A. mearnsii*, *C. maculata* and *E. cladocalyx* were least absorbent. The later two species have the benefit of possessing naturally durable heartwood (ratings apply to mature trees, but may also be applicable to posts). With a service life expectation of around 25 years for vineyard posts (compared to 40-50 years for H4 treated posts), field testing in vineyards will demonstrate if the treatments achieved are still ‘fit for purpose’.
- All PEC-treated hardwood post species were stronger than CCA-treated *P. radiata*.
- When hardwood results were grouped together, ACQ and PEC treatments gave no significant difference in strength. However, by species examination showed some minor differences in strength between some species.
- The strongest preservative treated posts were *C. maculata*, *E. cladocalyx* and *A. mearnsii*. Splitting did not appear to affect strength, as was demonstrated most clearly in *A. mearnsii*, the species showing greatest variability in splitting.
- ACQ-treated *P. radiata* posts treated to H5 retentions were weaker than similar CCA-treated posts treated to H4 retentions.
- Strength testing using the cantilever method gave post strength values generally 27% higher than MOR readings from the four point bending test. The trend and relative order in post strength was similar between both strength testing methods, with some minor variations.
- Eight hundred and eighty posts were installed at Seppelt’s vineyard at Great Western. Posts were driven into pilot holes dug by auger and water jetting, with large end down. Posts with small kinks did not cause any problems for this method of installation.
- Five hundred and eighty posts were installed at McWilliams vineyard at Griffith. Posts were rammed into soil (no pilot holes were dug), small end down. A few severely kinked posts were unable to be installed by ramming.
- Due to hardness, some hardwood posts could not have wire fixed to them using conventional staple guns. Holes were drilled in most *C. maculata, E. cladocalyx* and *A. mearnsii* posts to attach wire fastening systems.
- ACQ and PEC-treated hardwood posts are likely to be 10-30% more expensive than CCA-treated *P. radiata* posts, so should be marketed on the basis of increased strength.

Application of Results

The results show that several plantation species are well suited to the production of vineyard posts, besides *P. radiata*. Ideal hardwood species in terms of strength and a lack of splitting were *E. grandis*, *E. cladocalyx* and *C. maculata*, while *E. globulus* and *E. pilularis* suffered a low percentage of splitting and may also prove suitable. *E. dunnii* posts split excessively, unless treated with PEC. *A. mearnsii* posts also split excessively, and while still amongst the strongest of posts, would require a modification to the fastening system in order to straddle any split. The commercial production of hardwood vineyard posts is currently being demonstrated in Tasmania. There, at least 30% of thinnings from selected regrowth forests of *E. nitens* are sufficiently straight for vineyard posts, and are being treated with CCA. While this project focused on ACQ and PEC, any of the preservatives currently listed in AS 1604.1 for H4 should be suitable for vineyard post production. Obtaining higher value from thinnings would improve the economic viability of plantation forestry.

THE SUITABILITY OF PLANTATION THINNINGS AS VINEYARD POSTS

TABLE OF CONTENTS

INTRODUCTION

The area planted under vine in Australia has been increasing at the rate of about 15,000 hectares per year[1]. Typically, a vineyard requires 620 in-line posts per hectare for trellising, suggesting that 9.3 million new posts are needed each year[2]. About 70% of the posts are CCA-treated *Pinus* species (mostly *P. radiata*), 25% creosote-treated *P. radiata*, with remainder being other materials such as steel or untreated timbers. The most common in-line post size used is 75-100 mm diameter x 2.4 m long, while the end post strainers are normally 125-150 mm diameter or greater. CCA treatment can weaken timber slightly[3], and one of the problems facing CCA-treated *P. radiata* posts is breakage during harvesting, due to the vigour by which vines are shaken to dislodge grapes. On average about 1-2% of posts break during harvesting, although the proportion may be as high as 15% in some vineyards[4]. Therefore, the total number of new posts required each year is probably more than 10 million. Often during peak demand periods CCA-treated *P. radiata* posts are not available.

Plantation forestry has expanded rapidly in recent years, especially the plantings of *Eucalyptus globulus*. Some 50,000 hectares of hardwood and 5,000 hectares of softwood were planted in 2002[5]. The majority of thinnings from hardwood plantations are currently used as firewood, mulch, are dumped, or are left to rot. Recent reports in this series on the use of thinnings for vineyard posts examined plantations irrigated with effluent water[6,7]. The plantations of *E. grandis* and *E. globulus* examined were suitable for posts, and as trees were fast grown they contained mainly (80-90%) sapwood. The sapwood was readily treatable with pigment emulsified creosote (PEC). The current project was set up to examine a wider range of timber species from standard (non-irrigated) plantations. Seven hardwood species were examined (six from plantations and *Acacia mearnsii* from native regrowth), and three softwood plantation species (two from Queensland, and *P. radiata* for comparison).

While CCA is the favoured treatment for softwood vineyard posts, questions remain about some environmental aspects of the preservative, and the disposal of treated posts at the end of the service life. Earlier studies have shown that CCA is not taken into the stems, leaves and above-ground fruit of most plants, including vines[8,9]. Evidence is also lacking that handling CCA-treated timber would present a health problem[10]. Nevertheless, CCA-treated timber for domestic use is now restricted in the USA. The Australian Pesticides and Veterinary Medicines Authority (APVMA) has also reviewed CCA, and has announced restrictions on uses involving close human contact with the treated surfaces, such as decking, handrails, playground equipment and picnic tables[11]. These

---

[1] Australian Bureau of Statistics (ABS) (2003). Australian wine and grape industry. Australian Bureau of Statistics, Australia, catalogue number 1329.0.

[2] Mollah, M., Smith, J., McCarthy, K. and Cookson, L. (2004). Alternatives to CCA-treated *Pinus radiata* as vineyard posts. Internat. Res. Group on Wood Pres. Document No. IRG/WP/04-50212.

[3] Bariska, M., Pizzi. A. and Conradie, W.E. (1988). Structural weakening of CCA treated timber. Holzforschung 42: 339-345.

[4] Mollah, M.R. (1997). Practical aspects of grapevine trellising. Winetitles, Adelaide.

[5] National Forest Inventory (2004). National Plantation Inventory Update – March 2004, Bureau of Rural Sciences, Canberra.

[6] McCarthy, K.J, Scown, D.K., Cookson, L.J. and Mollah, M.R. (2000). Vineyard trellis posts from treated eucalypts. 26th Forest Prod. Res. Conf., Clayton, Pp 13-14.

[7] Cookson, L., McCarthy, K., Scown, D. and Mollah, M. (2002). Vineyard posts from eucalypts grown on effluent water. RIRDC Publication No. 02/014, 40 pp. http://www.rirdc.gov.au/reports/AFT/02-014.pdf.

[8] Levi, M.P., Huisingh, D. and Nesbitt, W.B. (1974). Uptake by grape plants of preservatives from pressure-treated posts not detected. Forest Products J. 24: 97-98.

[9] Zhaobang, L., Haitao, S. and Linquing, L. (2003). Do CCA treated support stakes cause increased arsenic level in crops? Internat. Res. Group on Wood Pres. Document No. IRG/WP/03-50204.

[10] Read, D. (2003). Report on copper, chromium and arsenic (CCA) treated timber. Environmental Risk Management Authority (ERMA) New Zealand. http://www.ermanz.govt.nz/resources/publications/pdfs/cca-report.pdf

[11] APVMA (2005). Arsenic Technical Report. The Reconsideration of registrations of arsenic timber treatment products (CCA and arsenic trioxide) and their associated labels. Review Summary, http://www.apvma.gov.au/chemrev/arsenic_summary.pdf

restrictions do not apply to agriculture posts, although there will also be greater regulation of operations at the treatment plant.

For the current project, it was decided to examine one of the alternatives to CCA, alkaline copper quaternary (ACQ)[12]. Copper azole is another preservative that has potential for the treatment of vineyard posts[13,14]. Both preservatives lack arsenic and chromium, and it is expected that the treated timber will be easier to recycle. As in the stage 1 trial[7], PEC[15] was used as the preservative treatment for hardwood species. It is less suited for the treatment of softwoods, as the pigment can be screened out of solution by the finer wood structure of softwoods, and therefore cake upon the surface of treated softwood. In hardwoods, the pigment moves into and clogs vessels, reducing the release of creosote as crud or vapour from the wood surface. Vineyard posts are treated to H4 requirements[16], and each post or post bundle should carry a brand or stamp to indicate that the treater considers that they have met standard treatment.

H4 preservative treatments are normally expected to provide protection from decay and termite attack for 40-50 years. However, vineyard posts may not need this extent of protection, as they are usually replaced within 25 years of service due to other factors such as mechanical breakage during harvesting, or the redevelopment of vineyards as grape varieties or customer preferences change. There is an opportunity to design a treatment that is ‘fit for purpose’ in vineyard posts. Such a treatment would have the additional benefits of reduced preservative cost, lower environmental risk from chemicals, and reduced contamination in waste when redundant posts are recycled. As the different timber species examined in this project were likely to acquire a range of preservative retentions at the commercial treatment plants (which could not alter their bulk preservative concentrations according to the requirement of each species), the opportunity was taken to produce and install the resulting range of retentions in softwoods and hardwoods. Future long-term inspections of the trial will reveal which retentions give optimal performance as a vineyard post.

The ACQ commercial treatment plant was calibrated for softwoods (slash pine). Therefore, most hardwoods would gain retentions below H4 requirements. There are a number of additional advantages in exploring lower ACQ retentions for vineyard posts. Currently, ACQ is not a commercial alternative to CCA for H4 vineyard posts, due to its higher cost. ACQ competes with CCA more successfully at the H3 retentions. Also, posts with reduced ACQ retentions may be stronger (if ACQ, like CCA, reduces post strength), and cause less corrosion to fasteners. Because the PEC treatment plant was calibrated to spotted gum (*Corymbia maculata*), creosote treatments were likely to meet or exceed H4 minimum requirements in the remaining hardwoods.

Due to environmental concerns about preservatives, there is some interest in the use of naturally durable untreated posts, such as cypress pine (*Callitris glaucophylla*) and certain eucalypts. An important point to remember is that natural durability applies to the heartwood only. The sapwood of all species is considered non-durable, so is likely to decay in ground contact within a few years of installation. This problem can be exacerbated when the small end is driven into the soil, as that will be the location of maximum sapwood. Also, in a minority of species, the natural durability of heartwood in young trees may be less than in mature trees for which durability ratings were originally established[17]. Post strength requirements for untreated posts should be based upon heartwood diameter at the ground-line, rather than post diameter. Other materials may be also

---

[12] Archer, K. (2003). ACQ update. Proc. American Wood-Preservers’ Assoc. 99: 223-226.
[13] Kyzer, T. (2003). Update on copper azole. Proc. American Wood-Preservers’ Assoc. 99: 221-222.
[14] Snow, J., Mollah, M. and Cobham, P. (2000). Strength of Tanalith E, CCA and creosote treated Pinus radiata posts. 26th Forest Products Research Conf., Clayton, Victoria, p. 12.
[15] Greaves, H., Watkins, J.B. and Chin, C.W. (1986). PEC – a family of improved oil-based preservatives. Annual Convention of the British Wood Preserving Assoc., pp 57-64.
[16] Standards Australia. (2000). *Specification for Preservative Treatment. Part 1. Sawn and round timber*. AS 1604.1-2000. Standards Australia, Homebush, New South Wales.
[17] Johnson, G.C., Thornton, J.D. and Nguyen, N.-K. (1993). An accelerated field simulator study of the natural durability of heartwood from mature and regrowth trees. Proc. 24th Forest Products Research Conference, Clayton, Victoria, topic 2/21, 9 pp.

considered, although in one study 8% of plastic posts fractured or bowed, and almost 2% of the steel posts had moved due to wind gusts[18].

There are no Australian standards issued for vineyard posts. An Australian standard on power poles is useful for giving some of the terminology that could be applied to posts[19]. Some post manufacturers produce their own quality control manuals. For example, Auspine Limited produced an ISO 9002 Work Procedures Manual for vineyard posts manufactured from *P. radiata* species[20], which was used in this study to evaluate surface defects. This manual was prepared for softwoods, but in the absence of an alternative, was also used to assess hardwoods in the trial. Some of the key features are a limitation on knots, splits and checks. Splits need to be less than 8 mm, which may not greatly affect strength, but produces a gap that staples or attachments may not straddle. Also, checking may expose untreated heartwood, which could lead to an acceleration of internal decay. Sapwood thickness for H4 treated posts should be at least 10 mm, to provide 10 mm minimum penetration[16]. Even greater sapwood volumes of at least 50-60% may be preferable. While 100% sapwood is ideal for treatment, it is probably not necessary in vineyard posts, as greatest strength occurs in the outer perimeter of a post, so that some loss of the central core could be tolerated. Strength is important for in-line posts, as replacement costs may be $30-100 per post, due to the difficulties of working inside the row of an established vineyard. Strength should not be obtained by using larger diameter posts, as these would create a 'shadow' problem where the mechanical harvester fails to collect those grapes nearest the posts. A further consideration is the hardness of posts. Staples are relatively easy to drive into softwood posts. However, driving staples or other attachments into some of the hardwoods examined in the study required mechanical assistance or pre-drilling.

There have been some earlier studies examining the production of posts from eucalypts. CSIRO produced a leaflet in 1961 on the treatment of round fence posts using a variety of preservatives[21]. Some of these preservatives are no longer available for use in Australia (e.g. pentachlorophenol), or cannot be used in mobile treatment plants as today they must remain contained within a bunded facility (e.g. CCA).

McKimm[22] examined several plantation species irrigated with sewage effluent for the production of fence posts, while Cookson *et al*.[7] examined the suitability of irrigated plantations for vineyard posts. Irrigated plantations were favoured because they are more likely to be fast grown, and therefore contain straight trees with maximum sapwood. Nunes and Reimao examined *Eucalyptus globulus* posts from Portuguese plantations, and found that they were suitable for CCA treatment, with most penetration occurring in the longitudinal direction.[23]

One of the main problems encountered when producing posts from hardwood species is splitting. This project examined three air drying regimes to investigate the problem of splitting. The main method used for hardwoods was air drying under hessian, whereas softwoods were air dried without the use of hessian as they usually split less. For the hardwoods, some posts were also dried with bark-on, in an attempt to slow the drying process. Another set of posts had gang-nails attached before air drying, which is a common practice when seasoning hardwood poles. For softwoods, posts were dried in the open (without hessian), in the shade (by wrapping in shade cloth), or in the open but with a wax emulsion sealant applied to ends in place of the gang-nails. A recent study on

---

[18] Anon. (2000). Recycled plastic vineposts. Final report of Bohd Estate Vineyards to Ecorecycle Victoria waste minimisation support program.
http://www.ecorecycle.vic.gov.au/asset/1/upload/Recycled_Plastic_Vineposts_(2000).pdf

[19] Australian Standard (1994). AS 2209-1994 Timber – Poles for overhead lines.

[20] Auspine Limited, (1996): *ISO9002 Work Procedure Manual (controlled document)*. Auspine Limited, Kalangadoo, SA, Australia.

[21] CSIRO (1961). Round fence posts: their preservative treatment. CSIRO Leaflet No. 12, 25 pp.

[22] McKimm, R.J. (1984). Fence posts from young trees irrigated with sewage effluent. Aust. Forestry 47: 172-178.

[23] Nunes, L. and Reimao, D. (1989). A study on the pressure impregnation of *Eucalyptus globulus* fence posts with CCA preservatives (Part II). Internat. Res. Group on Wood Pres. Document No. IRG/WP/3514.

Eucalyptus muelleriana (yellow stringybark) posts showed that microwave conditioning will also aid seasoning[24]. This technique was examined in *E. grandis* and *E. globulus* posts.

RESULTS AND DISCUSSION

Harvest and debarking

Hardwoods

E. grandis: Trees of the required 75-100 mm diameter were abundant in the plantation at Griffith, NSW. Approximately 75% of trees in the plantation were sufficiently straight to yield vineyard trellis posts. Only a few branches on some posts needed to be removed prior to debarking. All posts needed little effort to remove the bark. The bark would readily spring from the stem when hit with the back of an axe, and could be peeled away by hand. The posts had an air dry density of about 610 kg/m^3.

***E. globulus*:** Trees of the required 75-100 mm diameter were generally difficult to find in the plantation from Kinglake West, Victoria. Therefore, a number of harvested trees were marginally above 100 mm in diameter. Finding straight trees was also a problem. About 80% of trees harvested had small kinks. Branching was abundant, and their removal added to the time needed to prepare posts for debarking. The posts were driven over by a two wheel drive tractor to loosen the bark, which markedly enhanced removal by hand. Contractors considered this method to be much faster than debarking by hand. They also believed that the process could be improved by using a four wheel drive tractor. The posts had an air dry density of about 660 kg/m^3.

***C. maculata*:** Plots from the Beerburrum-Gympie region in south-east Queensland provided plenty of trees having desirable properties as vineyard posts. All trees were straight and only a few of those harvested were above 100 mm in diameter. Removal of bark by hand immediately after harvest required minimal effort. The posts had an air dry density of about 940 kg/m^3.

***E. pilularis*:** Unfortunately, the plots from Beerburrum-Gympie were only able to provide about 30% of the required number of posts between 75 and 100 mm diameter. The average diameter of posts was 125 mm, with the largest being around 165 mm. All trees in the plantation were straight and therefore appeared suitable for the production of vineyard posts (trellis and strainer posts). The posts were not debarked immediately after harvest. Instead, they were transported back to the Queensland Department of Primary Industries and Fisheries (DPI&F) Salisbury depot, where they were debarked 10 days after harvest. Debarking was therefore much more difficult and time consuming than for the *C. maculata* posts that had been debarked on site immediately after harvest. The posts had an air dry density of about 680 kg/m^3.

***E. dunnii*:** Again, trees of the desired diameter were difficult to find with over half selected being above that required. All trees from the Dorrigo plantation in NSW were straight enough to be used as vineyard posts. Trees had been harvested previously during a period of prolonged drought, and furthermore were cut in summer due to bushfire prevention programs in the region. Under these harsh drying conditions, splitting began soon after harvesting. Posts were cut from the trees two months after felling, so had already seasoned to some extent. Tightly adhering bark and the use of a softwood head to mechanically debark the posts also caused some damage to posts. The posts had an air dry density of about 775 kg/m^3.

***E. cladocalyx*:** Trees of the required properties were easy to find in the plantation from Horsham, Victoria (Figure 1). Almost all trees were straight and those cut were in the 75-100 mm diameter range. Debarking by hand was quick when performed directly after harvest. Some posts were

[24] Torgovnikov, G and Vinden, P. (2000). Microwave modification of yellow stringybark (*Eucalyptus muelleriana*) posts for impregnation with copper-chrom-arsenic (CCA) preservatives. Internat. Res. Group on Wood Pres. Document No. IRG/WP/00-40185.

debarked a few days after being cut and these were more difficult by comparison. The posts had an air dry density of about 935 kg/m^3.

Figure 1: Harvest of *E. cladocalyx* posts at Horsham

***A. mearnsii*:** Approximately 40% of the trees in the natural regrowth stand at Towamba near Eden, NSW had the required properties for vineyard posts. A shortfall of posts in the 75-100 mm diameter led to about 20% of the posts being oversize. More than one post was obtained from 10% of the trees cut. Around 20% of posts had bends and kinks. Debarking by hand was relatively easy. The posts had an air dry density of about 865 kg/m^3.

Softwoods

***P. elliottii*:** All trees in the plantation from Beerburrum, south-east Queensland had the properties required for vineyard posts. Harvested posts were straight and all were within the specified diameter range. Mechanical debarking was quick and caused no damage to posts. The posts had an air dry density of about 625 kg/m^3.

***A. cunninghamii*:** The plantation from south-east Queensland provided around 80% of trees with suitable properties for vineyard posts. Of the trees cut, all were straight, and a few were slightly above the maximum diameter of 100 mm. Mechanical debarking used for *P. elliottii* caused excessive damage in some posts, which were rejected. About 10% of the posts included in the study had slight damage from the debarking process. The posts had an air dry density of about 560 kg/m^3.

P. radiata: The *P. radiata* posts were selected from the yard of a commercial treatment plant in Timboon, southwest Victoria. The posts had been cambio-debarked and seasoned by air drying (similar to the other species in the trial). The posts had an air dry density of about 490 kg/m^3.

Seasoning

Posts were air dried in cross-stacks according to one of three different regimes. For hardwoods, posts were dried either under hessian, with ends gang-nailed and under hessian, or with bark-on and under hessian. For softwoods, all posts were debarked and then air dried in the open, in the open with ends sealed, or in the shade produced by wrapping in shade cloth. Qualitative notes are presented on the appearance of the posts, before preservative treatment. Detailed quantitative evaluation of surface defects and splitting is presented in a later section, on samples of treated posts (Table 14).

Hardwoods

***E. grandis*:** All posts from the 'debarked only', 'debarked only + gang-nail' and 'bark-on' drying methods were in good to excellent condition. Little or no splitting on the ends or internal checking was noticeable. For this species, it would not be necessary to gang-nail the ends or leave the bark-on to reduce splitting. For posts dried with bark-on, removal of bark by hand after 12 months drying was quick as most of the bark had already come away from the post. Minor borer damage was noticeable on most posts dried with the bark-on. All 440 posts were straight and of ideal appearance for use as vineyard posts.

Posts that were microwave conditioned were also in good order. No internal checking was evident and only a few posts had fine end-splits. No improvement in appearance or split reduction was discernable, because posts dried by the other regimes were already in good condition.

***E. globulus*:** Over 50% of posts from the 'debarked only' drying method had large end-splits and internal checks. The remainder of the 'debarked only' posts had some degree of splitting and checking. In contrast, splitting was less severe in posts dried with gang-nails attached. Only a few of the 100 gang-nailed posts had developed large end-splits and checking, while smaller splits and checks were noticeable in the remainder. Posts dried with bark-on were similar in appearance to the 'debarked only' posts, as large end-splits and internal checks were evident in 30% of the posts. Borer attack was present in all posts dried with bark-on, and bark removal after seasoning was difficult. A large proportion of *E. globulus* posts had bends and kinks that may make them unsuitable for commercial use.

A marked improvement in appearance was achieved by microwave conditioning, as end-splitting and checking was reduced. This result occurred, even though some of the posts had been peeled to a smaller diameter to fit the microwave pilot plant.

***C. maculata*:** Posts of this species were mostly in excellent condition. No end-splitting or internal checking was noticeable on any posts from the 'debarked only' (Figure 2) and 'debarked only + gang-nail' methods. Some end-splitting was evident in bark-on posts, although not sufficient to reject them as posts. Debarking of posts dried with the bark-on required considerable effort and was slow. Some bark-on posts also had noticeable borer attack. All posts were straight and suitable for use as trellis posts.

***E. pilularis*:** All posts had significant end-splitting and checking. A few of the larger diameter posts from the 'debarked only' drying method also had collapse splitting. A moderate reduction in the size of end-splitting was noticeable in posts with gang-nails. Drying with bark-on did not reduce splitting and checking. Removal of bark from posts with bark-on was also time consuming. The bark was spongy and absorbed any impact from the back of an axe, making it difficult to remove. Borer attack was present on all posts dried with the bark-on. Posts were straight, and those oversized as trellis posts, were of a size suitable for strainer posts. Grant and Bohringer found that small diameter poles of *E. pilularis* and *E. agglomerata* (blue leaved stringybark) had less checking when stacks were dried under shade-cloth than in direct sunlight. They considered drying under shade-cloth to be a commercially viable practice.[25]

[25] Grant, D. and Bohringer, P. (1998). Pole production from NSW juvenile eucalypt resource, procurement, seasoning, grading, manufacture, treatment and in-grade testing. Forest & Wood Products Research & Development Corporation, Melbourne, 25 pp.

Figure 2: Air dried and untreated *C. maculata* posts

***E. dunnii*:** There were insufficient samples to test the bark-on drying method with *E. dunnii*. More than half of the posts dried under hessian developed large splits along the full length, and the remainder had a small amount of splitting and checking. Most of the splits exceeded the 8 mm allowable width as outlined in the Auspine Work Procedures Manual[20]. A slight decrease in splitting occurred in posts with gang-nails attached at the ends. It should be noted that *E. dunnii* was not harvested under ideal conditions, as posts were docked and debarked two months after felling. More rapid conversion after harvesting may improve the performance of this species.

***E. cladocalyx*:** All posts were in excellent condition with no splitting or checking noticeable from any of the drying methods. Posts were straight and seemed ideally suited for vineyard trellising. Most of the bark had fallen off the posts from the 'bark-on' drying method, and minimal effort was required to remove any bark still attached. However, borer attack was evident on all posts dried with bark-on (Figure 3).

Figure 3: Borer attack (Cerambycidae or longicorn beetle) in *E. cladocalyx* posts dried with bark-on

***A. mearnsii*:** Large splits were found along the full length of 40% of the posts dried using the 'debarked only' method (Figure 4). Split size was similar to that developed in the *E. dunnii* posts. The remaining posts had some degree of checking and splitting. Gang-nailing reduced splitting to some extent. Bark-on posts also had large splits along their length. Furthermore, removal of bark from seasoned bark-on posts was the most time consuming of all species. The bark would not spring when hit and most removal was performed by peeling the bark with a knife. Borer attack was noticeable on most bark-on posts. The majority of posts were straight and could be used as trellis posts.

Figure 4: Large splits in *A. mearnsii* posts

Softwoods

***P. elliottii*:** All posts from each of the three drying methods: in the open (Figure 5); in the shade (wrapped in shade cloth); and in the open and end-sealed, were in excellent condition. Only a few very fine splits were present on the surface of a few posts. All posts were straight and suitable in appearance for use as vineyard posts.

Figure 5: Debarked *P. elliottii* posts left to dry in the open

***A. cunninghamii*:** Once again, posts were in excellent condition regardless of the drying method employed. A few posts that were not end-sealed had developed some small end-splitting. All posts appeared ideal for use in vineyard trellising.

Microwave drying

During preliminary tests, it was found that the conveyor applicator (vector E perpendicular to wood grain) provided more uniform distribution of voids (checks) through the posts than the box applicator (vector E parallel to the grain) (Figure 6). Therefore, the conveyor applicator was used to produce microwave (MW) conditioned posts for preservative treatment.

Figure 6: *E. globulus* post after modification using the conveyor applicator, showing uniformity of small checks. A few larger perimeter splits also developed in some posts.

Visual examination also showed that there was little difference between *E. grandis* and *E. globulus* in the degree of modification (induced checking). Previous studies have shown that moisture content is one of the most important factors influencing MW wood processing[26,27]. The initial moisture content (MC) of both *E. globulus* and *E. grandis* was 98% to 107% MC. MW conditioning reduced the MC of *E. globulus* by 45-57% and *E. grandis* by 59-62%. After microwave conditioning, the posts had slight checks visible on the surfaces.

The temperature profile that developed in posts was examined in stationary samples using 16 fibre-optic sensors. Maximum interaction between the MW and wood occurred 300 mm from the post end, corresponding to the centre of the wave-guide bend from the perpendicular applicator. Figure 7 shows that peak temperature and energy absorption occurred at this 300 mm location. Indeed, 72% of energy was absorbed in the 200 to 400 mm zone, with the remaining 28% absorbed in the 0-200 mm plus 400-800 mm regions.

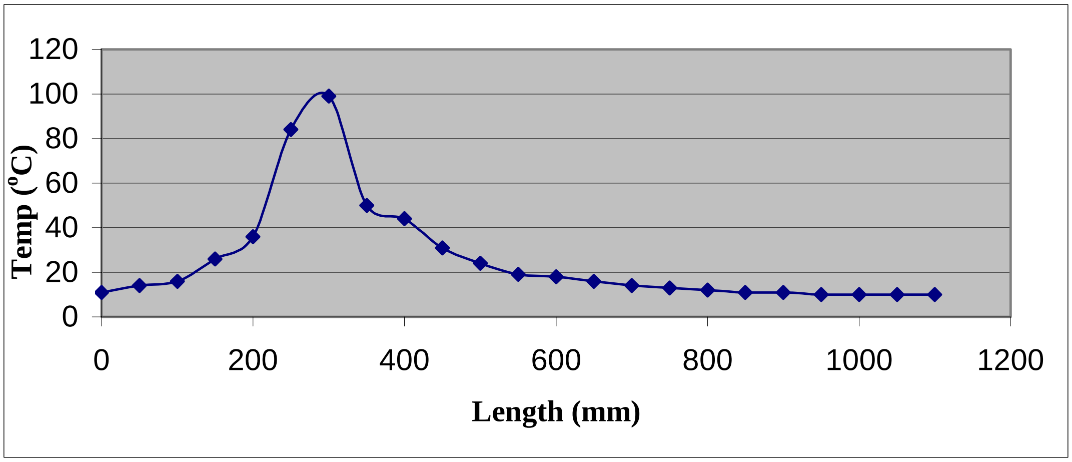


Figure 7: Temperature profile (energy absorption) in the centre of an *E. globulus* post held stationary within the conveyor applicator.

The shape of the curve showing microwave energy release (or energy absorbed by the timber) using the conveyor applicator (Figure 8) is derived using the temperature distribution data, and as a result is similar to the curve of the temperature profile. Most of the applied energy, 72%, was absorbed in the 200-400 mm zone. The 20% of energy corresponding to the zone after 400 mm is used to preheat the post. The remaining 8% of energy, which corresponds to the first 200 mm, is essentially "loss", as this energy is used in drying the post after modification has occurred. The design of the applicator is responsible for the skewed distribution observed. Use of the box applicator would result in a normal curve for the energy distribution with a higher corresponding amount of "loss".

[26] Birukov, V.A (1961) Process of Dielectric Heating and Drying of Wood, Goslesbumizat. Moscow (in Russian)

[27] Netushila, A.V. (1950) Radiofrequency Heating of Dielectrics and Semiconductors, State Energy Publisher. Moscow (in Russian)

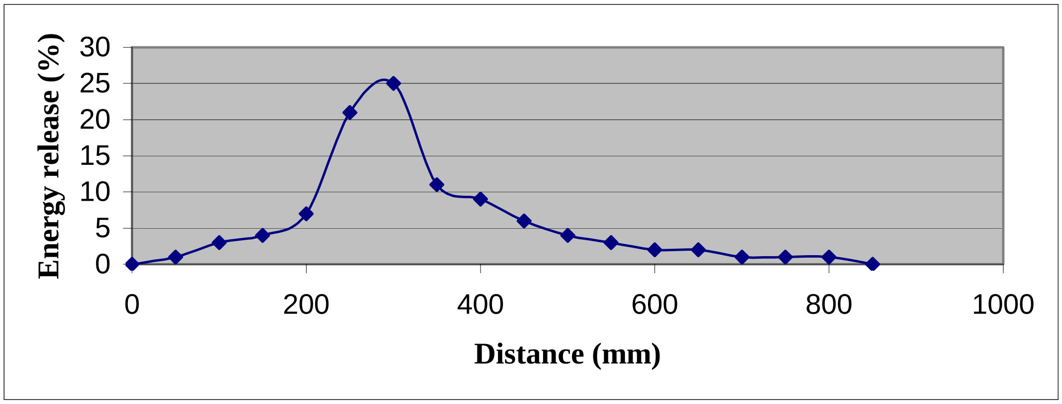


Figure 8: Profile of microwave energy released to a stationary post in the conveyor applicator (as a percentage of total MW power supplied)

A method for reducing the energy cost is to use the steam released from the wood during MW modification, and using it to preheat other posts prior to MW processing.

Electricity costs for MW modification of the posts were about 170 kW-h/m^3. By including the cost of electricity ($0.04-0.12/kW-h), labour, depreciation and maintenance costs, MW treatment would cost $27 to $53/$m^3$, or for one post $0.40 to $0.79 (assuming 67.5 posts/m^3, for posts less than 90 mm diameter).

Preservative treatment

PEC treatment

Creosote retention was determined by weighing rather than chemical analysis, following advice from the industry collaborator, Koppers Timber Preservation. It suggested that the method specified in the Australian Standard AS 1605-2000[28] could give rise to variable results, as some natural extractives in the wood can be analysed as creosote.

Sighter treatment

Twenty 'sighter' posts of each hardwood species were placed in the same 'H5' treatment charge to gain an indication of preservative uptake, as a guide to further treatment. The sapwood/heartwood boundary for the microwave conditioned posts could not be determined, as the ends had been painted. In addition, the boundary for *E. dunnii* was not clear. Therefore, the treatable volume percentage of the debarked only posts from the main test material (Table 2) was used to calculate retentions for the sighters. The mean preservative retentions of PEC, and their high temperature creosote (HTC) equivalents, for each species of sighter posts are presented in Table 1.

[28] Standards Australia. (2000). Methods for sampling and analysing timber preservatives and preservative-treated timber. AS/NZS 1605-2000. Standards Australia, Strathfield, New South Wales.

Table 1: PEC and ≡ HTC retentions in 'sighter' posts. Mean of 20 replicates.

Species	Sapwood volume (%)	Treatable volume (m^3)	Pick up (kg)	PEC retention (kg/m^3)	≡HTC retention (kg/m^3)	≡HTC* retention (% m/m)
E. grandis	56.3	0.0075	4.62	643	418	78
E. grandis (microwave)	45.4+	0.0068	3.78	558	363	72
E. globulus	73.1	0.0109	4.90	458	298	52
E. globulus (microwave)	51.8+	0.0077	4.44	580	376	64
C. maculata	66.7	0.0110	1.94	193	125	17
E. pilularis	52.4	0.0113	4.10	383	249	51
E. dunnii	69.1+	0.0155	4.86	314	204	31
E. cladocalyx	43.9	0.0073	1.60	237	154	19
A. mearnsii	59.5	0.0112	2.47	223	144	22

+ % sapwood volume taken from debarked only posts of the main test material.

* Calculated from mean air dry density and HTC retention in kg/m^3.

The mean PEC retention from 20 sighter posts in an 'H5' schedule ranged from 193 kg/m^3 for *C. maculata* to 643 kg/m^3 for *E. grandis*. As the mean uptakes varied considerably, two different treatment schedules were used to treat the remaining 'debarked only' and 'debarked + gang-nailed' posts. *E. grandis*, *E. globulus*, *E. dunnii* and *E. pilularis* were treated using an 'H4' schedule. The remaining species were treated using the same schedule as the sighters (H5).

Treatment of main test material

During the treatment of the main body of test posts, 30 posts from each post type were measured for sapwood volume and weighed for preservative uptake. These posts were also later used for strength testing and the determination of preservative penetration. The mean preservative retentions of PEC and their HTC equivalents for the 'debarked only' and 'debarked + gang-nailed' posts are presented in Tables 2 and 3 respectively.

Table 2: PEC and ≡ HTC retentions in 'debarked only' posts. Mean of 30 replicates.

Species	Treatable volume (%)	Treatable volume (m^3)	Pick up (kg)	PEC retention (kg/m^3)	≡HTC retention (kg/m^3)	≡HTC* retention (% m/m)
E. grandis	52.3	0.0067	3.88	597	388	73
E. grandis (microwave)	45.4	0.0056	2.98	558	363	72
E. globulus	62.1	0.0099	4.14	432	281	49
E. globulus (microwave)	51.8	0.0056	3.13	580	377	65
C. maculata	63.6	0.0092	2.07	229	149	18
E. pilularis	42.0	0.0099	3.31	361	235	43
E. dunnii	69.1	0.0154	4.45	314	204	31
E. cladocalyx	27.9	0.0047	1.29	286	186	23
A. mearnsii	73.4	0.0107	2.56	240	73	21

*Calculated from mean air dry density and HTC retention in kg/m^3.

Table 3: PEC and ≡ HTC retentions in 'debarked + gang-nailed' posts. Mean of 30 replicates.

Species	Treatable volume (%)	Treatable volume (m^3)	Pick up (kg)	PEC retention (kg/m^3)	≡HTC retention (kg/m^3)	≡HTC* retention (% m/m)
E. grandis	53.8	0.0078	4.77	603	392	75
E. globulus	47.5	0.0089	4.20	529	344	58
C. maculata	69.6	0.0101	2.16	202	131	16
E. pilularis	41.2	0.0082	3.39	426	277	41
E. dunnii	74.3	0.0147	4.61	322	209	33
E. cladocalyx	39.0	0.0063	1.45	238	154	19
A. mearnsii	72.2	0.0114	3.11	279	181	27

*Calculated from mean air dry density and HTC retention in kg/m^3.

There was little difference in retention between the two drying methods of the same species. The mean HTC retention with or without gang nails was respectively 75% and 73% m/m for *E. grandis*, 58% and 49% m/m for *E. globulus*, 16% and 18% m/m for *C. maculata*, 41% and 43% m/m for *E. pilularis*, 33% and 31% m/m for *E. dunnii*, 19% and 23% m/m for *E. cladocalyx*, and 27% and 21% m/m for *A. mearnsii*.

The treatment requirement for PEC-treated hardwoods in H4 exposure (outside in-ground) as specified in Australian Standard AS 1604.1-2000[16] is 10% m/m HTC minimum in the treated (sapwood) zone. The standard also requires that when a sample of ten posts is taken for analysis, all should contain this minimum preservative retention. Indeed, *E. grandis*, *E. globulus*, *E. dunnii* and *E. pilularis* exceeded the requirement, with no clear reduction in retention resulting from the H4 treatment schedule, compared to the H5 schedule used for the sighter posts (Table 1). Furthermore, there was no clear difference in retention in *E. grandis* posts from either drying method or from microwave conditioning. It appears that *E. grandis* posts were highly permeable, irrespective of the variations explored. *P. radiata* posts are usually treated with creosote using a Lowry schedule (empty cell treatment), to reduce creosote absorption. A similar schedule may suit *E. grandis* posts. In contrast, microwave conditioned *E. globulus* posts had higher mean HTC retentions (65% m/m) than 'debarked only' (49% m/m) and 'debarked + gang-nailed' (58% m/m) posts.

The species yielding lower creosote retentions were *C. maculata*, *E. cladocalyx* and *A. mearnsii*, although almost all treated posts still met H4 minimum requirements. The exception was one *C. maculata* post from the 'debarked only' drying regime. This post contained 9.3% m/m HTC, so its inclusion in a commercial bundle of posts would be of minor concern.

Posts dried with the bark-on were treated four months after the above-mentioned posts. This treatment was done at a time when the only creosote available at the commercial plant was a creosote plus oil mixture used for certain export poles. Posts from each species were included in the same treatment charge, which was subjected to an 'H5' schedule. The mean preservative retentions of creosote + oil and their HTC equivalents (i.e., excluding oil component) for posts dried with the bark-on are presented in Table 4.

Table 4: HTC retentions in 'bark-on' posts. Mean of 30 replicates.

Species	Treatable volume (%)	Treatable volume (m^3)	Pick up (kg)	Creosote retention (kg/m^3)	≡HTC retention (kg/m^3)	≡HTC* retention (% m/m)
E. grandis	83.8	0.0103	4.53	441	309	59
E. globulus	93.0	0.0183	8.65	471	330	60
C. maculata	67.4	0.0101	1.51	148	104	15
E. pilularis	54.5	0.0120	2.72	228	159	32
E. cladocalyx	39.3	0.0061	1.35	226	158	19
A. mearnsii	67.0	0.0118	2.01	180	126	18

*Calculated from mean air dry density and HTC retention in kg/m^3.

All bark-on posts were treated using the H5 schedule. When comparing the mean retentions achieved in bark-on posts using the H5 schedule, with debarked only posts treated using the H4 schedule, the retentions were 59% and 73% m/m respectively for *E. grandis*, 60% and 49% m/m for *E. globulus*, and 32% and 43% m/m for *E. pilularis*. Clearly, no consistent trend appeared, so did not confirm the expectation that there would be higher retentions in posts treated using the H5 schedule. The other more difficult to treat species (*C. maculata*, *E. cladocalyx* and *A. mearnsii*) had mean retentions that were more similar, whether posts were debarked only or had bark-on, as all were treated similarly using the H5 schedule. The mean creosote retentions of all species were above the minimum requirement of 10% m/m. However, five *C. maculata* and two *A. mearnsii* posts from the 30 sampled were below the minimum requirement. A slightly extended treatment schedule may be necessary in the commercial treatment of these species using creosote + oil for bark-on posts.

Figure 9 shows the equivalent HTC comparison between the different drying methods of PEC and creosote + oil-treated posts.

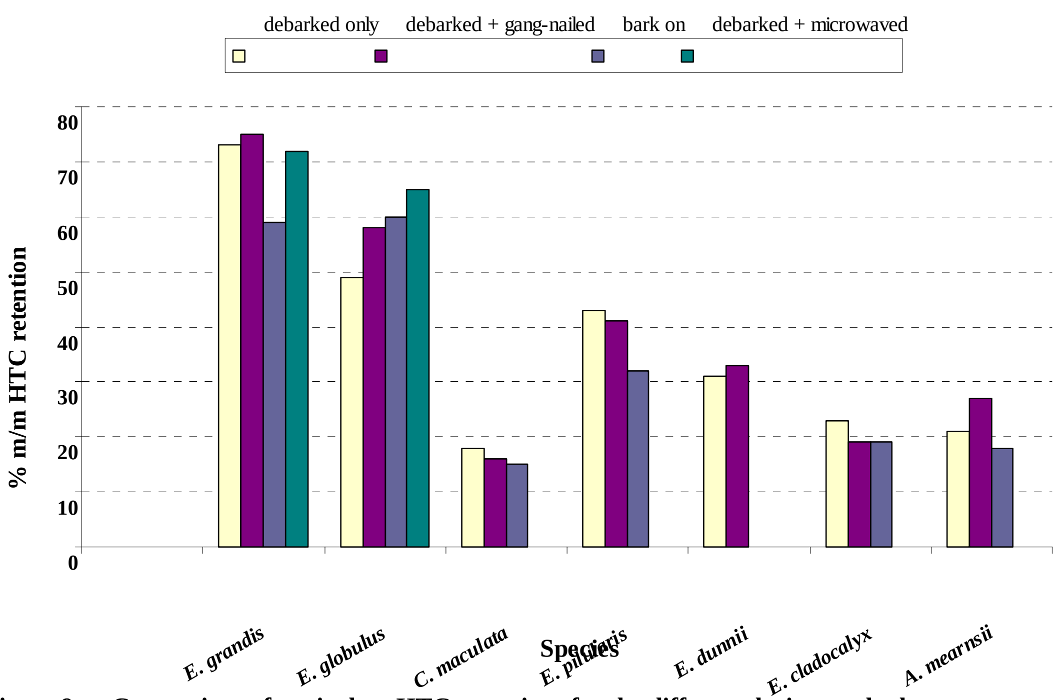


Figure 9: Comparison of equivalent HTC retentions for the different drying methods

Surface quality and penetration in test material

The surface condition of each PEC-treated post, after air-drying for three months in the Koppers yard at Grafton, appeared relatively dry, with little or no greasiness (Figure 10). No bleeding of exudate from the end grain or from checks or splits could be found on the posts. In contrast, most posts that had been treated with the creosote + oil were greasy on the surface and exudate was readily seen bleeding from the end grain and along splits and checks.

Figure 10: PEC-treated posts after three months air-drying

Cutting of PEC and creosote + oil-treated timber will mobilise the preservative. Therefore, it was important that penetration and distribution was recorded immediately after cutting each post. If not done instantly, smearing and bleeding on the cut surface can give an incorrect visual impression.

The penetration requirement in Australian Standard AS 1604.1-2000[16] for H4 states that if the species of timber used is of natural durability class 1 or 2, the preservative shall penetrate all sapwood. If the species of timber is class 3 or 4, the preservative shall penetrate all sapwood and the penetration shall be not less than 10 mm from the surface. Table 5 shows the number of PEC and creosote + oil-treated posts meeting the penetration requirement for all drying methods.

Table 5: No. of PEC and creosote + oil-treated posts (out of a possible 30) meeting penetration requirements.

Species	Natural durability class of heartwood	Debarked only	Microwave	Gang-nail	Bark-on
E. grandis	3	30	30	30	30
E. globulus	3	30	30	30	30
C. maculata	2	30		28	29
E. pilularis	2	30		30	30
E. dunnii	4	30		30	
E. cladocalyx	1	29		29	30
A. mearnsii	Unknown	28		27	28

The results show that with the exception of only a few posts from the more difficult to treat species of *C. maculata*, *E. cladocalyx* and *A. mearnsii*, all sapwood was treated and where necessary the penetration was more than 10 mm from the surface (Figure 11). There appeared to be no distinct difference in the macro-distribution of PEC and creosote + oil between each timber species.

On a smaller scale, posts could be treated with HTC using the hot and cold bath process. Brennan *et al*. found that *E. globulus* posts required up to three hot and cold bath cycles to meet the minimum retention of 10% m/m creosote.[29] Hot and cold bath treatment using PEC was less successful due to a breakdown of the emulsion system under the treatment conditions employed.

Figure 11: Full sapwood penetration of PEC in debarked only *A. mearnsii* posts

ACQ treatment

Sighter treatment

The mean preservative absorptions for each species of sighter posts are presented in Table 6. The treatment schedule used was typical for the commercial treatment of Queensland softwoods.

Table 6: ACQ absorptions in 'sighter' posts. Mean of 20 replicates.

Species	Treatable volume (m^3)	Pick up (kg)	ACQ absorption* (L/m^3)
E. grandis	0.013	6.15	489
E. globulus	0.022	9.25	392
C. maculata	0.013	2.97	167
E. pilularis	0.014	4.47	333
E. dunnii	0.017	7.39	491
E. cladocalyx	0.008	1.56	200
A. mearnsii	0.012	2.21	178
P. elliottii	0.017	9.69	560
A. cunninghamii	0.021	6.80	327
P. radiata	0.019	12.94	589

*Assumes 1 kg of treating solution = 1 Litre

P. elliottii and *P. radiata* are species known to be well suited to preservative treatment, as was demonstrated by the mean ACQ treatment solution absorptions of 560 and 589 L/m^3 respectively. However, absorption in *A. cunninghamii* was low, and was later found to be due to an inability to treat some of the sapwood of this species, due to 'wet patches'.

---

[29] Brennan, G.K., Pitcher, J.A. and Watkins, J.B. (1996). Treating four-year-old Tasmanian blue gum posts with pigment emulsified creosote. CALM Science 2: 119-128.

The mean absorptions in the hardwood species were consistent with the PEC uptakes discussed earlier. Again, *E. grandis, E. globulus, E. pilularis* and *E. dunnii* had the greatest uptakes, and *C. maculata*, *E. cladocalyx* and *A. mearnsii* the lowest.

Treatment of main test material

After air-drying for three months, the appearance of all ACQ-treated posts was excellent in terms of being dry and easy to handle (Figure 12).

Figure 12: ACQ-treated *P. elliottii* posts after three months air-drying

The determination of sapwood in some species was difficult when the indicator (Dimethyl Orange for hardwoods, and Variamine Blue RT for softwoods) used did not give a clear reaction. No reading could be determined accurately in *E. globulus* posts due to a lack of colour differentiation of the heartwood/sapwood boundary. The percentage sapwood volume for all the drying methods in ACQ-treated posts is presented in Table 7.

Table 7: Percentage sapwood volume in ACQ-treated posts. Mean of 20 replicates.

Species	Debark only	Micro wave	Gang-nail	Bark-on	Dry in open	End-seal	Dry in shade
E. grandis	91	100	94	95			
E. globulus	N/A	N/A	N/A	N/A			
C. maculata	70		76	88			
E. pilularis	51		38	65			
E. dunnii	79		89				
E. cladocalyx	48		48	46			
A. mearnsii	86		77	67			
P. elliottii					98	97	97
A. cunninghamii					86	92	55
P. radiata					99		

N/A – not available

The active ingredients in the ACQ used were copper and didecyldimethylammonium chloride (DDAC). Both actives were analysed and added together to give the total active elements (TAE). The treatment requirement for ACQ-treated hardwoods and softwoods as specified in the Timber Utilisation and Marketing Act (TUMA)[30] and Australian Standard AS 1604.1-2000[16] for H4 is 0.98 and 0.89% m/m TAE respectively, and 0.39 and 0.35% m/m respectively for H3.

The mean TAE analyses in ACQ-treated debarked only posts are presented in Table 8. Posts from softwood species had been dried in the open. The number of posts, out of 20 replicates, meeting each hazard class treatment requirement is also provided. Results for individual posts are shown in Appendix B.

Table 8: TAE analysis in ACQ-treated debarked only posts. Mean of 20 replicates.

Species	% m/m Cu	% m/m DDAC	% m/m TAE	Air dry density kg/m³	No. meeting hazard level requirement (out of 20)		
					H5	H4	H3
Softwoods							
P. radiata	0.952	0.653	1.61	490	18	20	20
*A. cunninghamii**	0.862	0.515	1.38	560	7	19	19
P. elliottii	0.531	0.282	0.81	625	0	6	20
Hardwoods							
E. grandis (microwave)	0.713	0.501	1.21	575	0	19	20
E. grandis	0.608	0.315	0.92	610	0	7	20
E. globulus	0.521	0.342	0.86	660	0	1	20
E. globulus (microwave)	0.513	0.337	0.85	665	0	3	19
E. pilularis	0.428	0.234	0.66	680	0	2	17
E. dunnii	0.396	0.227	0.62	775	0	0	20
E. cladocalyx	0.218	0.164	0.38	935	0	0	8
A. mearnsii	0.201	0.139	0.34	865	0	0	3
C. maculata	0.169	0.104	0.27	940	0	0	0

*19 replicates, of which 10 had failed the penetration requirement (of full sapwood treatment)

The commercial ACQ treatment plant available for this research had its ACQ treatment solution concentration calibrated to H4 softwood treatments. Therefore, both *A. cunninghamii* and *P. radiata* posts (dried in the open) were treated to H4 requirements, with some *A. cunninghamii* and most *P. radiata* posts also reaching H5 minimum requirements. The *P. elliottii* treatment proved to be just under the H4 requirement of 0.89% m/m, with a mean retention of 0.81% m/m. For softwoods, a trend occurred where higher retentions were found in those species with lower air dry densities (Table 8).

It was expected that most hardwoods treated using softwood ACQ solution concentrations would have lower ACQ retentions. As changing such a large volume of ACQ treating solution at the plant for this project was not possible, the focus of interest for the ACQ hardwood treatments became the comparison of retentions achieved between species, and the possibility of identifying the ACQ retention that will give optimal service life and performance to vineyard posts.

The hardwoods also followed the trend where species with increasing air dry density resulted in lower ACQ retentions (Table 8). The most treatable hardwood was microwave conditioned *E. grandis*, with a mean retention of 1.21% m/m and most posts meeting H4 requirements (Table 8).

[30] Timber Utilisation and Marketing Act of Queensland (1987)

In comparison, the second most treatable post was the same species but air-dried, with a mean ACQ retention of 0.92% m/m. *E. globulus* could also be treated close to the H4 requirement of 0.98% m/m at the softwood treatment plant, with little difference between mean retentions for microwave conditioned (0.85% m/m) and air-dried (0.86% m/m) posts. *E. pilularis* and *E. dunnii* posts mainly met H3 retention requirements, with mean retentions of 0.66 and 0.62% m/m respectively. *E. cladocalyx* and *A. mearnsii* were treated close to but just under H3 requirements (0.39% m/m), with mean retentions of 0.38 and 0.34% m/m respectively. *C. maculata* was most difficult to treat, with the lowest mean retention of 0.27% m/m. While these later retentions are low, it should be remembered that *E. cladocalyx* and *C. maculata* have naturally durable heartwood (classes 1 and 2 respectively), in mature trees at least, so that a reasonable service life may still occur in these heartwood-containing posts.

Table 9: TAE analysis in ACQ-treated 'debarked + gang-nailed' posts. Mean of 20 replicates.

Species	% m/m Cu	% m/m DDAC	% m/m TAE	No. meeting hazard level requirement		
				H5	H4	H3
E. grandis	0.605	0.322	0.93	0	9	20
E. globulus	0.482	0.310	0.79	0	2	20
C. maculata	0.166	0.086	0.25	0	0	0
E. pilularis	0.289	0.193	0.48	0	0	15
E. dunnii	0.457	0.250	0.71	0	0	20
E. cladocalyx	0.256	0.090	0.35	0	0	2
A. mearnsii	0.150	0.103	0.25	0	0	0

Gang-nails were used on hardwood posts, with the aim of reducing end splits. Gang-nails were not expected to have much impact on preservative treatment, and in other regards, these posts were processed similarly to the debarked only posts mentioned above. Again, *E. grandis* and *E. globulus* were the most treatable of the hardwoods, with mean ACQ retentions of 0.93 and 0.79% m/m respectively (compared to 0.92 and 0.86% m/m for debarked only posts). Most *E. pilularis* and *E. dunnii* posts met H3 requirements, while *C. maculata*, *E. cladocalyx* and *A. mearnsii* were most difficult to treat.

The mean TAE analyses for ACQ-treated bark-on posts and the number of posts meeting hazard level requirements (out of a possible 20) are presented in Table 10.

Table 10: TAE analysis in ACQ-treated 'bark-on' hardwood posts. Mean of 20 replicates.

Species	% m/m Cu	% m/m DDAC	% m/m TAE	No. meeting hazard level requirement		
				H5	H4	H3
E. grandis	0.654	0.350	1.00	1	11	20
E. globulus	0.590	0.337	0.93	0	7	20
C. maculata	0.243	0.177	0.42	0	0	13
E. pilularis	0.423	0.253	0.68	0	0	20
E. cladocalyx	0.277	0.152	0.43	0	0	15
A. mearnsii	0.142	0.069	0.21	0	0	0

Seasoning posts with bark-on was expected to affect seasoning, but could also affect the amount of biological degrade suffered by posts prior to treatment. ACQ retentions tended to be higher in most species seasoned with bark-on. Greatest difference was found in *C. maculata*, as the mean retention was 0.42% m/m compared to debarked only posts with 0.27% m/m and gang-nailed posts with 0.25% m/m ACQ. This small increase for bark-on posts was sufficient to bring 13 posts into H3 treatment specifications, compared with zero for the other two seasoning methods. Leaving bark-on resulted in increased borer attack, and possibly a higher level of microbial activity, and both factors could make more pathways open to chemical impregnation in the attacked regions of the timber.

The mean TAE analyses for ACQ-treated 'end-sealed' and 'dried in shade' (= wrapped in shade cloth) softwood posts, and the number of posts meeting hazard level requirements (out of a possible 20) are presented in Table 11.

Table 11: TAE analysis in ACQ-treated softwood posts. Mean of 20 replicates.

Species	% m/m Cu	% m/m DDAC	% m/m TAE	No. passing penetration requirement	No. meeting hazard level requirement for retention		
					H5	H4	H3
P. elliottii (dried in open)	0.531	0.282	0.81	20	0	6	20
P. elliottii (end-sealed)	0.482	0.281	0.76	20	0	2	20
P. elliottii (dried in shade)	0.589	0.312	0.90	20	0	11	20
A. cunninghamii (dried in open)	0.862	0.515	1.38	9 (out of 19)	7	19	19
A. cunninghamii (end-sealed)	0.935	0.572	1.51	16	14	20	20
A. cunninghamii (dried in shade)*	0.497	0.371	0.87	2	0	10	20

*All but two failed the penetration (full sapwood) requirement, and the mean sapwood penetration achieved was 74%.

P. elliottii posts that were end-sealed (to reduce splitting) while air drying in the open, had a mean ACQ retention of 0.76% m/m, compared to 0.81% m/m for those not end-sealed (Table 11). The difference is minor, although end-sealing may have inhibited end grain penetration (without affecting penetration from the side-grain or rays). *P. elliottii* dried in the shade had a mean ACQ retention of 0.90% m/m, which was also similar to the afore-mentioned mean retentions. The H4 ACQ retention requirement in the penetrated zone was met by all of the *A. cunninghamii* posts dried in the open (mean of 1.38% m/m) and dried in the open with ends sealed (mean of 1.51% m/m). However, 14 of these posts (10 dried in the open, and 4 end-sealed) failed to achieve the requirement of full sapwood penetration (Table 11). Similar posts dried in the shade were even more difficult to treat, with only ten posts meeting H4 requirements in the penetrated zone (mean of 0.87% m/m), and only two posts meeting full sapwood penetration requirements. Hoop pine is known to cause preservative penetration problems due to 'wet patches' that can remain even in seasoned samples. Drying posts in the shade appears to have exacerbated this problem, by extending the proportion of wet patches that could not be penetrated.

Figure 13 shows a comparison between the drying methods for each of the species treated with ACQ.

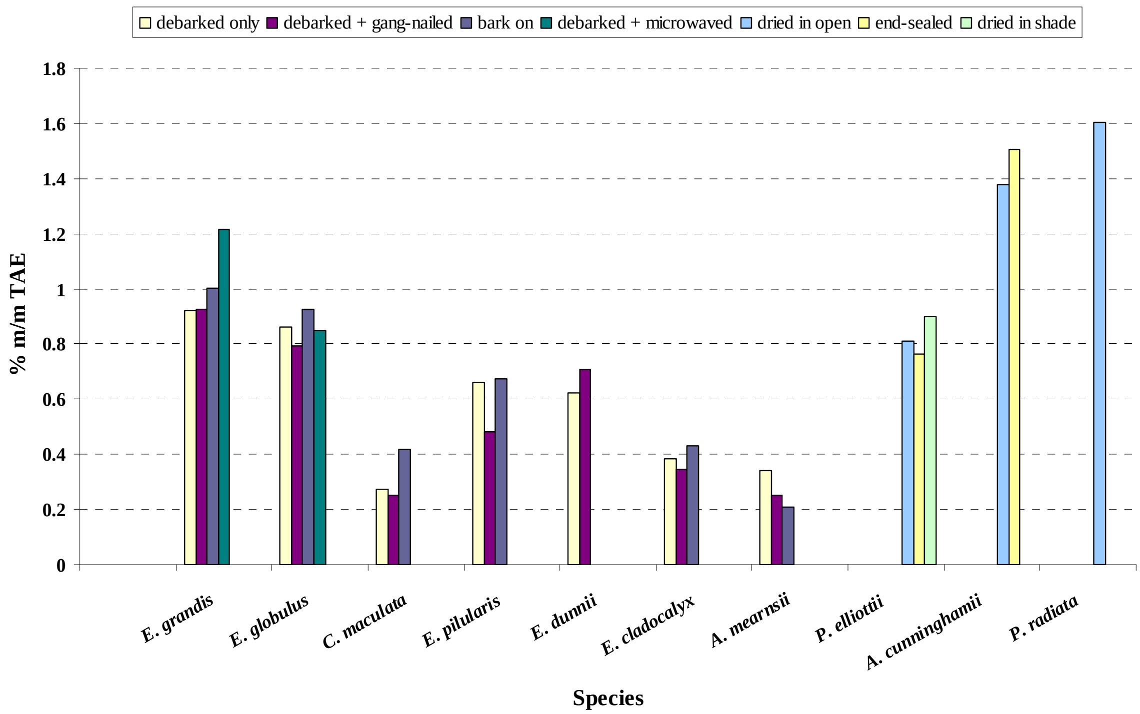


Figure 13: Comparison of ACQ TAE mean retentions for the different drying methods.

Penetration of test material

Table 12 shows the number of posts meeting the penetration requirement (based on copper) for all drying methods in ACQ-treated posts. CCA-treated posts are included for comparison.

Table 12: Number of ACQ-treated posts (out of a possible 20) meeting penetration requirements.

Species	Natural durability class of heartwood	Debark only	Micro wave	Gang-nail	Bark-on	Dry in open	End-seal	Dry in shade
E. grandis	3	20	20	20	20	-	-	-
E. globulus	3	17	20	20	20	-	-	-
C. maculata	2	20	-	16	20	-	-	-
E. pilularis	2	20	-	20	20	-	-	-
E. dunnii	4	20	-	20	-	-	-	-
E. cladocalyx	1	20	-	16	10	-	-	-
A. mearnsii	?	20	-	20	13	-	-	-
P. elliottii	4	-	-	-	-	20	20	20
A. cunninghamii	4	-	-	-	-	9	16	2
P. radiata	4	-	-	-	-	20	-	-
P. radiata(CCA)	4	-	-	-	-	20	-	-

- Not applicable

The majority of posts from each timber and drying regime met the penetration requirements of full sapwood penetration. As sapwood thickness was always more than 10 mm, there was no requirement for heartwood penetration in those species with heartwood natural durability in the 3 or 4 classes. Posts dried with bark-on appeared to reduce sapwood penetration in *E. cladocalyx* and

A. mearnsii, for unknown reasons. This finding was not necessarily reflected in reduced preservative uptake in the treated zone, as the mean ACQ retention in *E. cladocalyx* was highest (0.43% m/m) in bark-on posts (Table 10) compared to the other drying regimes where mean retentions were 0.35 and 0.38% m/m. In softwood posts, penetration problems were encountered only in *A. cunninghamii* posts as discussed previously.

CCA treatment

A preliminary assessment of the CCA-treated *P. radiata* posts showed, when a sample of ten posts was sprayed with chromazurol indicator, that some did not meet penetration requirements. The problem was caused by cambium still being present on some posts, which inhibits penetration of the rays. As excess posts had been treated, those with most visible cambium still attached were sorted and excluded from the vineyard post trial. In the same way, similar untreated *P. radiata* posts that were to be sent to Queensland for ACQ treatment were sorted to exclude posts with excess cambium. The result is that all CCA-treated *P. radiata* posts in test met the penetration requirements (Table 12). The mean TAE analyses for the CCA-treated *P. radiata* posts are presented in Table 13.

Table 13: TAE analysis in CCA-treated *P. radiata* posts. Mean of 20 replicates.

Species	% m/m Cu	% m/m Cr	% m/m As	% m/m TAE
P. radiata	0.201	0.319	0.289	0.81

The mean TAE of 0.81% m/m for CCA-treated *P. radiata* posts met the minimum H4 requirement for softwood posts of 0.63% m/m in AS 1604.1 2000[16]. All 20 posts analysed were above the minimum requirement.

Surface defects

No post was rejected due to defective knots using the Auspine Manual for evaluation of surface defects[20]. However, significant numbers of posts for some species were rejected due to splits. Tables 14 and 15 show the percentage of posts rejected due to splitting from each treatment and drying method, following examination by DPI Mildura and DPI&F respectively. Where common species and treatments were examined by the two testing organisations, the extent of splitting defect found by DPI&F was mostly in accordance with, or slightly higher than, the results obtained by DPI Mildura (Table 15). The only major differences in assessments occurred for PEC-treated *E. pilularis* with 67% of posts rejected by DPI&F (20% by DPI Mildura), ACQ-treated *E. pilularis* with 47% rejected (23% by DPI Mildura) and PEC-treated *E. dunnii* with 60% of posts rejected (13% by DPI Mildura). The difference may have been simply a product of randomised sampling, where more defective posts happened to have been sent to Brisbane. Alternatively, the environmental conditions under which posts were stored before testing may have been more severe in Brisbane than Mildura, causing splits to open up slightly more in Brisbane.

Table 14: Post rejections due to splitting, assessed by DPI Mildura

Species	Drying method	Treatment	No. of posts tested	No of posts with splits	Width of largest split (mm)	Mean split width (mm)	% posts rejected
E. grandis	debarked only	PEC	30	4	5	1	0
E. grandis	debark + gang-nail	PEC	30	5	10	1	3
E. grandis	bark-on	creosote+oil	30	10	4	1	0
E. grandis	microwave	PEC	30	10	7	1	0
E. grandis	debarked only	ACQ	29	12	5	1	0
E. grandis	debark + gang-nail	ACQ	30	9	6	1	0
E. grandis	bark-on	ACQ	30	20	7	3	0
E. grandis	microwave	ACQ	30	16	5	2	0
E. globulus	debarked only	PEC	30	14	8	2	3
E. globulus	debark + gang-nail	PEC	30	10	8	2	3
E. globulus	bark-on	creosote+oil	29	22	19	4	7
E. globulus	microwave	PEC	30	8	5	1	0
E. globulus	debarked only	ACQ	30	26	15	6	33
E. globulus	debark + gang-nail	ACQ	30	15	12	3	7
E. globulus	bark-on	ACQ	30	28	16	6	20
E. globulus	Microwave	ACQ	30	19	10	3	3
C. maculata	debarked only	PEC	30	11	15	3	7
C. maculata	debarked only	ACQ	30	14	5	2	0
E. pilularis	debarked only	PEC	30	24	12	7	20
E. pilularis	debarked only	ACQ	30	21	13	5	23
E. dunnii	debarked only	PEC	30	19	10	4	13
E. dunnii	debarked only	ACQ	30	25	35	13	60
E. cladocalyx	debarked only	PEC	30	9	6	1	0
E. cladocalyx	debark + gang-nail	PEC	30	6	6	1	0
E. cladocalyx	bark-on	creosote+oil	30	5	4	1	0
E. cladocalyx	debarked only	ACQ	30	15	8	2	3
E. cladocalyx	debark + gang-nail	ACQ	27	13	11	3	7
E. cladocalyx	bark-on	ACQ	30	23	10	5	7
A. mearnsii	debarked only	PEC	30	26	15	7	23
A. mearnsii	debark + gang-nail	PEC	30	13	5	2	0
A. mearnsii	bark-on	creosote+oil	30	30	16	11	83
A. mearnsii	debarked only	ACQ	30	28	25	12	70
A. mearnsii	debark + gang-nail	ACQ	30	28	15	9	53
A. mearnsii	bark-on	ACQ	30	30	50	15	93
P. elliottii	dried in open	ACQ	30	9	7	1	0
A. cunninghamii	dried in open	ACQ	30	2	4	0	0
P. radiata	dried in open	ACQ	30	3	4	0	0
P. radiata	dried in open	CCA	30	9	6	1	0

Table 15: Post rejections due to splitting, assessed by DPI&F

Species	Drying method	Treatment	No. of posts tested	No of posts with splits	Width of largest split (mm)	Mean split width (mm)	% posts rejected (Mildura result)
E. grandis	debarked only	PEC	30	8	6	2	0 (0)
E. grandis	debarked only	ACQ	30	14	8	2	3 (0)
E. globulus	debarked only	PEC	30	11	6	3	3 (3)
E. globulus	debarked only	ACQ	30	22	18	5	37 (33)
C. maculata	debarked only	PEC	30	14	11	5	20 (7)
C. maculata	debark + gang-nail	PEC	30	8	8	3	3
C. maculata	bark-on	creosote+oil	30	12	9	4	13
C. maculata	debarked only	ACQ	30	18	6	3	0 (0)
C. maculata	debark + gang-nail	ACQ	30	15	7	3	0
C. maculata	bark-on	ACQ	30	16	7	3	0
E. pilularis	debarked only	PEC	30	26	13	6	67 (20)
E. pilularis	debark + gang-nail	PEC	30	22	12	5	47
E. pilularis	bark-on	creosote+oil	30	28	18	5	63
E. pilularis	debarked only	ACQ	30	20	11	6	47 (23)
E. pilularis	debark + gang-nail	ACQ	30	18	15	8	53
E. pilularis	bark-on	ACQ	30	18	15	7	50
E. dunnii	debarked only	PEC	30	19	13	9	60 (13)
E. dunnii	debark + gang-nail	PEC	31	13	9	7	29
E. dunnii	debarked only	ACQ	33	26	35	13	76 (60)
E. dunnii	debark + gang-nail	ACQ	30	24	23	10	77
E. cladocalyx	debarked only	PEC	30	8	6	2	0 (0)
E. cladocalyx	debarked only	ACQ	30	18	9	4	20 (3)
A. mearnsii	debarked only	PEC	30	12	9	4	17 (23)
A. mearnsii	debarked only	ACQ	26	24	22	15	92 (70)
P. elliottii	dried in open	ACQ	29	9	7	2	0 (0)
P. elliottii	dried in shade	ACQ	30	6	5	2	0
P. elliottii	end sealed	ACQ	30	7	7	2	0
A. cunninghamii	dried in open	ACQ	30	2	4	2	0 (0)
A. cunninghamii	dried in shade	ACQ	29	3	3	1	0
A. cunninghamii	end sealed	ACQ	30	1	1	1	0
P. radiata	dried in open	ACQ	30	3	4	2	0 (0)
P. radiata	dried in open	CCA	30	8	4	2	0 (0)

Debarked only

Rejections due to splitting were highest in *A. mearnsii* posts (up to 92% rejected). *E. dunnii*, *E. globulus* and *E. pilularis* also had a number of posts rejected. ACQ-treated posts of these species had more rejections than those treated with PEC, and the differences were substantial in *A. mearnsii* (e.g. 70% ACQ, 23% PEC by DPI Mildura), *E. dunnii* (although not in the DPI&F assessed posts) and *E. globulus* posts (e.g. 33% ACQ, 3% PEC by DPI Mildura). No *P. elliottii*, *A. cunninghamii* or *P. radiata* softwood post was rejected, regardless of the treatment, while only one ACQ-treated *E. grandis* post (= 3%) was rejected. Similarly, no ACQ-treated *C. maculata* or PEC-treated *E. cladocalyx* post was rejected. PEC-treated *C. maculata* and ACQ-treated *E. cladocalyx* had very few rejections from the DPI Mildura assessment, and 20% rejections from the DPI%F assessment. No CCA-treated *P. radiata* post was rejected for excessive splitting.

Debark+gang-nail for hardwoods

Gang-nailing often produced a moderate reduction in splitting compared to debarked only posts. From the DPI Mildura assessments, rejections from splitting fell from 70% in ACQ-treated *A.*

mearnsii posts (debarked only) to 53% after gang-nailing, and from 23% to 0% in PEC-treated *A. mearnsii* posts. A reduction in rejection from splitting from 33% to 7% occurred in ACQ-treated *E. globulus* posts. Rejections due to splitting were zero or minimal in the remaining species.

Similarly, the DPI&F assessments showed that rejections for splitting reduced from 20% in PEC-treated *C. maculata* debarked only posts to 3% when gang-nailed. Improvements for the excessively splitting species *E. pilularis* and *E. dunnii* did not occur, except for PEC-treated *E. dunnii* with the rejection rate falling from 60% to 29%.

Bark-on for hardwoods

There was severe splitting in posts of *A. mearnsii* dried with bark-on (Figure 14). Eighty-three percent of the creosote + oil-treated posts were rejected due to splits (Table 14). This level was higher than for PEC-treated debarked only posts of the same species (23% rejection). Debarked only ACQ-treated *A. mearnsii* posts also had fewer splits (53%) than posts with bark-on (93%). There was little difference in splitting between creosote-treated *C. maculata* posts with bark-on (13% rejected) compared to debarked only posts (20% rejected), creosote-treated *E. pilularis* posts with bark-on (63% rejection) compared to debarked only posts (67% rejected), ACQ-treated *E. pilularis* posts with bark-on (50% rejected) compared to debarked only posts (47% rejected) (Table 15), and ACQ-treated *E. globulus* posts with bark-on (20% rejected) compared to debarked only posts (33% rejected) (Table 14). The remaining hardwood species and treatments had few or no rejections from splitting, whether debarked only posts or dried with bark-on. As most drying occurs through the end-grain, drying rates that permit splitting appear to have been little affected in posts with bark-on, except for a worsening of splits in *A. mearnsii*. Leaving the bark-on posts may actually induce steeper moisture gradients within the post (ends drier than post centre) that could exacerbate splitting.

Figure 14: Full length split in *A. mearnsii* dried with the bark-on

Softwood seasoning variations

There was no benefit in drying the softwoods *P. elliottii* and *A. cunninghamii* more slowly, by end sealing or by drying them in the shade. While none of the posts were rejected due to splitting, neither were there any rejections for similar posts dried unsealed and in the open. Indeed, slower drying in the shade reduced ACQ penetration in the sapwood of *A. cunninghamii* posts (Table 11), which was probably due to in increased proportion of internal ‘wet patches’.

Microwave conditioning

No *E. grandis* or *E. globulus* PEC-treated post was rejected due to splitting following microwave conditioning. For the ACQ treatment, only one microwave conditioned *E. globulus* post was rejected. A reduction in splitting for microwave conditioning could not be demonstrated for *E. grandis* and PEC-treated *E. globulus* posts, because debarked only posts were also free of excessive splitting. However, improvement from microwave conditioning was found in *E. globulus* posts treated with ACQ, as rejection from splitting was reduced from 33% to 3%.

Strength testing and evaluation of surface defects at Department of Primary Industries (DPI) Mildura

A REML (Residual Maximum Likelihood) analysis was performed on the main factors influencing strength (drying regime, timber species, preservative). Timber species had by far the largest affect on bending strength of posts ($P < 0.001$), followed by drying method (with or without bark-on, $P < 0.001$), preservative used ($P < 0.001$), and then gang-nailing post ends to minimise splitting ($P = 0.010$). Microwave drying had no significant effect on bending strength ($P = 0.73$).

Effects of individual treatment factors are discussed below.

Debarked only

The bending strength results for PEC and ACQ-treated, debarked only posts, are presented in Tables 16 and 17 respectively. The softwood posts had been dried in the open. The species have been ranked in decreasing order of bending strength. In addition, results are compared with the most widely used vineyard trellis post, CCA-treated *P. radiata*.

Table 16: Mean bending strengths in PEC-treated, debarked only posts

Species	No. of posts tested	Air dry density of untreated posts, kg/m^3	Mean bending strength (MPa)	Standard deviation (MPa)
C. maculata	30	940	127	32
E. cladocalyx	30	935	120	21
A. mearnsii	30	865	100	20
E. globulus	30	660	71	18
E. grandis	30	610	64	9
E. dunnii	30	775	63	18
E. pilularis	30	680	60	14
P. radiata (CCA-treated)	30	490	45	10

All PEC-treated posts were significantly stronger than CCA-treated *P. radiata* posts. *C. maculata*, *E. cladocalyx* and *A. mearnsii* were significantly stronger than the other eucalypt species tested. This superior strength is probably due to these species having the higher air dry densities within those examined. *C. maculata*, *E. cladocalyx* and *A. mearnsii* also had the lowest mean retentions of creosote (18, 23 and 21% m/m HTC, Table 2), so it could be argued that species with higher creosote retentions suffered greater strength loss due to preservative treatment. However, creosote treatment normally causes minor (5-10%), if any, loss in strength[31]. Greater strength loss can result from CCA treatment. This trend was supported by Mollah *et al*., with the finding that HTC-treated *P. radiata* posts were stronger than CCA-treated *P. radiata* posts[32].

---

[31] Winandy, J.E. (1996). Effects of treatment, incising, and drying on mechanical properties of timber. In: Ritter, M.A., Duwadi, S.R. and Lee, P.D.H. eds. National conference on wood transportation structures; 1996 October 23-25; Madison, WI. Gen. Tech. Rep. FPL-GTR-94. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory: 178-185.

[32] Mollah, M.R., Burrow, R.P. and Hayes, R.J. (1997). Strength of grapevine trellis posts. Wine Industry J. 12: 401-406.

Table 17: Mean bending strengths in ACQ-treated, debarked only posts

Species	No. of posts tested	Mean bending strength (MPa)	Standard deviation (MPa)
C. maculata	29	144	24
E. cladocalyx	30	118	23
A. mearnsii	30	88	18
E. pilularis	30	74	28
E. grandis	29	66	12
E. globulus	30	64	14
P. elliottii	29	64	19
E. dunnii	30	60	13
A. cunninghamii	30	51	13
P. radiata (CCA-treated)	30	45	10
P. radiata	30	34	9

With the exception of ACQ-treated *P. radiata* (1.61% m/m TAE) and *A. cunninghamii* (1.34% m/m TAE) posts, all ACQ-treated posts were stronger than CCA-treated *P. radiata*. *C. maculata* (0.27% m/m TAE) and *E. cladocalyx* (0.38% m/m TAE) were also significantly stronger than the other species tested, which was a similar result in the PEC comparisons. Of the softwoods tested, *P. elliottii* (0.81% m/m TAE) was significantly stronger than *A. cunninghamii* (1.34% m/m TAE) which was in turn significantly stronger than ACQ-treated *P. radiata* (1.61% m/m TAE). It is noteworthy that while 70% of ACQ-treated *A. mearnsii* (0.34% m/m TAE) posts had been rejected due to excessive splitting, they were the third strongest of the ACQ-treated posts tested. This finding suggests that splitting may not be a fatal defect in posts where strength alone is concerned.

ACQ-treated *P. radiata* posts had only 75% of the bending strength of CCA-treated *P. radiata* posts, although it should be noted that the posts had been treated with ACQ to H5 retentions, and H4 with CCA. The average difference in bending strength was statistically significant ($P < 0.001$) when a **t**-test was carried out. Further investigation on other batches of CCA and ACQ-treated *P. radiata* posts is needed to confirm this apparent reduction in strength with ACQ.

Results of the comparative effects of treatment on mean bending strength, for species treated with both preservatives, are presented in Table 18. This analysis applies only to the hardwood species.

Table 18: Comparative mean bending strengths between PEC and ACQ-treated, debarked only posts

Species/treatment	No. of posts tested	ACQ retention % m/m TAE	PEC retention % m/m HTC	Mean bending strength (MPa)	Standard deviation (MPa)
E. grandis					
PEC	30		73	64	9
ACQ	29	0.923		66	12
E. globulus					
PEC	30		49	71	18
ACQ	30	0.863		64	14
C. maculata					
PEC	30		18	127	32
ACQ	29	0.273		144	24
E. pilularis					
PEC	30		43	60	14
ACQ	30	0.662		74	28
E. dunnii					
PEC	30		31	63	18
ACQ	30	0.623		60	13
E. cladocalyx					
PEC	30		23	120	21
ACQ	30	0.382		118	23
A. mearnsii					
PEC	30		21	100	20
ACQ	30	0.340		88	18

Generally, there was no significant difference ($P = 0.82$) in bending strength between PEC and ACQ-treated hardwood posts. However, there was a significant interaction depending on post species between the preservatives used, ($P < 0.001$), implying that while one preservative did not alter strength (or less likely, that it made posts stronger) for some species, it had the reverse effect in others. There were moderately significant differences in favour of ACQ for *C. maculata* and *E. pilularis* and moderately significant differences in favour of PEC for *E. globulus* and *A. mearnsii*. There were no significant differences between the preservatives for the other three species. *E. grandis* had the highest ACQ retention near H4 requirements, and strength was similar to PEC-treated *E. grandis* posts.

These results suggest that ACQ is a suitable alternative to PEC for hardwood posts, as there is no clear trend in a reduction in strength from ACQ over the range of retentions examined for hardwoods. However, posts from *A. mearnsii*, *E. dunnii* and *E. globulus* split much more when treated with ACQ compared to PEC, and had a higher rejection rate (Tables 14 and 15). A similar result may have occurred if the posts had been treated with CCA, another water-borne preservative. Splitting in some species may make ACQ-treated posts less popular with users, unless the problem of occasionally having to straddle a split when applying wire fasteners can be resolved.

Debark+gang-nail

This analysis applied to *E. grandis*, *E. globulus*, *E. cladocalyx* and *A. mearnsii* posts treated with PEC and ACQ. Table 19 shows the mean bending strength of posts debarked and ends gang-nailed. Comparative results for debarked only posts are also shown.

Table 19: Mean bending strengths of PEC and ACQ-treated debark + gang-nail posts, compared to debarked only posts

Species	Treatment	No. of gang-nail posts tested	Mean bending strength (MPa)		Standard deviation - gang-nail (MPa)
			Debark + gang-nail	Debarked only	
E. grandis	PEC	30	61	64	9
E. grandis	ACQ	30	60	66	9
E. globulus	PEC	30	69	71	14
E. globulus	ACQ	30	65	64	16
E. cladocalyx	PEC	30	107	120	26
E. cladocalyx	ACQ	27	107	118	27
A. mearnsii	PEC	30	100	100	15
A. mearnsii	ACQ	30	88	88	19

There was a significant effect of gang-nailing on bending strength (P = 0.001), and no significant interactions between gang-nailing and post species (P = 0.10) or gang-nailing and the preservative used (P = 0.78). On average, posts with gang-nails were 4.5 MPa weaker than posts of the same species and preservative without gang-nails.

It was not obvious why gang-nailing the ends of a post should reduce bending strength slightly. However, the overall reduction in bending strength was mostly attributable to gang-nailed posts from *E. cladocalyx,* and to a lesser extent from *E. grandis*. Despite the slight reduction in strength, posts were still stronger than CCA-treated *P. radiata*.

Bark-on

Determining the effect of drying posts with or without bark was complicated slightly by the use of a different preservative (creosote + oil) for posts dried with the bark-on. No PEC preservative was available to treat these posts, but as both formulations are based on creosote, it was considered reasonable to compare the PEC-treated, debarked only posts, with the creosote + oil-treated posts dried with bark-on. Table 20 shows the mean bending strengths of posts treated with creosote (either creosote + oil, or PEC) and ACQ-treated posts dried with or without bark. Comparative results for debarked only posts are also shown. This analysis applied to *E. grandis, E. globulus, E. cladocalyx* and *A. mearnsii* posts.

Table 20: Mean bending strengths of creosote and ACQ-treated bark-on posts compared to debarked posts

Species	Treatment	No. of bark-on posts tested	Mean bending strength (MPa)		Standard deviation – bark-on (MPa)
			Bark-on^{A}	Debarked only^{B}	
E. grandis	creosote	30	61	64	14
E. grandis	ACQ	30	57	66	16
E. globulus	creosote	29	44	71	19
E. globulus	ACQ	30	35	64	18
E. cladocalyx	creosote	30	112	120	22
E. cladocalyx	ACQ	30	93	118	24
A. mearnsii	creosote	30	97	100	22
A. mearnsii	ACQ	30	87	88	20

A = creosote used was creosote + oil; B = creosote used was PEC

Debarked posts treated with PEC were significantly stronger than creosote + oil-treated posts dried with bark-on (P < 0.001). There was also a significant effect from post species (P < 0.001), indicating that the effect of debarking differed between post species. A small reduction only in bending strength was found in *E. grandis*, *E. cladocalyx* and *A. mearnsii* for bark-on posts. However, in *E. globulus* the reduction in strength was significant for bark-on posts.

Similar results occurred in posts treated with ACQ. Debarked only posts were stronger than those left to dry with the bark-on. Again, there was significant interaction between post species (P < 0.001) and debarking. The strength difference between posts dried with and without bark was greater in *E. globulus* and *E. cladocalyx* than in *E. grandis* and *A. mearnsii*.

The reduction in bending strengths of *E. globulus* posts dried with the bark-on is consistent for both creosote-based and ACQ preservatives. However, drying *E. globulus* posts with the bark-on helped to reduce rejection due to splitting for ACQ-treated posts (Table 14). One possible reason for a reduction in strength of bark-on posts is that greater timber degradation occurred due to borer attack in these posts.

Microwave drying

Only posts of *E. grandis* and *E. globulus* were conditioned using the microwave technology. Table 21 shows the mean bending strength of PEC and ACQ-treated microwave-conditioned posts and their comparison with the debarked only posts of the same species.

Table 21: Mean bending strengths of PEC and ACQ-treated microwave-dried posts compared to debarked only posts

Species	Treatment	No. of bark-on posts tested	Mean bending strength (MPa)		Standard deviation – microwave (MPa)
			Microwave-conditioned	Debarked only	
E. grandis	PEC	30	66	64	9
E. grandis	ACQ	30	65	66	12
E. globulus	PEC	29	69	71	15
E. globulus	ACQ	30	65	64	14

Microwave drying had no significant effect on bending strength (P = 0.73). Results between the two species and preservative type were almost identical.

Four-point bending tests at Queensland Department of Primary Industries and Fisheries (DPI&F)

Debarked only

The mean bending strength or modulus of rupture (MOR) results for PEC and ACQ-treated, debarked only posts are presented in Tables 22 and 23 respectively. Softwood species were dried in the open. The species are ranked in decreasing order of bending strength. Results from CCA-treated *P. radiata* are included in each table for comparison.

Table 22: Mean bending strengths (MOR) in PEC-treated, debarked only posts

Species	No. of posts tested	Mean bending strength (MPa)	Standard deviation (MPa)
C. maculata	30	103	19
E. cladocalyx	30	96	21
A. mearnsii	30	71	13
E. pilularis	30	67	25
E. globulus	30	55	11
E. dunnii	30	48	12
E. grandis	30	46	6
P. radiata (CCA-treated)	29	39	8

All PEC-treated posts were stronger than CCA-treated *P. radiata*. *C. maculata* and *E. cladocalyx* posts were stronger than posts of the other eucalypt species tested.

Table 23: Mean bending strengths (MOR) in ACQ-treated, debarked only posts

Species	No. of posts tested	Mean bending strength (MPa)	Standard deviation (MPa)
E. cladocalyx	30	100	23
C. maculata	30	93	21
A. mearnsii	25	74	18
E. pilularis	30	69	24
E. globulus	30	52	8
E. dunnii	30	45	10
E. grandis	30	44	7
P. elliottii	30	41	10
P. radiata (CCA-treated)	29	39	8
A. cunninghamii	30	38	9
P. radiata	30	29	7

All ACQ-treated posts, except for *P. radiata* and *A. cunninghamii*, were stronger than the CCA-treated *P. radiata* posts. As with the DPI Mildura strength tests, both *E. cladocalyx* and *C. maculata* were stronger than the other species tested. Of the ACQ-treated softwoods tested, *P. elliottii* and *A. cunninghamii* were similar in strength, while *P. radiata* was weaker. H4 CCA-treated *P. radiata* posts were stronger than their H5 ACQ-treated counterparts, a trend shared with DPI Mildura.

Results of the comparative effects of treatment on the mean bending strength (MOR), for species treated with both preservatives, are presented in Table 24. This analysis applies to the hardwood species tested.

Table 24: Comparative mean bending strengths (MOR) between PEC and ACQ-treated, debarked only posts

Species/treatment	No. of posts tested	Mean bending strength (MPa)	Standard deviation (MPa)
E. grandis			
PEC	30	46	6
ACQ	30	44	7
E. globulus			
PEC	30	55	11
ACQ	30	52	8
C. maculata			
PEC	30	103	19
ACQ	30	93	21
E. pilularis			
PEC	30	67	25
ACQ	30	69	24
E. dunnii			
PEC	30	48	12
ACQ	30	45	10
E. cladocalyx			
PEC	30	96	21
ACQ	30	100	23
A. mearnsii			
PEC	30	71	13
ACQ	25	74	18

There were no clear differences between the preservatives for any of the hardwood species examined.

Debark + gang-nail

This analysis applied to *C. maculata*, *E. pilularis* and *E. dunnii* posts treated with PEC and ACQ. Table 25 shows the mean bending strength (MOR) of posts debarked and ends gang-nailed. Comparative results for debarked only posts are also shown.

Table 25: Mean bending strengths (MOR) of PEC and ACQ-treated debark + gang-nail posts compared to debarked only posts

Species	Treatment	No. of gang-nail posts tested	Mean bending strength (MPa)		Standard deviation - gang-nail (MPa)
			Debark + gang-nail	Debarked only	
C. maculata	PEC	29	99	103	24
C. maculata	ACQ	30	102	93	19
E. pilularis	PEC	29	67	67	13
E. pilularis	ACQ	30	66	69	13
E. dunnii	PEC	31	53	48	9
E. dunnii	ACQ	30	61	45	16

There was no difference in strength between debarked only and debark + gang-nailed posts of *E. pilularis.* Small and inconsistent differences were found in *C. maculata*, where gang-nailed PEC-treated posts were weaker, while ACQ-treated posts were stronger, than debarked only posts. For *E. dunnii*, gang-nailed posts were stronger than debarked only posts. In contrast, gang-nailed *E. cladocalyx* and *E. grandis* posts (where gang-nails had no effect on the extent of splitting in either species), strength tested by DPI Mildura, were weaker than debarked only posts. Such a range of results suggest that gang-nailing has little real effect on strength. The main effect of gang-nails was a moderate reduction in splitting for some species. A reduction in splitting by gang-nails was most clearly found in *A. mearnsii* posts, yet there was no corresponding increase in strength.

Bark-on

As mentioned previously, the effect of drying posts with or without the bark-on was complicated by the use of a different preservative (creosote + oil or PEC). Discussion is based on the creosote component of both formulations. This analysis was restricted to *C. maculata* and *E. pilularis* posts. Table 26 shows the mean bending strengths (MOR) of creosote and ACQ-treated posts dried with bark-on. Comparative results for debarked only posts are also shown.

Table 26: Mean bending strengths (MOR) of creosote and ACQ-treated bark-on posts compared to debarked only posts

Species	Treatment	No. of bark-on posts tested	Mean bending strength (MPa)		Standard deviation – bark-on (MPa)
			Bark-on[A]	Debarked only[B]	
C. maculata	creosote	30	85	103	22
C. maculata	ACQ	30	73	93	12
E. pilularis	creosote	30	51	67	11
E. pilularis	ACQ	30	46	69	13

A = creosote used was creosote + oil; B = creosote used was PEC

PEC-treated debarked only posts were stronger than the creosote + oil-treated posts dried with bark-on. The reduction in strength for posts left to dry with the bark-on is consistent with the results obtained by DPI Mildura, and was attributed to borer damage in posts seasoned with bark attached.

End-sealed

The two softwood species, *P. elliottii* and *A. cunninghamii*, had their ends sealed before being dried in the open, in an attempt to slow drying. Table 27 shows the mean bending strengths (MOR) of ACQ-treated posts with their ends sealed. Comparative results for posts dried in the open, without end sealing, are also shown.

Table 27: Mean bending strengths (MOR) of ACQ-treated posts with ends sealed, compared to unsealed posts dried in the open

Species	No. of end-sealed posts tested	Mean bending strength (MPa)		Standard deviation – end-sealed (MPa)
		End-sealed	Dried in open	
P. elliottii	30	56	41	11
A. cunninghamii	30	34	38	9

There was no difference in strength between *A. cunninghamii* posts with ends sealed compared to those not end-sealed. However, a significant strength increase occurred in *P. elliottii* posts that had been end-sealed. The reason for this increase in strength is unknown. None of the posts dried in the open were rejected for excessive splitting.

Dried in shade

P. elliottii and *A. cunninghamii* posts were also air dried in the shade to slow drying. Table 28 shows the mean bending strengths (MOR) of ACQ-treated posts dried in the shade, compared to those dried in the open.

Table 28: Mean bending strengths (MOR) of ACQ-treated posts dried in the shade compared to posts dried in the open

Species	No. of end-sealed posts tested	Mean bending strength (MPa)		Standard deviation – dried in open (MPa)
		Dried in shade	Dried in open	
P. elliottii	30	53	41	10
A. cunninghamii	30	36	38	13

Once again a strength increase occurred in *P. elliottii* posts that had been dried in the shade compared to those dried in the open, for unknown reasons. ACQ retentions were similar at 0.90% m/m TAE for shade dried posts compared to 0.81% m/m for posts dried in the open. No significant difference in strength was evident for *A. cunninghamii* posts dried in the shade or open.

Comparison between strength testing at DPI Mildura and Queensland DPI&F

This comparison is based on 'debarked only' posts, without gang-nailing, of *E. grandis*, *E. globulus*, *C. maculata*, *E. pilularis*, *E. dunnii*, *E. cladocalyx* and *A. mearnsii* for both treatments, and 'dried in open' *P. elliottii*, *A. cunninghamii* and *P. radiata* for ACQ treatment.

The mean bending strengths for the 18 treatment/drying types tested in common by DPI Mildura DPI&F are presented in Table 29. Figure 15 shows a comparison between the two test methods.

Table 29: Mean bending strengths of debarked only posts for each treatment tested by DPI Mildura and Queensland DPI&F

Species	Treatment	Mean bending strength (MPa)	
		DPI Mildura	Queensland DPI&F
E. grandis	PEC	64	46
E. grandis	ACQ	66	44
E. globulus	PEC	71	55
E. globulus	ACQ	63	52
C. maculata	PEC	127	103
C. maculata	ACQ	144	93
E. pilularis	PEC	60	67
E. pilularis	ACQ	74	69
E. dunnii	PEC	63	48
E. dunnii	ACQ	60	45
E. cladocalyx	PEC	120	96
E. cladocalyx	ACQ	118	100
A. mearnsii	PEC	100	71
A. mearnsii	ACQ	88	74
P. elliottii	ACQ	64	41
A. cunninghamii	ACQ	51	38
P. radiata	ACQ	34	29
P. radiata	CCA	45	39
Total		1412	1110

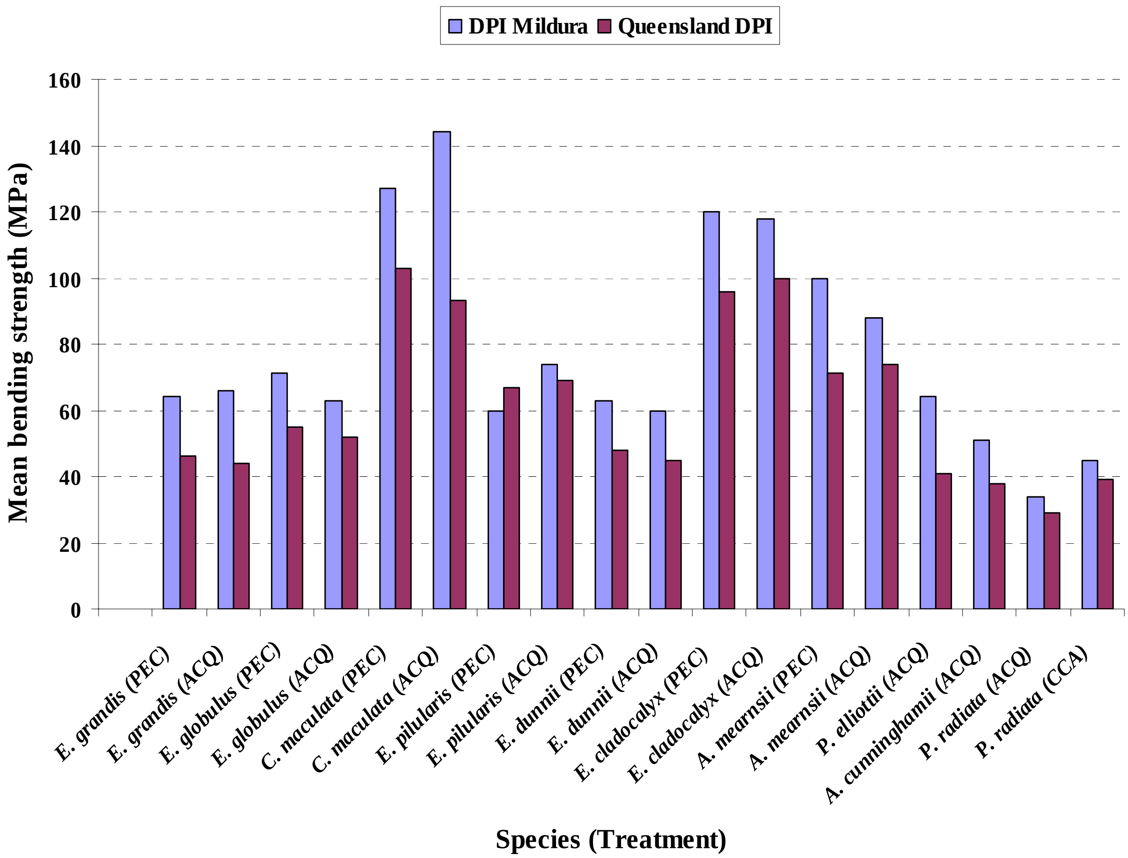


Figure 15: Comparative mean bending strengths of debarked only posts for each treatment

In nearly all cases bending strength determined by the cantilever method (DPI Mildura) was greater than determined by 4-point bending (Queensland DPI&F). If the strengths obtained are totalled and compared (Table 29), the cantilever test result was 27% higher than by 4-point bending. After preservative treatment, posts to be tested were transported in bundles to Brisbane and Mildura for strength testing. Before testing commenced, the posts were left to dry for three to four months under different atmospheric conditions. It is possible that drying rates and the degree of post splitting were different in the two locations, thus causing some of the differences found between the two post strength testing methods. More likely, the differences are due to the different testing methods used. Tables 30 and 31 show the comparative strength ranking of posts treated with PEC and ACQ respectively.

Table 30: Comparative ranking of PEC-treated posts based on bending strength

Species	DPI Mildura ranking	Queensland DPI&F ranking
C. maculata	1	1
E. cladocalyx	2	2
A. mearnsii	3	3
E. globulus	4	5
E. grandis	5	7
E. dunnii	6	6
E. pilularis	7	4

Table 31: Comparative ranking of ACQ-treated posts based on bending strength

Species	DPI Mildura ranking	Queensland DPI&F ranking
C. maculata	1	2
E. cladocalyx	2	1
A. mearnsii	3	3
E. pilularis	4	4
E. grandis	5	7
P. elliottii	6	8
E. globulus	7	5
E. dunnii	8	6
A. cunninghamii	9	9
P. radiata	10	10

Overall, the rankings of the seven species treated with PEC were similar using either test method. The main difference was that *E. pilularis* was ranked last by DPI Mildura compared with fourth at Queensland DPI&F.

Rankings of the ten species treated with ACQ were again similar. Both methods ranked *P. radiata* as having least strength. DPI Mildura ranked *C. maculata* as the strongest post, while the Queensland DPI&F test ranked *E. cladocalyx* at the top.

Field installation

Seppelt

Installation at Seppelt's vineyard occurred in November 2003 when the temperatures reached over 28°C. The post surface of those treated with PEC remained dry and no exudate was noticeable on posts. No problems were encountered by contractors installing the posts, even for those that were not straight (Figure 16). The technique of drilling holes, squirting a water jet into them and ramming the posts large end down seemed to overcome any problems that may have been encountered from irregularities in the posts.

Figure 16: Installation of posts at Seppelt Winery, Great Western

One problem experienced during installation was the attachment of wires for the cordon and drip tube wires to some of the more dense hardwood species (in particular *C. maculata*, *E. cladocalyx* and *A. mearnsii*). These posts were too hard to hammer a normal staple into, regardless of the treatment used. A tech screw and clip had to be used as a substitute for the staple (Figure 17). In addition, holes had to be pre-drilled to insert the tech screws. An additional cost was incurred using the tech screw and clip and installation was more time consuming than the traditional staple method (Figure 18).

Figure 17: Tech screw fixing the cordon wire to the post

Figure 18: The more traditional staple method for fixing the cordon wire to the post

McWilliams

Installation at Griffith took place in July 2003, and the temperature was around 18°C. As the posts were rammed into position, contractors encountered difficulty installing a few of the *A. mearnsii* posts that had kinks. The surface of PEC-treated posts was dry and no greasy exudate was present. In contrast, the HTC-treated *P. radiata* posts installed in the remainder of the block were wet and oily on the surface. Prior to installation, small puddles of creosote were evident beneath a couple of the bundles treated with HTC. Figure 19 shows the difference in appearance between the HTC-treated *P. radiata* posts which had just been delivered and the PEC-treated test posts. In addition, a much stronger creosote odour was evident from the HTC-treated posts compared to the PEC-treated ones.

Figure 19: PEC-treated test posts alongside commercial bundles of HTC-treated *P. radiata* posts

Again the problem of stapling the cordon wire and wire for drip tube to the more dense hardwoods occurred. The more expensive and time consuming tech screw and clip were used.

Commercial considerations

Plantation selection

Plantation selection for the production of vineyard posts is a crucial step. Obviously, economics will improve with an increasing number of straight stems in the plantation. Higher yields will normally occur in fast grown plantations, and these also tend to have higher sapwood volumes making them more suitable for preservative treatment. The proportion of trees suitable for posts will vary according to many parameters such as timber species, stems per hectare, growing conditions, rainfall, irrigation, and can therefore vary within the full spectrum of possibilities from almost 100% suitable to totally unsuitable. In an earlier study, plantations of *E. grandis* irrigated with effluent water had 60% or more of the trees suitable for posts, and these had 80-90% sapwood content (Cookson *et al*., 2002)[7]. In some natural eucalypt regrowth, only 15-25% of trees might be straight enough for posts.

Preferably, harvesting should target single species plantations, as mixed species will be difficult to treat economically due to variations in preservative absorptions.

Typically, trees are planted at 1000-1100 stems per hectare in plantation forests. Thinning might aim to keep the best 300-500 trees per hectare, leaving 15-25% suitable for posts, and the remaining timber for pulp, and perhaps firewood production. The yield of posts improves if plantations are clear-felled rather than thinned. Each tree may give 1 to 3 posts, where 500-600 posts per hectare could be produced during a thinning operation, as normally occurs during the thinning of selected *E. nitens* plantations in Tasmania (Bill Hodgson, pers. comm.). An earlier study by the Victorian Department of Primary Industries found that 100-1000 posts were produced per hectare from central Victorian eucalypt plantations (Rhodey Bowman, pers. comm.).

Debarking

In the experimental work for this project, a variety of debarking methods were used, ranging from mechanical harvesting to hitting posts with the back of an axe and then pulling the bark off by hand. Another method used was to run over a row of posts obliquely with wheel chains on a light tractor to loosen the bark, so that the bark could then be pulled away. For a large scale commercial operation, mechanical harvesters are required. Industry partners to the project included two companies routinely harvesting eucalypt plantations. Koppers Timber Preservation is producing CCA-treated posts at its Longford plant (Tasmania) from *E. nitens* plantation thinnings. Timbercorp is clear-felling *E. globulus* in south-western Australia for pulp production by chipping debarked logs (posts). Some of the harvesters giving satisfactory performance included an AFM 60, and a Waratah. The harvesting head of some machines may need to be modified for processing smaller diameter logs. The bark can be removed by rollers in the harvesting head that twist the bark free. Other useful tips are to use an excavator with no tail swing for greater manoeuvrability though the plantation. Also, wider extended tracks on the excavator would allow extended reach by the boom. Another point worth noting is that cambio debarked posts are usually stronger than peeled posts[4].

When debarking by hand, the study found that it was important to debark posts within about six hours of felling. Otherwise, the bark will cling to the stem and become difficult to remove. Greater difficulty was also experienced for trees growing in dry sites, harvested during long dry periods of weather, or from trees growing on higher ground where the soil was dry. Some posts in the project were left with bark attached, to determine if there would be fewer checks and splits due to slowed seasoning. There was some previous experience that after a period and when the posts had dried, the bark would once more become easy to remove. However, leaving bark-on the posts during seasoning mainly created problems. The bark became easy to remove for only a few species (*E. grandis* and *E. cladocalyx*), there was little benefit in reduced splitting, and degrade from borers increased as many prefer to lay their eggs under bark. This latter problem was especially noticeable in *Acacia* posts.

Drying

Some pine treaters air dry posts to prepare them for treatment, although most steam condition green posts to avoid such delays. Eucalypts generally cannot be steam conditioned, as they can suffer excessively from checking and splitting (Cookson, 2000)[33]. However, steam conditioning of small diameter posts of *E. nitens* is performed routinely (Bill Hodgson pers. comm.).

In commercial practice, the simplest operation for drying hardwoods would be to leave posts in bundles outside to dry. Most drying will occur over the warmer months; although during mid-summer splitting may become excessive. The outer logs in a bundle may suffer more from checking and splitting than central posts, and because drying will occur more slowly in the central posts, these should be tested with a moisture meter when determining their suitability for preservative treatment. An earlier study by Watkins and Waugh (unpublished) with *E. grandis* posts showed that most degrade from splitting occurred in posts seasoned unpacked in rows outside, or in a low temperature kiln. Least degrade was in posts seasoned in rows on racks in a shed. In the current study, posts were seasoned outside in cross stacks, and covered in hessian.

---

[33] Cookson, L.J. (2000). The preservation of eucalypts. In 'The Future of Eucalypts for Wood Products' Proc. IUFRO Conf, March 19-24, Launceston, Tasmania, Australia, pp 248-255.

Reduced drying degrade can be expected if posts are covered in hessian, located within the shade of a plantation, or placed under cover in sheds.

Splitting tended to be least in posts that were mainly sapwood, while increasing proportions of heartwood was sometimes associated with splits. *E. grandis* posts were amongst those with least splits, while as poles they have a reputation for splitting excessively (Terry Hawkins pers. comm.). When posts have dried, it may be necessary to sort posts to remove those with excessive splits, rather than treat them and create a disposal problem. The discarded untreated posts could be used for firewood.

Gang-nailing hardwoods gave some improvement in appearance after seasoning for a few species, but may not be economical for vineyard posts. Higher valued round timbers such as poles are routinely end coated and gang-nailed to reduce splitting. Gang-nails were 15 cents each, plus about 60 cents to apply, adding 90 cents cost to each post.

Microwave conditioning reduced splitting problems, and hastened drying, so would benefit some species and commercial operations. Microwave drying is estimated to cost $0.40-0.80 per post. Best results occur on green posts, and will immediately reduce the moisture content by about 20%, and allow further air or kiln drying to proceed more quickly. The process may also increase preservative uptake and penetration, although this may not be an advantage if posts already contain more than 60-70% treatable sapwood.

In the current project, posts were seasoned to around 12-15% moisture content before treatment. In commercial practice, hardwood posts and poles are often treated when they have just 30-35% moisture content in the sapwood. Posts may take 8-12 weeks to reach such moisture content during the warmer months.

Transportation

Transportation costs will vary greatly. In the current project, the cost of transporting posts in bundles from Brisbane to Mildura was $2920, and was a full semi-trailer load. The total number of posts in the load was 2,600. Therefore, the cost per post was $1.12. However, all posts were not unloaded at Mildura. 580 posts were unloaded at Griffith and the remainder at two sites in Mildura. Had the posts been transported directly to Mildura the cost would have been less. Transportation from a treatment plant to a vineyard within the same State would be expected to cost less than $0.50 per post.

Preservative treatment

This trial demonstrated the wide range of retentions that can be achieved between species within the same treatment charge, especially in hardwoods. There are two main options for treating the ‘different’ materials to meet treatment specifications. Firstly, the plant could stockpile the ‘different’ material until there was sufficient of any one species to treat in one or more charges. The solution strength needed to achieve the required retention must then be adjusted and such action is appropriate if the volume of ‘different’ material is sufficient to justify the cost of time and chemicals. Alternatively, the plant could adjust the solution strength and treating schedule and treat all material so that the most difficult to treat (least absorptive) material is properly treated. The effect of this approach is that some of the charge will be ‘over’ treated, which is an unnecessary expense, making the first approach more appealing.

PEC treatment

The main commercial treatments with creosote are carried out near Mount Gambier for *P. radiata*, and Grafton for hardwoods. PEC is available at Grafton, and reduces creosote bleeding and odour compared to unmodified creosote. PEC is less suited to softwoods as the narrower pathways in pine tend to screen out the pigment in PEC. Some of the advantages of PEC are reduced splitting in posts, reduced corrosion, no reduction in post strength, and discarded posts may be easier to dispose of by burning. An occasional problem with creosote-treated pine posts is that globules of crud (hardened creosote deposits on the wood surface) may fall from the post during harvesting and contaminate grapes. The PEC-treated hardwood posts produced little or no crud.

The minimum preservative retention of creosote (PEC contains 65% creosote) needed for hazard class 4 (H4) as required in vineyard posts is 10% m/m in hardwoods and 20% m/m in softwoods. Therefore, at least 100-120 litres of creosote may be needed per cubic metre of treatable volume. A treatment charge of eucalypt posts will typically have 60% treatable volume (heartwood does not treat). Creosote costs about 60c/litre and PEC about $1.10/litre. The cost for custom treating with PEC is about $80/m^3, but will vary with species and treatment characteristics. Because they are highly absorbent, *P. radiata* posts are normally treated with a Lowry schedule, to increase the kickback of creosote from the wood after pressurisation, so that uptakes are reduced. Less absorbent hardwoods such as *C. maculata* and *E. pilularis* are normally treated using full cell Bethell schedules. However, some of the hardwoods examined in this study were also highly absorbent, such as *E. grandis*, *E. globulus* and posts that were microwave conditioned. Lowry schedules may be required for these timbers.

Creosote-treated posts should be stored outside, and air dried for 1-2 months before sale, so that timber surfaces become drier and easier to handle.

CCA treatment

CCA is the most widely used wood preservative for vineyard posts, and normally produces posts that are surface dry and easy to handle. CCA has come under intense scrutiny in recent years, mainly due to concerns about arsenic. There is limited leaching of CCA from posts (Cookson and Lehane, 2002)[34], and no evidence that it is absorbed into the vine[8]. However, it is likely that the use of CCA will continue to be questioned, with the result that further restrictions may be placed on its use in Australia. CCA also slightly weakens timber (Bariska *et al*,. 1988)[3], especially the salt rather than oxide formulation. Perhaps the main problem facing CCA-treated posts will be their disposal after use. Current practice suggests that the treated timber cannot be burned in industrial facilities, so acceptance at landfills must be sought. The cost for custom treating posts to H4 requirements with CCA is around $80/m^3. Posts are not redried after treatment, but must be held at the treatment plant for several weeks until fixation is complete. Fixation can occur between 48 hours and several weeks, depending on the ambient temperature.

ACQ treatment

ACQ preservative, along with Tanalith E, is likely to replace CCA in a number of applications. These preservatives do not contain arsenic and chromium, so are considered safer to use, and the treated wood will be easier to dispose of compared to CCA-treated timber.

As with CCA, some weakening of timber may occur after ACQ treatment. One possible reason is that the alkaline preservative fractures some of the lignin and polysaccharides. Weakening in *P. radiata* posts appeared to be greater with ACQ (at H5 retentions) than CCA (at H4 retentions), while no effect could be demonstrated in hardwoods in comparison to PEC. ACQ has around four times the copper loading of CCA-treated posts, so can be more corrosive to fasteners. Therefore, stainless steel or hot dip galvanised fasteners are recommended.

Currently, ACQ and Tanalith E cannot compete on cost with CCA, at the H4 retentions requirements. The ACQ preservative is two to three times the price of CCA. When other treatment costs, which largely remain the same, are taken into consideration, ACQ-treated timber normally costs 20-30% more than CCA-treated timber.

[34] Cookson, L.J. and R. Lehane (2002). Safety of timber treated with CCA preservative. CSIRO FFP http://www.ffp.csiro.au/wft/wpc/ccafact1.htm.

CCA-treated pine posts, 2.4 m x 75-100 mm diameter, typically sell for $5-6 per post. Table 32 shows the possible costs associated with producing ACQ or PEC-treated hardwood posts treated to H4 requirements. It seems likely that ACQ or PEC-treated hardwood posts will be slightly dearer than CCA-treated pine posts, so will need to be marketed upon the benefit of having greater strength.

Table 32 Suggested cost structure for producing ACQ or PEC-treated hardwood posts

	Cost per post	**Cost per cubic metre (assume = 55 posts, = 1 tonne while green)**
Stumpage royalty	$0.36-0.64	$20-35
Harvest, assume 25% recovery as posts. Harvest costs $350/hr.	$0.91-1.00	$50-55
Transport posts to treatment plant	$0.36	$20
Seasoning losses, poor form	$0.55	$30
Preservative treatment	$1.45-1.80	$80-100
Total	$3.63-4.35	$200-220
Add profit - sale price at treatment plant	$5.10-5.45	$280-300
Allow up to 20% error in estimates – revised sale price at treatment plant	$5.10-6.54	$280-360
Add transportation costs to vineyard from treatment plant	$0.10-1.00	$5.50-55

Monitoring stage 1 posts

Before the current project began, a smaller vineyard post study was conducted on three eucalypt species treated with PEC[7]. A selection of these posts was installed at several locations, including 276 treated posts to a vineyard at Karadoc. Although the posts were installed, vines were not grown on the posts due to changed priorities at the vineyard. Nevertheless, the posts have been inspected annually for three years since installation. During inspections, soil core samples were removed to determine extent of preservative leaching, and they were also inspected for appearance and decay.

Polycyclic aromatic hydrocarbon (PAH) analysis

Mean PAH levels from surface soil samples taken at 50, 100 and 500 mm distances from PEC-treated posts are presented in Table 33.

Table 33: PAH levels in soil samples taken at distances from PEC-treated posts. Mean of 10 replicates.

Species	Mean PAH levels (mg/kg)*								
	50 mm from post			100 mm from post			500 mm from post		
	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr
E. grandis	26.1	15.4	24.1	2.5	2.1	3.3	<1.6	<1.6	<1.6
E. globulus	16.8	7.5	13.0	3.8	4.1	2.2	<1.6	<1.6	<1.6
E. camaldulensis	20.8	20.5	25.8	3.4	2.4	7.8	<1.6	<1.6	<1.6
P. radiata (HTC)^	25.5	12.0	30.0	1.7	3.1	2.1	<1.6	<1.6	<1.6

* Mean of ten replicates ^ Mean of two replicate 30 year old *P. radiata* posts

Samples taken 500 mm from all posts recorded negligible PAH levels, regardless of the sampling year. Initially, it was considered possible that levels might increase slightly in years two and three, but this did not occur. Sampling 100 mm from the posts also recorded low PAH levels. Apart from the three year *E. camaldulensis* result, an increase in PAH with time was not noticeable. PAH levels in soil samples taken 50 mm from posts were much higher. However, the mean concentrations are well below the Health Based Investigation Level of 100 mg/kg for industrial sites in the National Environment Protection Council Australia – Assessment of Site Contamination Guidelines.[35] No sample taken 50 mm from the post was above this level. The highest reading of 80 mg/kg was recorded for an *E. globulus* post after one year. Again, a significant increase in levels with time did not occur.

The HTC-treated *P. radiata* posts recorded levels similar to the PEC-treated posts. These posts have been in-service for almost 30 years. The evident lack of migration of PAH's into the soil from PEC-treated posts is thus encouraging.

Surface quality

Soil was excavated from around posts (except those used for PAH soil analysis) to a depth of 100 mm, to determine the extent of decay or termite attack, and then the soil was returned. No signs of biodeterioration could be found in any of the posts, when probed with a knife.

After one year, 70% of *E. grandis* posts were free of surface exudate and greasiness. These posts were dry and no oily deposits or black exudate (crud) was apparent on the surface. The remaining posts had between 2 and 20% crud present on surfaces visible above-ground. The second and third year inspections for surface cleanliness remained relatively unchanged.

For *E. globulus* approximately 60% of posts were free of any crud after one year in service. Once again the remaining posts had between 2 and 20% crud on the above-ground surfaces. The second and third year inspections recorded results similar to those of the first year.

In contrast to the excellent surface quality results of *E. grandis* and *E. globulus* posts, considerably more crud was present on *E. camaldulensis* posts. Only 26% of these posts were free of any exudate on the above-ground surfaces. The amount of crud present on the remaining posts ranged from 2 to 65%, with most having around 30% of the surface covered with crud.

Surface defects in terms of splits in two posts of *E. globulus* and *E. grandis* and one of *E. camaldulensis* exceeded the 8 mm allowable width as outlined in the Auspine Work Procedures Manual[20] after one year. Further inspections after two and three years indicated the split size in

---

[35] National Environment Protection Council (1999) *Assessment of site contamination Schedule B Guideline on the Investigation Levels for Soil and Groundwater.* NEPC 12 pp.

these posts remained unchanged and that no other posts had developed splits sufficient for rejection.

ACKNOWLEDGEMENTS

We gratefully acknowledge the generous help and support provided by several participants to this large project. Terry Hawkins (Koppers Timber Preservation Pty Ltd) provided creosote treatment facilities. Paul Dakis (Southcorp Wines Pty Ltd) and Jeff Dance (McWilliams Winery) provided vineyard test sites for posts. Fiona Macdonald (Murray Riverina Farm Forestry) provided *E. grandis* posts, Helen O'Sullivan (Silvagene, Timbercorp) provided *E. globulus* posts, Louise Maud (SE NSW Private Forestry) provided *A. mearnsii* posts, Charles Hajek (Victorian DPI) provided *E. cladocalyx* posts, Robin Heathcote (State Forests of NSW) provided *E. dunnii* posts and input to the commercial considerations. Barry McVilly (McVilly Timbers) provided advice and facilities for the CCA treatments. Jennifer Smith for statistical analysis of the posts strength tested at DPI Mildura. At CSIRO technical assistance on the project was provided by Damian Scown and Sam Zoobi. At Queensland DPI&F, Bill Atyeo carried out the strength testing evaluation and Eric Littee provided valuable technical assistance. The Forest and Wood Products Research and Development Corporation provided significant funding to the project.

MATERIALS AND METHODS

Harvest and debarking

Hardwoods

Trees of seven hardwood species, *E. grandis*, *E. globulus*, *C. maculata*, *E. pilularis*, *E. dunnii*, *E. cladocalyx*, and *A. mearnsii*, were harvested to produce posts measuring 2.4 metres in length and ranging in small end diameter from around 70-150 mm. The majority of posts were in the 75-100 mm range. Approximately 440 posts of each species were required. In addition, 100 posts of *E. grandis* and *E. globulus* were required for microwave conditioning to be carried out by The University of Melbourne, Creswick campus.

E. grandis posts were harvested from an irrigated plantation at Griffith in the Riverina district of New South Wales. Trees were almost three years of age and were debarked by hand immediately after harvest. *E. globulus* posts were cut from a seed orchard at Kinglake West in southern Victoria (Figure 20). Debarking was done by initially running over the posts with a tractor to loosen the bark and then fully removing the bark by hand. *C. maculata* and *E. pilularis* posts were harvested from six-year-old plots in the Beerburrum region in south east Queensland. *C. maculata* posts were debarked immediately after harvest by hand on site, while *E. pilularis* posts were transported back to the Queensland DPI&F's depot at Salisbury near Brisbane. *E. dunnii* posts were harvested from a seven-year-old plantation at Dorrigo in northern New South Wales. Trees were mechanically harvested using a Timbertech 500 Harvester. *E. cladocalyx* posts were harvested from a plantation near Horsham in western Victoria and immediately debarked by hand (Figure 21). *A. mearnsii* posts were harvested from a dense stand of natural regrowth at Towamba near Eden in south east New South Wales. Once again, debarking was carried out by hand soon after harvest.

Figure 20: *E. globulus* harvest at Kinglake

Figure 21: Debarking *E. cladocalyx* posts at Horsham

Softwoods

Two softwood species, *P. elliottii* and *A. cunninghamii*, were harvested to produce similarly dimensioned posts. All posts were in the 75-100 mm range. About 220 of each species were required. Both species were cut from the DPI&F plots at Beerburrum and were debarked using a Morbark peeler.

A further 220 *P. radiata* posts for comparative purposes were obtained from McVilly Timber, Timboon in south west Victoria. Of these, 120 remained untreated and were sent to Queensland for ACQ treatment, while the balance was treated with CCA. The posts had been debarked with a

Cambio Debarker. Sorting was carried out to remove those posts with the most visible cambium still attached.

Seasoning

Hardwoods

Three drying regimes were used to season the hardwood posts: 240 posts of each species were debarked, cross-stacked and covered with hessian (Figure 22); 100 posts were debarked, their ends gang-nailed to reduce splitting, cross-stacked and covered with hessian (Figure 23); and 100 posts had the bark left on (Figure 24), were cross-stacked and covered with hessian.

Figure 22: Debarked only *E. globulus* posts drying under hessian

Figure 23: Gang-nailed *E. globulus* posts

Figure 24: ***E. globulus*** **posts left to dry with the bark-on**

Softwoods

Softwood posts were also subject to three drying regimes: 120 of both species were debarked and cross-stacked in the open without shade; 50 posts were debarked, their ends sealed with a wax emulsion (MobilCer) to slow drying and cross-stacked in the open without shade (Figure 25); 50 posts were debarked and cross-stacked in the shade, by wrapping the stack in shade cloth (Figure 26).

Figure 25: **End-sealing** ***P. elliottii*** **posts**

Figure 26: ***A. cunninghamii*** **posts dried in the shade (wrapped in shade cloth)**

The sapwood moisture content of the outer posts in the stacks was checked periodically. All posts were air dried for at least three months, labeled with a stainless steel tag and then transported to Queensland DPI&F's depot at Salisbury, Brisbane. All debarked posts were sorted at Salisbury and then transported to the appropriate treatment plant. Posts dried with bark-on remained stored at Salisbury for another four months after which time they were hand debarked and transported to their respective treatment plant. The bark had been left on most species for almost 12 months. No *E. dunnii* was harvested for this drying regime.

Microwave drying

Posts to be microwave conditioned were left with the bark-on and end sealed with silicon to minimise longitudinal drying during transportation to the Melbourne University School of Forestry, Creswick. The posts were maintained in a wet condition through the use of water sprays and soaking until ready for debarking and conditioning. The maximum post diameter that could pass through the microwave (MW) applicator was 90 mm. Posts needed to be debarked, and some were oversize. Therefore, the posts were sent to McVilly Timbers at Beaufort, near Ballarat, to be debarked and peeled to a suitable diameter that would fit through the microwave pilot plant. The posts were passed three times through a cambio ring debarker and once through a Morbark peeler. Initial moisture contents were then determined.

Equipment
A 60 kW microwave (MW) installation was used. It included a MW power supply, wave guides, tuner, MW applicator, water load, tunnel, conveyor feeding system and dynamic air flow system. The dynamic air flow system removes vapours from the applicator and prevents water condensation on the walls of the applicator.

The parameters used for MW conditioning in this study included a power range of 18-54 kW at a frequency of 0.922 GHz. The timber was fed through at a speed of 5-15 mm/sec. Hot air (100-120^{o}C) was blown through the applicator to remove steam generated by MW treatment. MW intensity was 59 to 176 W/cm^2.

Two types of MW applicators were examined, a box applicator (Figure 27) and a conveyor applicator (Figure 28). These differ in the direction of the applied electromagnetic field. The box applicator had the wave guide with vector E parallel to the wood grain, while the conveyor applicator provides a vector E orientation perpendicular to the grain.

Figure 27: 60 kW microwave with box applicator

Figure 28: 60 kW microwave with conveyor applicator

The criterion used to evaluate the degree and success of MW wood modification was the uniformity of void distribution through the posts. Ten posts conditioned by each applicator method were examined in detail, by docking posts every 30 cm and visually examining for the presence of checks.

The temperature profile within a post was examined so that a profile of MW energy absorption by the post could be derived. The distribution of the energy released by the microwaves is used to provide an indication of the process efficiency. To obtain a temperature profile along the length of a post, a sample post was held stationary within the conveyor applicator. Sixteen fibre-optic sensors were inserted into the centre of the post, at 50 to 100 mm spacing, for 1.1 m of the 2.4 m post length. A low MW power setting of 7.2 kW was applied to ensure that the maximum temperature inside the post did not exceed 100^{o}C; otherwise, the subsequent deformation of the wood can damage the fibre optic probes. Additionally, reflected energy (energy not absorbed by the timber) was measured using a power meter so that the amount of energy absorbed by the post could be determined.

Preservative treatment

PEC treatment

A sample of hardwood posts from each of the four drying methods (including microwave conditioning) was delivered to Koppers Timber Preservation plant at Grafton in northern New South Wales.

Sighter treatment
Twenty posts of each species (including microwave posts) for the debarked only drying regime were treated with pigment emulsified creosote (PEC) to obtain a sighter on the required treatment schedule for the remaining posts. Each of these ‘sighter’ posts was weighed and their outside and heartwood diameters at both ends and their length measured. The measurements at each end were averaged in order to calculate the sapwood volume as accurately as possible. These posts were loaded in strapped bundles on to bogies and transported into the cylinder. The sighter posts underwent an H5 treatment schedule of 30 minutes initial vacuum at -90 kPa, 210 minutes pressure at 1400 kPa, and a 30 minute final vacuum at -90 kPa. Posts were removed from the cylinder and weighed the morning after when the hot fumes had dissipated from the posts. The PEC retentions were then calculated and the treatment schedules for the remaining posts determined.

Treatment of main test material
The remaining debarked only (including microwave posts) and debarked and gang-nail posts were treated in two charges. All *E. grandis*, *E. globulus*, *E. pilularis* and *E. dunnii* posts were treated together using an H4 schedule of 15 minutes initial vacuum at -95 kPa, 45 minutes pressure at 1400 kPa and 15 minutes final vacuum at -95 kPa. The more difficult to treat species, *C. maculata*, *E. cladocalyx*, and *A. mearnsii*, as determined by the sighter uptakes, were treated using the same H5 schedule outlined above.

Prior to treatment, thirty posts for each species/drying regime were weighed and their outside and heartwood diameters at both ends and their length measured. After treatment, posts were weighed to determine PEC retentions (Figure 29). These same posts were later assessed for defects, strength tested and assessed for preservative penetration.

Figure 29: Post-treatment weight of a PEC-treated post

After impregnation with PEC, the treated posts were allowed to air dry in bundles in the Koppers exposure yard (Figure 30) before being transported to Salisbury for further sorting.

Figure 30: PEC-treated posts immediately after treatment

Posts from the bark-on drying regime arrived at the Koppers treatment plant approximately four months later. At the time, the plant was not treating with PEC as it had a large export order to fulfill using a 70% conventional creosote and 30% 180 CST fuel oil mix. To keep the work program on schedule it was decided to treat the posts with the creosote + oil mix. Posts were treated to full sapwood penetration using the H5 schedule used previously. Once again, prior to treatment, thirty posts for each species were weighed and measured. After treatment, posts were weighed to determine creosote + oil retentions. The posts were left to air-dry in the yard before being transported to Salisbury, where they were sorted for strength testing and exposure at demonstration sites.

Surface quality and penetration of test material

After strength testing, the broken creosote-treated posts, for which creosote uptakes had already been measured, were sent to CSIRO for assessment of penetration patterns and the calculation of creosote retentions. The surface condition of each post was visually assessed for oil and crud. Posts were cross-sectioned with a chainsaw 500 mm from one end and the penetration and distribution of creosote recorded immediately after being cut. Photos of the freshly cut surfaces were taken before significant bleeding occurred.

ACQ treatment

Hardwood and softwood posts from all drying methods were transported to Perma Log Products at Narangba in southeast Queensland for ACQ treatment.

Sighter treatment

Twenty posts from the debarked only hardwoods and the softwoods dried in the open were treated with ACQ in a single charge to determine preservative treatment characteristics. Prior to treatment, all sighter posts were weighed and their outside and heartwood diameters at both ends and their length measured. The measurements at each end were averaged in order to calculate the treatable volume as accurately as possible. A Bethell process was used to treat the charge and the treatment parameters are shown in Table 34. This treatment schedule is used by Perma Log to treat *P. elliottii*. All posts were reweighed after treatment and the liquid absorptions calculated. As treatment was carried out in a commercial treatment plant, further adjustment of the treatment schedule was not possible.

Table 34: Treatment charge parameters for sighter posts treated with ACQ

Parameter	Level
Solution strength	0.012 kg/litre
Initial vacuum	-90kPa
Time at maximum vacuum	10 minutes
Maximum pressure	1450 kPa
Time at pressure	10 minutes (refusal)
Second vacuum	Up to – 90 kPa then release
Total charge volume	9.75 m^3
Charge absorption	348 L/m^3
Charge retention	4.2 kg/m^3

Treatment of main test material

All test species were checked for moisture content prior to treatment. Posts were then treated with ACQ (Figure 31) in two charges using the same treatment conditions presented in Table 34. The second charge contained the hardwood posts that had been dried with bark-on (but removed before treatment). This charge was carried out four months after the initial charge.

Figure 31: Untreated posts being loaded into the ACQ treatment cylinder at Perma Log Products

Chemical analysis and penetration of test material

After treatment, the posts were allowed to air dry in bundles at Perma Log before being transported back to Salisbury. Posts were sorted for strength testing and exposure at demonstration sites. Twenty of the thirty posts, for each species and drying method that were strength tested at Queensland DPI&F, were randomly selected for testing of preservative penetration (based on the copper component) and retention by chemical analysis. A spot test reagent (Dimethyl Orange for hardwoods, Variamine Blue RT for softwoods) was used to determine the sapwood diameter of each post. In addition, the ACQ-treated gang-nailed and bark-on posts, strength tested at DPI Mildura, were sent to Queensland DPI&F for preservative penetration and chemical analysis.

A 300 mm cross-section sample was removed 450 mm from the end of the post as shown in Figure 32. A 50-75 mm billet was cut from the 300 mm sample. The analytical sample was sectioned from the sapwood zone and then Wiley milled to pass a 2 mm screen. Elemental copper analysis was conducted on a 1-2 g homogenised sawdust sample by extraction and measurement of concentration by Atomic Absorption Spectrometry according to the Queensland DPI&F test method of copper determination.[36] DDAC analysis was conducted by extraction and three phase titration according to the Queensland DPI&F test method of determination of alkyl ammonium compounds in wood.[37]

The other end of the post was used to determine if it met the penetration requirements in AS 1604.1-2000[16]. The post was cross-cut 400 mm from the end. A further 50-75 mm section was removed from the longer piece and sprayed with chromazurol indicator and the copper penetration recorded.

[36] Queensland Department of Primary Industries and Fisheries Test method (2004). Determination of copper in wood treated with ACQ #WACQC Controlled document. 6 pp.
[37] Queensland Department of Primary Industries and Fisheries Test method (2004). Determination of Alkyl ammonium compounds in wood. #WDDAC Controlled document. 8 pp.

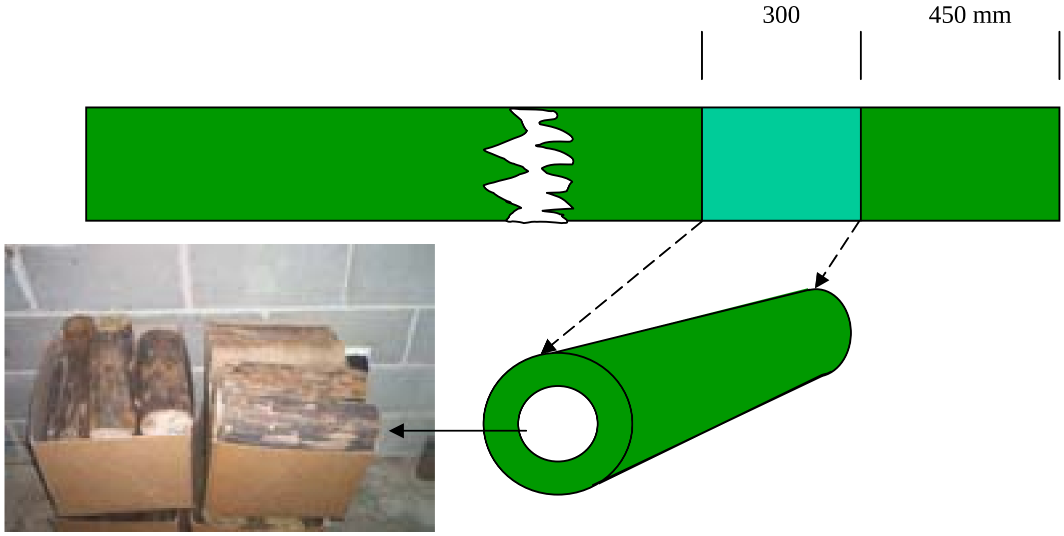


Figure 32: Sampling procedure for ACQ analysis

CCA treatment

As previously mentioned, 100 air dried *P. radiata* posts were treated with CCA at McVilly Timbers, Timboon in southwest Victoria. Posts were treated using an H4 schedule, with the maximum initial vacuum of -60 kPa held for 7 minutes, a maximum pressure of 1400 kPa held for 5 minutes, and a maximum final vacuum of -60 kPa held for 5 minutes. A sample of ten posts was initially checked to determine if they met penetration requirements in AS 1604.1-2000[16]. Posts were cross-sectioned and then sprayed with chromazurol indicator to determine copper penetration. Further analysis to determine CCA retentions and preservative penetration of the sapwood of 20 posts was carried out by Queensland DPI&F after they had been strength tested.

Strength testing and evaluation of surface defects at DPI Mildura

After preservative treatment and sorting at Queensland DPI&F, selected posts were transported to DPI Mildura for strength testing and the evaluation of surface defects. Table 35 shows the post types evaluated for surface defects and strength tested using the cantilever method. In addition to those shown in the table, CCA-treated *P. radiata* was also strength tested.

Table 35: Species/treatment/drying method combinations strength tested using a cantilever test at Mildura, with 30 replicates for each.

Species	PEC and ACQ				ACQ		
	Debark only	Debark + gang-nail	Bark-on	Microwave drying	Debark open	Debark End-seal	Debark shade
E. grandis	Y	Y	Y	Y			
E. globulus	Y	Y	Y	Y			
C. maculata	Y	N	N				
E. pilularis	Y	N	N				
E. dunnii	Y	N					
E. cladocalyx	Y	Y	Y				
A. mearnsii	Y	Y	Y				
P. elliottii					Y	N	N
A. cunninghamii					Y	N	N
*P. radiata**					Y		

* *P. radiata* only treated with ACQ or CCA

Surface defects

Posts transported to Mildura were first evaluated for surface defects in terms of splits and knots. The Auspine Work Procedures Manual (a vineyard trellis post manufacturer)[20] was followed to evaluate surface defects. Some of the grade descriptions provided in the manual are:

- Diameter of an individual knot shall not exceed 12.5% of post circumference at knot.
- Diameter of all knots over 150 mm length shall not exceed 50% of post circumference.
- Change in diameter due to presence of knot whorl shall not exceed 10 mm.
- No single end split shall equal or exceed 8 mm width and the sum of the widths shall not equal or exceed 19 mm.

Each post was checked for splits (Figure 33) and the width of each split measured at the thinner end of the post. In-line posts for vineyards are usually driven 600 mm into the ground. This was simulated in the test rig by clamping each post at 600 mm from the thick end for strength testing. The bending moment for each post under load would be maximised at the clamp. The presence of a knot at this point may reduce the load bearing capacity of a post. Therefore, the presence of knots at 600 mm from the thick end of each post was checked and recorded. Diameters of other knots were also checked to see whether they complied with the grading descriptions stated in the Auspine Work Procedures Manual[20].

Figure 33: End splits in some posts

Strength testing

Method

The equipment used for bending strength tests consisted of a portable test rig capable of applying horizontal pulls of up to 10 tonnes at a particular height, a fixed bed rig (post clamping facility installed in concrete), STC tension load cell, digital indicator and a tractor with double acting hydraulic remote (Figure 34).

The portable test rig was used with the fixed bed rig to measure the strength of individual posts. A chain, connected to a hydraulic cylinder of the portable rig, applied horizontal pull (Figure 34). The post to be tested was placed at a depth of 600 mm in the fixed bed rig and held firmly by the clamp. The portable rig was placed against the concrete bed and the end of the chain was tied to the post at 1.4 m above the clamp of the fixed bed rig. The tractor was reversed on the portable rig (Figure 34), so the weight of the tractor could act as an anchor during the testing. The hydraulic cylinder was activated through the hydraulic remote of the tractor to apply the pull, which gradually increased until the post broke. The STC load cell, in association with the digital indicator, measured the peak pulling force at post breakage.

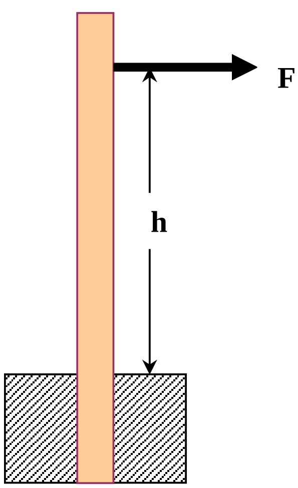
Before strength testing, the circumference of each post was measured at 600 mm from the thick end to calculate the diameter of the post at the clamp. The diameter and breaking force were used in the calculation of bending strength.

Posts were broken individually, with 9 or 10 posts being broken consecutively in batches (blocks) without stopping the test. The blocks and the order of breaking individual posts were specified by a formal experimental design. The experimental design was a randomised incomplete block design with four consecutive blocks (two with 10 posts and two with 9 posts) constituting a replicate of all 38 treatments.

Figure 34: Posts being strength tested using the cantilever method

Strength calculation

The simplest way to simulate a bending load on a trellis post in the vineyard, and test it for strength, is to clamp a post at the bottom and apply a horizontal pull at the top (Figure 34). The bending strength of the post material can be defined as the value of maximum stress (**σ**) that occurs when the post breaks (Figure 35).



F = Pull (N)

h = height of pull (m)

BM = (F × h), bending moment (Nm)

z = (πD^3 / 32), section modulus for a round post

D = post diameter (m)

σ = (BM / z), maximum stress in timber (post strength) (Pa)

Figure 35: Schematic diagram of a loaded post, and formulae to calculate post strength.

Statistical methods

The bending strength for each post was initially analysed using Residual Maximum Likelihood (REML)[38]. **P**-values for the Wald-statistic were used to test which factors were significant at the P < 0.05 level. Subsequent REML analyses were carried out on the relevant subsets of species and, if a factor or interaction were significant at the P < 0.05 level, specific pairwise comparisons of interest were made using **t**-tests with standard errors of difference (**sed**) based on the variances for the particular bundles in the comparison, rather than the overall **sed** from the REML analyses.

The ranking of species by bending strength with statistical significance tests was done using the Hochberg modification of the Bonferroni criterion in order to maintain the overall level of significance at P < 0.05[39]. Using this method all the **P**-values for differences between means were ordered from highest to lowest and tested sequentially in that order. The null hypothesis of no difference for an individual comparison was rejected (i.e. a significant result was claimed) if the **P**-value was less than or equal to $1 - 0.95^{1/(\mathbf{i}+1)}$ where **i** was the number of hypotheses already tested and not rejected. All **P**-values lower than the first significant **P**-value were also declared significant at the 0.05 level. Hence the criterion for each pairwise comparison when ranking species treated with ACQ was P < 0.004, and when ranking species treated with PEC was P < 0.007.

Strength testing at Queensland DPI&F

After treatment and sorting, a sample of posts remained at Queensland DPI&F for strength testing. Table 36 shows the posts which were strength tested using the 4-point bending test method. In addition to those shown in the table, CCA-treated *P. radiata* was also strength tested.

Table 36: Species/treatment/drying method combinations strength tested using a 4-point bending test. 30 replicates of each.

Species	PEC and ACQ				ACQ		
	Debark only	Debark + gang-nail	Bark-on	Microwave drying	Debark open	Debark End-seal	Debark shade
E. grandis	Y	N	N	N			
E. globulus	Y	N	N	N			
C. maculata	Y	Y	Y				
E. pilularis	Y	Y	Y				
E. dunnii	Y	Y					
E. cladocalyx	Y	N	N				
A. mearnsii	Y	N	N				
P. elliottii					Y	Y	Y
A. cunninghamii					Y	Y	Y
*P. radiata**					Y		

* *P. radiata* only treated with ACQ or CCA

Measurements were carried out on a Shimadzu 30 T Universal Testing Machine (Figure 36) using a load range of 60 kilo newtons over a four point load. Shaped supports for round wood were used. The upper span was 720 mm and the lower span 2160 mm. The deflection was taken at the centre span and measurements were carried out using a dial gauge or displacement transducer.

[38] Payne R. W, Baird, D. B., Cherry, M., Gilmour, A. R., Harding, S. A., Kane, A. F., Lane, P. W., Murray, D. A., Soutar, D. M., Thompson, R., Todd, A. D., Tunnicliffe, W. G, Webster, R., Welham, S. J. (2003). *The Guide to GenStat Release 7.1, Part 2*: Statistics. Oxford: VSA International.

[39] Hochberg, Y, and Benjamini, Y. (1990): More powerful procedures for multiple significance testing. *Statistics in Medicine* **9**, 811-818.

The test method is based on AS/NZS 4063: 1992 Timber - Stress-graded - In-grade strength and stiffness evaluation-Section 8[40]. This in turn is based on ASTM D198: Methods of static tests of timbers in structural sizes-Sections 4 - 11[41].

The attributes measured were stiffness in bending (Modulus of Elasticity (MOE)) and ultimate bending strength (Modulus of Rupture (MOR)). The load was applied to each specimen at a rate of 15 - 20 mm per minute of crosshead movement. A load/deflection curve was taken at 4 points within the range 0 to 8 kN for calculation of the load/deflection slope. The transducer was removed as loading continued until failure of the specimen. The maximum load attained before failure was recorded. These data, plus the specimen dimensions, were used to calculate the MOE and MOR. In these tests, the specimen was assumed to be a cylinder whose diameter was the mean of the posts small and large end diameters.

Figure 36: Strength testing an *A. mearnsii* post using the 4-point bending test method

Comparison between strength testing at DPI Mildura and Queensland DPI&F

DPI Mildura tested 38 treatment/drying combinations using the cantilever method (simulating vineyard situation), and Queensland DPI&F tested 32 different combinations using the 4-point bending test in the laboratory. Of these, 18 combinations were common to both tests.

Queensland DPI&F calculated the MOR as a measure of post bending strength for each post. MOR was considered to be equivalent to the bending strength analysis used in the DPI Mildura testing.

Queensland DPI&F testing of the different combinations was not randomised. In most cases replicates of a given combination were tested on the same day or over two days. Any variation between testing days was likely to be obscured by variation between posts. No formal statistical analysis of the QFRI data was undertaken, but the mean MOR for each of the 18 combinations was compared with the means from the DPI Mildura.

---

[40] Standards Australia (1992) *Timber - Stress-graded - In-grade strength and stiffness evaluation* Section 8: AS/NZS 4063 1992 Standards Australia, Homebush, New South Wales.

[41] ASTM International 1998, 'Methods of static tests of timbers in structural sizes' ASTM D198-02: 1998 Sections 4-11

Field installation

Grapevine trellises were constructed from 1460 treated posts, consisting of 520 PEC, 810 ACQ, 70 creosote + oil, and 60 CCA, at demonstration sites in Victoria and New South Wales. A further 190 posts (80 PEC and 110 ACQ) were installed as fencing around a woodlot at a demonstration site in Bega.

Seppelt

Vineyards at Seppelt are located at Great Western in North West Victoria. Great Western is part of a major wine-grape growing region of the Australian wine industry. The vineyards of this area receive an average annual rainfall of 530 mm and the soil is a limey loam with a clay underlay. Supplementary irrigation is used as there is a shortage of moisture over the summer months.

A total of 880 posts comprising 295 PEC, 485 ACQ, 70 creosote + oil and 30 CCA were installed. Thirty posts of each species from the ‘debarked only’ drying regime along with ten posts of each species from the other drying methods were used to construct the trellis. Ten posts of the same species and drying regime were grouped together to form 88 groups. The groups were then randomised prior to installation.

The posts were laid along the rows in their groups. Contractors, using an auger attached to the back of a tractor, drilled pilot holes. To coincide with drilling, a jet of water was squirted into the hole to create a slurry. The post was positioned in the hole with the large end down and then rammed into place until the required depth was obtained. Each row was around 300 metres long and in all 18 rows were used. The remainder of the block, and the end strainer posts, consisted of CCA-treated *P. radiata* from a commercial supplier.

McWilliams

McWilliams Hanwood Estate vineyards are situated at Griffith in the Riverina region of southern New South Wales. The region is credited with producing more than two-thirds of New South Wales’ wine and one-quarter of Australia’s total wine production. The vineyard at Hanwood has a sandy loam soil overlaying a clay soil. The average annual rainfall is 410 mm and irrigation is used.

Trellises were constructed from 580 posts, consisting of 225 PEC, 325 ACQ and 30 CCA-treated posts. Twenty posts of each species for ‘debarked only’ and ten from the other drying methods were used. Posts that had been dried with the bark left on were not installed at this site. Again, 10 posts of the same species and drying regime were grouped together to form 58 groups and subsequently randomised prior to installation.

Posts were laid along the rows in their groups and then mechanically rammed into position with the small end down. This is the preferred method of the area. The rows were 650 metres long and six rows were used to construct the trellis. The remainder of the block, and end strainer posts, consisted of HTC-treated *P. radiata* from a commercial supplier.

Monitoring stage 1 posts

Grapevine trellises, constructed in May 2000 from 276 posts treated with PEC as part of stage one of the project[42], were inspected annually for three years. Due to changing priorities at the vineyard, vines were not grown on these posts, and they were not spray irrigated. At each inspection all posts were examined for preservative cleanliness (% crud on post surface), splits and the presence of biodeterioration at the groundline.

---

[42] McCarthy, K.J., Scown, D.K., and Cookson, L.J. (2001). *Vineyard trellis posts from treated eucalypts grown in low rainfall areas or using effluent water. Part 2: Preservative treatment and field installation.* CSIRO Forestry and Forest Products Client Report No. 930 20pp.

Soil samples were collected (Figure 37) annually from the same ten random posts of each of the three species. Samples were taken in a different direction each year at distances of 50, 100 and 500 mm from the post. In addition, samples were taken from two HTC-treated *P. radiata* posts at a nearby vineyard for comparative purposes. Approximately 100 g of soil was collected into a glass jar and placed in a refrigerated container. The samples were transported to the Australian Government Analytical Laboratories (AGAL) and analysed for 16 PAH's known to be present in creosote. Analysis was carried out using a Gas Chromatograph Mass Spectrometer (GCMS).

Figure 37: Collection of soil at Lindemans Winery, Karadoc

APPENDIX A PEC and creosote retentions

E. grandis debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
228	80	50	2410	0.0121	0.0074	6.109	10.546	4.437	601.1	390.7	504.3	443.8	135.4	88.0
261	75	55	2470	0.0109	0.0050	6.852	9.86	3.008	596.4	387.6	627.9	552.6	107.9	70.2
232	75	55	2410	0.0106	0.0049	6.721	9.743	3.022	614.1	399.1	631.3	555.5	110.5	71.9
241	90	70	2420	0.0154	0.0061	8.573	12.752	4.179	687.1	446.6	556.9	490.0	140.2	91.1
247	85	60	2430	0.0138	0.0069	7.318	10.912	3.594	519.5	337.7	530.7	467.0	111.2	72.3
234	80	45	2400	0.0121	0.0082	6.435	10.896	4.461	540.9	351.6	533.4	469.4	115.2	74.9
273	80	60	2415	0.0121	0.0053	7.77	10.827	3.057	575.6	374.1	640.1	563.3	102.2	66.4
236	80	50	2420	0.0122	0.0074	7.01	10.931	3.921	529.0	343.8	576.3	507.1	104.3	67.8
244	90	60	2405	0.0153	0.0085	9.821	14.862	5.041	593.1	385.5	641.9	564.9	105.0	68.2
246	80	50	2290	0.0115	0.0070	8.376	12.245	3.869	551.6	358.5	727.7	640.3	86.1	56.0
262	80	65	2305	0.0116	0.0039	7.402	10.383	2.981	757.1	492.1	638.9	562.2	134.7	87.5
274	90	50	2255	0.0143	0.0099	8.044	12.915	4.871	491.1	319.2	560.7	493.4	99.5	64.7
259	100	65	2390	0.0188	0.0108	10.249	15.754	5.505	507.8	330.1	546.0	480.5	105.7	68.7
237	90	60	2400	0.0153	0.0085	9.224	12.862	3.638	428.9	278.8	604.1	531.6	80.7	52.4
242	90	55	2398	0.0153	0.0096	8.74	13.528	4.788	500.9	325.6	572.9	504.2	99.4	64.6
235	80	60	2350	0.0118	0.0052	7.772	11.092	3.320	642.4	417.6	658.0	579.0	111.0	72.1
226	70	50	2400	0.0092	0.0045	6.765	9.859	3.094	683.9	444.6	732.4	644.5	106.1	69.0
239	80	50	2380	0.0120	0.0073	7.304	11.277	3.973	545.0	354.2	610.5	537.3	101.4	65.9
233	85	55	2420	0.0137	0.0080	7.552	11.772	4.220	528.6	343.6	549.9	484.0	109.2	71.0
264	80	60	2380	0.0120	0.0052	6.79	10.879	4.089	781.3	507.8	567.6	499.5	156.4	101.7
243	80	55	2395	0.0120	0.0063	7.519	11.659	4.140	652.1	423.9	624.6	549.6	118.6	77.1
275	75	50	2400	0.0106	0.0059	6.969	11.126	4.157	705.7	458.7	657.3	578.4	122.0	79.3
253	85	65	2410	0.0137	0.0057	8.37	11.831	3.461	609.5	396.2	612.0	538.6	113.2	73.6
230	80	60	2398	0.0121	0.0053	7.704	11.289	3.585	679.8	441.9	639.1	562.4	120.9	78.6
238	85	65	2390	0.0136	0.0056	7.325	11.231	3.906	693.6	450.9	540.1	475.3	145.9	94.9
249	75	50	2295	0.0101	0.0056	6.212	9.352	3.140	557.5	362.3	612.7	539.2	103.4	67.2
248	80	55	2380	0.0120	0.0063	7.552	11.528	3.976	630.2	409.7	631.3	555.5	113.5	73.7
255	80	55	2390	0.0120	0.0063	8.549	12.326	3.777	596.2	387.5	711.6	626.2	95.2	61.9
225	80	60	2405	0.0121	0.0053	8.064	11.176	3.112	588.4	382.5	667.1	587.0	100.2	65.2
227	80	50	2415	0.0121	0.0074	7.035	10.969	3.934	531.8	345.7	579.5	510.0	104.3	67.8
Mean											**610**		**112.0**	**72.8**
S.D.													**16.8**	**10.9**

E. grandis debarked + microwave dried

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
558	80	65	2465	0.0124	0.0042	7.391	10.064	2.673	634.8	412.6	596.5	524.9	120.9	78.6
535	75	55	2430	0.0107	0.0050	6.177	8.835	2.658	535.7	348.2	575.4	506.3	105.8	68.8
528	85	60	2414	0.0137	0.0069	8.302	11.053	2.751	400.3	260.2	606.1	533.3	75.1	48.8
589	80	60	2515	0.0126	0.0055	6.225	9.678	3.453	624.3	405.8	492.4	433.3	144.1	93.7
552	80	60	2230	0.0112	0.0049	7.067	10.318	3.251	662.9	430.9	630.5	554.8	119.5	77.7
507	75	60	2490	0.0110	0.0040	6.499	10.014	3.515	887.6	576.9	590.8	519.9	170.7	111.0
540	80	60	2428	0.0122	0.0053	6.071	9.233	3.162	592.2	384.9	497.4	437.7	135.3	87.9
513	80	55	2388	0.0120	0.0063	7.142	9.959	2.817	445.0	289.3	595.0	523.6	85.0	55.2
566	80	60	2396	0.0120	0.0053	7.396	10.307	2.911	552.5	359.1	614.1	540.4	102.2	66.5
527	90	60	2455	0.0156	0.0087	8.286	11.195	2.909	335.3	217.9	530.5	466.9	71.8	46.7
578	80	55	2450	0.0123	0.0065	7.664	10.609	2.945	453.5	294.8	622.3	547.6	82.8	53.8
593	80	60	2433	0.0122	0.0054	7.828	10.429	2.601	486.1	316.0	640.1	563.3	86.3	56.1
586	75	55	2420	0.0107	0.0049	6.579	9.406	2.827	572.1	371.8	615.4	541.5	105.6	68.7
512	75	60	2455	0.0108	0.0039	6.302	8.512	2.210	566.0	367.9	581.1	511.3	110.7	72.0
553	90	70	2390	0.0152	0.0060	7.564	10.795	3.231	537.9	349.6	497.5	437.8	122.9	79.9
542	70	55	2390	0.0092	0.0035	5.057	7.218	2.161	614.0	399.1	549.8	483.8	126.9	82.5
551	75	60	2420	0.0107	0.0038	7.096	9.694	2.598	675.0	438.8	663.7	584.1	115.6	75.1
559	70	50	2455	0.0094	0.0046	6.24	8.83	2.590	559.7	363.8	660.5	581.2	96.3	62.6
567	75	55	2440	0.0108	0.0050	6.724	9.465	2.741	550.1	357.6	623.8	548.9	100.2	65.1
595	75	50	2400	0.0106	0.0059	5.934	9.526	3.592	609.8	396.4	559.7	492.5	123.8	80.5
520	80	60	2458	0.0124	0.0054	6.392	9.868	3.476	643.1	418.0	517.4	455.3	141.2	91.8
544	70	50	2435	0.0094	0.0046	5.758	8.048	2.290	498.9	324.3	614.5	540.7	92.3	60.0
565	85	50	2465	0.0140	0.0091	8.465	11.815	3.350	366.2	238.0	605.2	532.6	68.8	44.7
574	90	60	2405	0.0153	0.0085	6.929	11.189	4.260	501.2	325.8	452.9	398.5	125.8	81.7
561	90	65	2435	0.0155	0.0074	7.532	10.58	3.048	411.3	267.3	486.2	427.9	96.1	62.5
575	85	70	2439	0.0138	0.0045	6.956	9.89	2.934	658.8	428.2	502.6	442.3	148.9	96.8
555	80	65	2410	0.0121	0.0041	7.616	10.862	3.246	788.5	512.5	628.7	553.3	142.5	92.6
581	85	60	2415	0.0137	0.0069	7.426	10.762	3.336	485.2	315.4	541.9	476.9	101.7	66.1
Mean											**574**		**111.4**	**72.4**
S.D.													**24.9**	**16.2**

E. globulus debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
321	100	60	2375	0.0187	0.0119	13.694	17.863	4.169	349.2	227.0	734.1	646.0	54.1	35.1
330	90	60	2390	0.0152	0.0084	8.816	13.293	4.477	530.0	344.5	579.8	510.2	103.9	67.5
264	80	60	2397	0.0120	0.0053	8.975	11.862	2.887	547.7	356.0	744.9	655.5	83.6	54.3
336	75	45	2380	0.0105	0.0067	8.14	11.335	3.195	474.8	308.6	774.2	681.3	69.7	45.3
340	90	40	2385	0.0152	0.0122	9.402	13.538	4.136	339.7	220.8	619.7	545.3	62.3	40.5
318	90	65	2380	0.0151	0.0072	10.365	13.724	3.359	463.7	301.4	684.6	602.4	77.0	50.0
275	95	70	2390	0.0169	0.0077	9.238	13.501	4.263	550.6	357.9	545.3	479.9	114.7	74.6
334	90	50	2395	0.0152	0.0105	10.568	14.568	4.000	379.7	246.8	693.6	610.4	62.2	40.4
268	80	40	2400	0.0121	0.0090	9.062	12.249	3.187	352.2	229.0	751.2	661.0	53.3	34.6
329	80	35	2400	0.0121	0.0098	7.87	10.304	2.434	249.5	162.2	652.4	574.1	43.5	28.3
276	100	50	2392	0.0188	0.0141	10.374	14.698	4.324	306.9	199.5	552.2	485.9	63.2	41.0
271	90	45	2410	0.0153	0.0115	9.148	14.18	5.032	437.6	284.4	596.7	525.1	83.3	54.2
323	80	40	2395	0.0120	0.0090	9.862	13.565	3.703	410.1	266.6	819.2	720.9	56.9	37.0
272	95	60	2400	0.0170	0.0102	11.798	18.637	6.839	668.8	434.7	693.5	610.3	109.6	71.2
274	90	50	2414	0.0154	0.0106	7.885	12.974	5.089	479.3	311.6	513.4	451.8	106.1	69.0
266	80	60	2375	0.0119	0.0052	11.166	14.677	3.511	672.2	437.0	935.3	823.1	81.7	53.1
315	110	75	2410	0.0229	0.0123	15.158	21.756	6.598	538.4	349.9	661.8	582.4	92.4	60.1
333	80	50	2385	0.0120	0.0073	8.092	11.644	3.552	486.2	316.0	675.0	594.0	81.9	53.2
332	100	60	2387	0.0187	0.0120	13.594	18.202	4.608	384.1	249.6	725.1	638.1	60.2	39.1
337	90	55	2390	0.0152	0.0095	8.573	12.219	3.646	382.7	248.8	563.8	496.2	77.1	50.1
339	80	50	2407	0.0121	0.0074	8.638	10.719	2.081	282.3	183.5	713.9	628.3	44.9	29.2
313	100	55	2420	0.0190	0.0133	11.517	15.326	3.809	287.3	186.8	605.9	533.2	53.9	35.0
319	85	60	2405	0.0136	0.0068	9.994	12.112	2.118	309.3	201.1	732.3	644.4	48.0	31.2
263	100	65	2398	0.0188	0.0109	12.555	17.602	5.047	464.0	301.6	666.6	586.6	79.1	51.4
326	95	60	2378	0.0169	0.0101	9.364	12.424	3.060	302.0	196.3	555.5	488.9	61.8	40.2
262	95	50	2380	0.0169	0.0122	10.105	14.807	4.702	385.5	250.6	599.0	527.1	73.1	47.5
314	115	60	2380	0.0247	0.0180	13.286	19.139	5.853	325.3	211.5	537.4	472.9	68.8	44.7
338	115	75	2380	0.0247	0.0142	14.175	20.864	6.689	470.8	306.1	573.4	504.6	93.3	60.7
270	90	60	2387	0.0152	0.0084	9.713	13.533	3.820	452.8	294.3	639.6	562.9	80.4	52.3
265	90	70	2382	0.0152	0.0060	10.555	14.536	3.981	665.0	432.2	696.5	612.9	108.5	70.5
Mean											**661**		**74.9**	**48.7**
S.D.													**20.2**	**13.1**

E. globulus debarked + microwave dried

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
521	70	45	2405	0.0093	0.0054	6.042	9.804	3.762	692.7	450.3	652.8	574.5	5.31696	574.5
582	75	55	2420	0.0107	0.0049	7.685	10.637	2.952	597.4	388.3	718.8	632.6	6.7628	632.6
519	85	60	2285	0.0130	0.0065	6.97	9.798	2.828	434.7	282.6	537.5	473.0	6.1336	473.0
605	80	50	2415	0.0121	0.0074	7.102	11.09	3.988	539.1	350.4	585.1	514.8	6.24976	514.8
600	80	50	2370	0.0119	0.0073	7.03	11.171	4.141	570.4	370.8	590.1	519.3	6.1864	519.3
505	70	45	2425	0.0093	0.0055	6.927	10.419	3.492	637.7	414.5	742.2	653.2	6.09576	653.2
526	65	40	2380	0.0079	0.0049	5.718	8.455	2.737	557.8	362.6	724.0	637.1	5.03184	637.1
565	75	60	2390	0.0106	0.0038	7.182	10.438	3.256	856.6	556.8	680.2	598.6	6.32016	598.6
501	70	50	2400	0.0092	0.0045	7.359	9.846	2.487	549.7	357.3	796.7	701.1	6.47592	701.1
604	80	60	2455	0.0123	0.0054	7.471	9.697	2.226	412.3	268.0	605.4	532.8	6.57448	532.8
591	80	55	2402	0.0121	0.0064	8.393	11.755	3.362	528.0	343.2	695.1	611.7	7.38584	611.7
609	70	50	2390	0.0092	0.0045	6.344	9.088	2.744	609.1	395.9	689.7	607.0	5.58272	607.0
511	85	65	2440	0.0138	0.0057	8.918	13.573	4.655	809.7	526.3	644.1	566.8	7.84784	566.8
530	75	55	2365	0.0104	0.0048	6.502	9.742	3.240	670.9	436.1	622.3	547.6	5.72176	547.6
566	85	55	2385	0.0135	0.0079	7.456	11.324	3.868	491.7	319.6	550.9	484.8	6.56128	484.8
550	70	50	2464	0.0095	0.0046	7.115	10.318	3.203	689.6	448.3	750.3	660.3	6.2612	660.3
563	70	45	2360	0.0091	0.0053	6.842	10.066	3.224	605.0	393.2	753.3	662.9	6.02096	662.9
580	80	50	2420	0.0122	0.0074	7.408	10.566	3.158	426.0	276.9	609.0	535.9	6.51904	535.9
561	80	55	2368	0.0119	0.0063	6.761	9.7	2.939	468.2	304.3	568.0	499.9	5.94968	499.9
548	65	50	2375	0.0079	0.0032	6.776	9.069	2.293	712.6	463.2	859.8	756.6	5.96288	756.6
553	80	55	2380	0.0120	0.0063	8.226	10.61	2.384	377.9	245.6	687.6	605.1	7.23888	605.1
570	75	50	2328	0.0103	0.0057	6.473	8.743	2.270	397.3	258.2	629.4	553.9	5.69624	553.9
587	75	55	2455	0.0108	0.0050	7.917	11.374	3.457	689.6	448.2	730.0	642.4	6.96696	642.4
603	75	40	2368	0.0105	0.0075	7.001	9.187	2.186	292.0	189.8	669.2	588.9	6.16088	588.9
595	75	45	2470	0.0109	0.0070	7.226	10.755	3.529	505.3	328.5	662.2	582.7	6.35888	582.7
606	80	55	2405	0.0121	0.0064	7.19	10.493	3.303	518.1	336.8	594.8	523.4	6.3272	523.4
508	75	60	2350	0.0104	0.0037	7.329	10.177	2.848	762.0	495.3	705.9	621.2	6.44952	621.2
567	75	60	2375	0.0105	0.0038	6.232	9.352	3.120	826.0	536.9	594.0	522.7	5.48416	522.7
Mean											**666**		**99.3**	**64.5**
S.D.													**24.0**	**15.6**

C. maculata debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	**≡HTC**			**PEC**	**≡HTC**
301	90	50	2420	0.0154	0.0106	15.225	17.369	2.144	201.4	130.9	988.9	870.3	23.1	15.0
302	100	65	2420	0.0190	0.0110	17.6	20.779	3.179	289.6	188.3	926.0	814.9	35.5	23.1
303	80	45	2455	0.0123	0.0084	11.162	13.463	2.301	272.8	177.3	904.5	796.0	34.3	22.3
304	70	35	2425	0.0093	0.0070	8.182	10.164	1.982	283.2	184.1	876.7	771.5	36.7	23.9
305	95	45	2387	0.0169	0.0131	16.235	18.928	2.693	205.2	133.4	959.5	844.4	24.3	15.8
306	80	35	2425	0.0122	0.0099	10.793	13.311	2.518	255.5	166.1	885.4	779.2	32.8	21.3
307	85	55	2440	0.0138	0.0080	13.636	15.473	1.837	228.2	148.4	984.8	866.7	26.3	17.1
308	80	25	2440	0.0123	0.0111	9.101	12.002	2.901	262.1	170.4	742.0	653.0	40.1	26.1
313	90	55	2426	0.0154	0.0097	14.92	17.408	2.488	257.3	167.2	966.7	850.7	30.2	19.7
314	80	70	2453	0.0123	0.0029	13.351	14.345	0.994	344.0	223.6	1082.8	952.9	36.1	23.5
315	90	30	2432	0.0155	0.0138	12.943	16.299	3.356	244.0	158.6	836.6	736.2	33.1	21.5
317	85	50	2432	0.0138	0.0090	13.874	16.052	2.178	241.3	156.9	1005.3	884.7	27.3	17.7
318	80	50	2395	0.0120	0.0073	12.892	14.35	1.458	198.7	129.2	1070.9	942.4	21.1	13.7
320	95	60	2420	0.0172	0.0103	17.775	19.115	1.340	130.0	84.5	1036.2	911.9	14.3	9.3
321	95	60	2410	0.0171	0.0103	15.955	17.93	1.975	192.3	125.0	934.0	821.9	23.4	15.2
322	95	80	2408	0.0171	0.0050	16.781	18.14	1.359	273.7	177.9	983.2	865.2	31.6	20.6
323	85	60	2440	0.0138	0.0069	12.936	15.056	2.120	305.2	198.4	934.3	822.2	37.1	24.1
325	75	55	2434	0.0108	0.0050	12.002	13.245	1.243	250.1	162.6	1116.1	982.2	25.5	16.5
326	85	55	2438	0.0138	0.0080	11.838	13.607	1.769	220.0	143.0	855.7	753.0	29.2	19.0
327	75	35	2432	0.0107	0.0084	9.522	11.081	1.559	185.5	120.6	886.2	779.9	23.8	15.5
328	80	55	2440	0.0123	0.0065	11.515	12.645	1.130	174.7	113.6	938.9	826.2	21.1	13.7
329	90	50	2410	0.0153	0.0106	14.157	16.582	2.425	228.8	148.7	923.4	812.6	28.2	18.3
330	80	50	2415	0.0121	0.0074	13.093	14.724	1.631	220.5	143.3	1078.6	949.1	23.2	15.1
331	80	50	2422	0.0122	0.0074	11.516	13.073	1.557	209.9	136.4	945.9	832.4	25.2	16.4
333	80	50	2410	0.0121	0.0074	12.139	13.674	1.535	207.9	135.2	1002.1	881.8	23.6	15.3
336	110	70	2440	0.0232	0.0138	17.41	19.644	2.234	161.9	105.2	750.8	660.7	24.5	15.9
337	85	40	2430	0.0138	0.0107	12.4	14.892	2.492	232.1	150.9	899.3	791.4	29.3	19.1
338	100	60	2398	0.0188	0.0121	15.766	18.134	2.368	196.5	127.7	837.1	736.7	26.7	17.3
339	90	55	2405	0.0153	0.0096	14.565	15.955	1.390	145.0	94.3	952.0	837.7	17.3	11.3
340	100	45	2397	0.0188	0.0150	16.501	20.299	3.798	253.0	164.4	876.5	771.3	32.8	21.3
Mean											**939**		**27.9**	**18.2**
S.D.													**6.2**	**4.0**

E. pilularis debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	**≡HTC**			**PEC**	**≡HTC**
272	145	115	2530	0.0418	0.0155	24.781	29.882	5.101	329.1	213.9	593.2	522.0	63.1	41.0
273	120	75	2510	0.0284	0.0173	16.15	20.708	4.558	263.5	171.3	568.9	500.6	52.6	34.2
274	115	80	2555	0.0265	0.0137	15.342	19.359	4.017	293.3	190.6	578.1	508.7	57.7	37.5
275	140	115	2554	0.0393	0.0128	23.132	27.058	3.926	307.0	199.6	588.4	517.8	59.3	38.5
276	125	100	2503	0.0307	0.0111	17.129	22.667	5.538	500.8	325.5	557.6	490.7	102.1	66.3
278	120	90	2510	0.0284	0.0124	18.629	22.231	3.602	290.0	188.5	656.2	577.5	50.2	32.6
281	95	50	2495	0.0177	0.0128	9.776	12.307	2.531	197.9	128.7	552.8	486.4	40.7	26.5
282	95	85	2535	0.0180	0.0036	9.024	11.035	2.011	561.1	364.7	502.2	441.9	127.0	82.5
283	95	70	2508	0.0178	0.0081	17.528	20.131	2.603	320.4	208.2	986.0	867.7	36.9	24.0
284	95	40	2508	0.0178	0.0146	14.221	17.275	3.054	208.8	135.7	800.0	704.0	29.7	19.3
286	120	100	2465	0.0279	0.0085	14.174	18.46	4.286	503.1	327.0	508.4	447.4	112.5	73.1
287	75	50	2540	0.0112	0.0062	6.403	8.834	2.431	390.0	253.5	570.6	502.1	77.7	50.5
288	90	70	2510	0.0160	0.0063	8.725	12.141	3.416	541.5	352.0	546.4	480.8	112.6	73.2
289	115	90	2490	0.0259	0.0100	25.421	28.798	3.377	336.9	219.0	982.9	864.9	39.0	25.3
290	130	115	2485	0.0330	0.0072	17.974	21.384	3.410	475.4	309.0	544.9	479.5	99.1	64.4
291	105	90	2500	0.0216	0.0057	11.083	15.355	4.272	743.8	483.5	512.0	450.5	165.1	107.3
292	110	90	2450	0.0233	0.0077	15.721	18.823	3.102	403.0	262.0	675.2	594.2	67.8	44.1
294	120	95	2465	0.0279	0.0104	15.139	19.489	4.350	418.0	271.7	543.0	477.9	87.5	56.9
295	110	90	2495	0.0237	0.0078	20.612	23.221	2.609	332.9	216.4	869.3	765.0	43.5	28.3
296	105	85	2470	0.0214	0.0074	18.939	20.864	1.925	261.1	169.7	885.5	779.2	33.5	21.8
297	100	70	2500	0.0196	0.0100	14.998	17.768	2.770	276.6	179.8	763.8	672.2	41.2	26.7
298	110	85	2489	0.0237	0.0095	17.642	19.466	1.824	191.4	124.4	745.8	656.3	29.2	19.0
299	90	65	2502	0.0159	0.0076	12.767	14.945	2.178	286.0	185.9	802.1	705.8	40.5	26.3
300	120	95	2535	0.0287	0.0107	29.357	31.792	2.435	227.5	147.9	1024.0	901.1	25.3	16.4
Mean											**682**		**66.4**	**43.2**
S.D.													**35.8**	**23.3**

E. dunnii debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
240	130	70	2398	0.0318	0.0226	24.843	28.286	3.443	152.3	99.0	780.5	686.8	22.2	14.4
242	110	85	2400	0.0228	0.0092	19.282	25.315	6.033	656.5	426.7	845.4	744.0	88.2	57.4
246	75	25	2390	0.0106	0.0094	7.258	9.863	2.605	277.6	180.4	687.4	604.9	45.9	29.8
241	95	40	2395	0.0170	0.0140	11.285	15.48	4.195	300.4	195.2	664.8	585.0	51.3	33.4
251	105	45	2395	0.0207	0.0169	15.714	19.57	3.856	227.8	148.1	757.7	666.8	34.2	22.2
250	110	50	2381	0.0226	0.0180	18.225	23.08	4.855	270.4	175.8	805.4	708.8	38.2	24.8
249	95	40	2405	0.0170	0.0140	13.143	18.048	4.905	349.7	227.3	771.0	678.5	51.5	33.5
247	130	75	2390	0.0317	0.0212	26.774	31.3	4.526	213.9	139.0	844.0	742.7	28.8	18.7
248	125	80	2395	0.0294	0.0174	25.599	28.911	3.312	190.9	124.1	871.0	766.5	24.9	16.2
244	110	90	2395	0.0228	0.0075	13.628	18.879	5.251	697.9	453.6	598.8	526.9	132.5	86.1
233	80	20	2400	0.0121	0.0113	8.586	13.18	4.594	406.2	264.0	711.7	626.3	64.9	42.2
231	80	30	2405	0.0121	0.0104	8.106	11.85	3.744	360.4	234.3	670.5	590.1	61.1	39.7
226	100	50	2495	0.0196	0.0147	14.692	17.626	2.934	199.6	129.8	749.8	659.8	30.3	19.7
229	115	65	2405	0.0250	0.0170	18.424	22.878	4.454	262.0	170.3	737.5	649.0	40.4	26.2
243	120	60	2390	0.0270	0.0203	19.039	25.093	6.054	298.6	194.1	704.4	619.8	48.2	31.3
232	125	85	2355	0.0289	0.0155	24.719	30.235	5.516	355.0	230.8	855.3	752.7	47.2	30.7
221	95	40	2395	0.0170	0.0140	15.52	19.8	4.280	306.4	199.2	914.2	804.5	38.1	24.8
222	130	90	2400	0.0319	0.0166	26.662	31.78	5.118	308.5	200.6	837.0	736.5	41.9	27.2
237	125	75	2390	0.0293	0.0188	23.275	30.38	7.105	378.5	246.0	793.6	698.3	54.2	35.2
223	130	85	2390	0.0317	0.0182	27.594	31.69	4.096	225.5	146.6	869.8	765.5	29.5	19.2
228	120	75	2390	0.0270	0.0165	21.966	26.505	4.539	275.6	179.1	812.6	715.1	38.5	25.0
224	80	40	2400	0.0121	0.0090	9.42	12.13	2.710	299.5	194.7	780.9	687.2	43.6	28.3
238	140	90	2405	0.0370	0.0217	28.498	31.301	2.803	129.0	83.9	769.8	677.4	19.0	12.4
227	105	55	2395	0.0207	0.0150	15.27	21.028	5.758	382.6	248.7	736.3	648.0	59.1	38.4
Mean											**774**		**47.2**	**30.7**
S.D.													**23.8**	**15.5**

E. cladocalyx debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
212	90	75	2415	0.0154	0.0047	14.635	16.12	1.485	316.3	205.6	952.6	838.3	37.7	24.5
195	80	65	2335	0.0117	0.0040	11.755	12.666	0.911	228.4	148.5	1001.5	881.4	25.9	16.8
230	90	70	2495	0.0159	0.0063	12.904	13.9	0.996	158.8	103.2	813.0	715.4	22.2	14.4
202	100	85	2380	0.0187	0.0052	17.85	19.175	1.325	255.4	166.0	954.9	840.3	30.4	19.8
193	75	65	2445	0.0108	0.0027	11.37	12.489	1.119	416.2	270.5	1052.6	926.3	44.9	29.2
239	75	65	2390	0.0106	0.0026	9.989	10.848	0.859	326.9	212.5	946.0	832.5	39.3	25.5
187	95	80	2270	0.0161	0.0047	15.113	16.299	1.186	253.4	164.7	939.3	826.6	30.7	19.9
199	100	90	2435	0.0191	0.0036	18.249	19.489	1.240	341.3	221.8	954.2	839.7	40.6	26.4
194	70	65	2375	0.0091	0.0013	8.744	9.333	0.589	467.8	304.1	956.7	841.9	55.6	36.1
210	100	85	2330	0.0183	0.0051	17.039	18.41	1.371	270.0	175.5	931.1	819.4	32.9	21.4
203	95	80	2375	0.0168	0.0049	16.101	17.018	0.917	187.3	121.7	956.4	841.7	22.3	14.5
207	80	65	2425	0.0122	0.0041	10.74	11.774	1.034	249.6	162.2	881.1	775.4	32.2	20.9
198	105	85	2410	0.0209	0.0072	18.08	20.29	2.210	307.3	199.7	866.4	762.4	40.3	26.2
221	105	90	2370	0.0205	0.0054	18.775	19.98	1.205	221.3	143.9	914.9	805.1	27.5	17.9
209	105	85	2440	0.0211	0.0073	19.201	21.333	2.132	292.8	190.3	908.8	799.7	36.6	23.8
201	110	90	2422	0.0230	0.0076	22.88	24.937	2.057	270.3	175.7	994.0	874.8	30.9	20.1
231	120	105	2364	0.0267	0.0063	24.56	26.629	2.069	330.2	214.6	918.6	808.4	40.8	26.5
185	105	95	2405	0.0208	0.0038	18.115	19.889	1.774	469.6	305.2	869.9	765.5	61.3	39.9
208	85	70	2340	0.0133	0.0043	11.718	13.28	1.562	365.6	237.6	882.5	776.6	47.1	30.6
226	105	95	2467	0.0214	0.0039	19.88	20.978	1.098	283.3	184.2	930.6	819.0	34.6	22.5
227	100	85	2410	0.0189	0.0053	17.485	18.705	1.220	232.3	151.0	923.8	812.9	28.6	18.6
232	100	85	2415	0.0190	0.0053	19.32	20.52	1.200	228.0	148.2	1018.6	896.4	25.4	16.5
215	105	90	2335	0.0202	0.0054	19.273	20.629	1.356	252.8	164.3	953.2	838.8	30.1	19.6
228	110	95	2490	0.0237	0.0060	19.305	20.345	1.040	172.9	112.4	815.8	717.9	24.1	15.7
233	100	85	2416	0.0190	0.0053	17.532	18.528	0.996	189.2	122.9	923.9	813.1	23.3	15.1
218	75	65	2415	0.0107	0.0027	10.637	11.531	0.894	336.7	218.8	997.0	877.3	38.4	24.9
206	70	55	2375	0.0091	0.0035	8.93	9.982	1.052	300.8	195.5	977.0	859.8	35.0	22.7
Mean											**935**		**34.8**	**22.6**
S.D.													**9.7**	**6.3**

A. mearnsii debarked

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
255	80	30	2410	0.0121	0.0104	10.645	13.839	3.194	306.8	199.4	878.7	773.3	39.7	25.8
243	85	50	2456	0.0139	0.0091	11.602	13.506	1.904	208.9	135.8	832.5	732.6	28.5	18.5
262	80	30	2425	0.0122	0.0105	9.756	13.535	3.779	360.8	234.5	800.4	704.3	51.2	33.3
246	75	45	2500	0.0110	0.0071	9.981	11.801	1.820	257.5	167.4	903.7	795.3	32.4	21.0
249	110	50	2450	0.0233	0.0185	17.61	21.844	4.234	229.2	149.0	756.3	665.6	34.4	22.4
238	75	30	2400	0.0106	0.0089	10.774	13.367	2.593	291.1	189.2	1016.1	894.2	32.6	21.2
252	70	45	2490	0.0096	0.0056	10.911	12.69	1.779	316.4	205.7	1138.6	1002.0	31.6	20.5
274	110	60	2492	0.0237	0.0166	26.101	30.27	4.169	250.6	162.9	1102.1	969.9	25.8	16.8
225	75	40	2370	0.0105	0.0075	10.312	12.347	2.035	271.6	176.6	984.9	866.7	31.3	20.4
253	85	45	2445	0.0139	0.0100	12.982	15.099	2.117	212.0	137.8	935.7	823.4	25.7	16.7
248	75	40	2465	0.0109	0.0078	10.736	12.221	1.485	190.6	123.9	985.9	867.6	22.0	14.3
266	85	50	2495	0.0142	0.0093	10.487	12.929	2.442	263.7	171.4	740.7	651.8	40.5	26.3
242	85	45	2470	0.0140	0.0101	11.292	13.234	1.942	192.5	125.1	805.6	709.0	27.2	17.6
256	95	50	2415	0.0171	0.0124	14.86	17.481	2.621	211.8	137.7	868.1	763.9	27.7	18.0
247	100	60	2435	0.0191	0.0122	19.294	21.983	2.689	219.7	142.8	1008.9	887.8	24.7	16.1
260	80	35	2425	0.0122	0.0099	9.898	12.636	2.738	277.8	180.6	812.0	714.6	38.9	25.3
259	90	50	2440	0.0155	0.0107	13.292	15.526	2.234	208.2	135.3	856.3	753.5	27.6	18.0
244	105	45	2475	0.0214	0.0175	19.344	24.126	4.782	273.3	177.7	902.6	794.3	34.4	22.4
245	80	45	2485	0.0125	0.0085	10.69	12.481	1.791	209.7	136.3	855.8	753.1	27.9	18.1
222	90	45	2455	0.0156	0.0117	11.51	13.286	1.776	151.6	98.6	737.0	648.5	23.4	15.2
231	95	45	2490	0.0176	0.0137	15.129	17.429	2.300	168.0	109.2	857.2	754.3	22.3	14.5
226	85	40	2410	0.0137	0.0106	9.457	12.216	2.759	259.1	168.4	691.5	608.5	42.6	27.7
241	95	60	2460	0.0174	0.0105	13.479	15.489	2.010	191.8	124.6	773.0	680.2	28.2	18.3
228	80	35	2425	0.0122	0.0099	10.673	13.432	2.759	279.9	182.0	875.6	770.5	36.3	23.6
227	90	40	2395	0.0152	0.0122	14.179	17.392	3.213	262.8	170.8	930.6	818.9	32.1	20.9
273	80	45	2505	0.0126	0.0086	9.983	11.933	1.950	226.5	147.3	792.8	697.7	32.5	21.1
233	80	45	2410	0.0121	0.0083	8.113	9.66	1.547	186.8	121.4	669.7	589.4	31.7	20.6
224	85	45	2440	0.0138	0.0100	11.705	14.529	2.824	283.4	184.2	845.4	743.9	38.1	24.8
221	90	40	2395	0.0152	0.0122	12.499	14.938	2.439	199.5	129.7	820.3	721.9	27.6	18.0
223	90	40	2385	0.0152	0.0122	12.205	15.081	2.876	236.2	153.5	804.4	707.9	33.4	21.7
Mean											**866**		**31.7**	**20.6**
S.D.													**6.6**	**4.3**

E. grandis debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
373	90	55	2405	0.0153	0.0096	7.806	14.772	6.966	726.7	472.3	510.2	449.0	161.9	105.2
374	95	55	2410	0.0171	0.0114	9.069	15.912	6.843	602.5	391.7	530.9	467.2	129.0	83.8
378	75	50	2397	0.0106	0.0059	5.958	9.291	3.333	566.5	368.2	562.6	495.1	114.4	74.4
371	85	60	2420	0.0137	0.0069	8.572	12.802	4.230	613.9	399.1	624.2	549.3	111.8	72.6
375	85	55	2380	0.0135	0.0079	7.225	12.318	5.093	648.7	421.7	535.0	470.8	137.8	89.6
370	80	55	2395	0.0120	0.0063	6.734	11.595	4.861	765.7	497.7	559.4	492.2	155.6	101.1
388	85	50	2360	0.0134	0.0088	8.222	12.714	4.492	512.9	333.4	614.0	540.3	94.9	61.7
387	80	45	2400	0.0121	0.0082	6.998	11.998	5.000	606.3	394.1	580.1	510.5	118.8	77.2
369	80	55	2395	0.0120	0.0063	8.47	13.165	4.695	739.5	480.7	703.6	619.1	119.4	77.6
386	95	75	2360	0.0167	0.0063	9.232	12.824	3.592	570.0	370.5	551.9	485.7	117.4	76.3
390	95	65	2390	0.0169	0.0090	10.264	15.714	5.450	604.9	393.2	605.9	533.2	113.4	73.7
368	80	50	2404	0.0121	0.0074	7.846	11.485	3.639	494.2	321.2	649.3	571.4	86.5	56.2
365	90	60	2374	0.0151	0.0084	10.205	15.267	5.062	603.3	392.2	675.7	594.6	101.5	65.9
364	90	60	2395	0.0152	0.0085	8.242	13.315	5.073	599.3	389.6	540.9	476.0	125.9	81.8
385	90	60	2382	0.0152	0.0084	8.25	12.546	4.296	510.3	331.7	544.4	479.1	106.5	69.2
363	90	60	2430	0.0155	0.0086	11.369	16.084	4.715	549.0	356.9	735.4	647.2	84.8	55.1
376	85	60	2352	0.0133	0.0067	10.101	14.956	4.855	725.0	471.3	756.8	666.0	108.9	70.8
358	90	60	2380	0.0151	0.0084	8.19	13.052	4.862	578.0	375.7	540.9	476.0	121.4	78.9
361	85	55	2410	0.0137	0.0079	8.344	12.148	3.804	478.5	311.0	610.1	536.9	89.1	57.9
360	90	60	2430	0.0155	0.0086	9.065	15.059	5.994	697.9	453.7	586.4	516.0	135.3	87.9
355	105	85	2409	0.0209	0.0072	12.708	17.696	4.988	693.8	451.0	609.2	536.1	129.4	84.1
357	100	75	2415	0.0190	0.0083	12.392	17.269	4.877	587.7	382.0	653.3	574.9	102.2	66.4
353	90	60	2410	0.0153	0.0085	11.32	15.672	4.352	510.9	332.1	738.3	649.7	78.6	51.1
366	90	60	2420	0.0154	0.0086	7.806	12.758	4.952	579.0	376.3	507.0	446.2	129.8	84.3
359	95	60	2414	0.0171	0.0103	9.606	14.745	5.139	499.6	324.8	561.4	494.0	101.1	65.7
362	95	70	2420	0.0172	0.0078	11.488	15.86	4.372	557.6	362.5	669.7	589.4	94.6	61.5
380	85	60	2398	0.0136	0.0068	8.121	12.6	4.479	656.0	426.4	596.8	525.2	124.9	81.2
377	90	65	2435	0.0155	0.0074	8.367	12.887	4.520	609.9	396.5	540.1	475.3	128.3	83.4
367	100	80	2400	0.0188	0.0068	9.156	13.995	4.839	713.1	463.5	485.7	427.5	166.8	108.4
389	85	55	2365	0.0134	0.0078	8.557	12.385	3.828	490.7	318.9	637.6	561.1	87.4	56.8
Mean											**601**		**115.9**	**75.3**
S.D.													**22.3**	**14.5**

E. globulus debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
354	115	70	2410	0.0250	0.0158	15.991	21.46	5.469	347.1	225.6	638.8	562.2	61.7	40.1
355	120	80	2330	0.0264	0.0146	18.081	23.176	5.095	348.0	226.2	686.1	603.8	57.6	37.5
358	85	60	2330	0.0132	0.0066	10.258	13.6	3.342	503.8	327.5	775.9	682.8	73.8	48.0
381	100	60	2400	0.0188	0.0121	10.031	14.602	4.571	378.9	246.3	532.2	468.3	80.9	52.6
385	80	60	2390	0.0120	0.0053	7.932	10.087	2.155	410.0	266.5	660.3	581.0	70.6	45.9
347	90	70	2395	0.0152	0.0060	9.286	12.998	3.712	616.7	400.8	609.5	536.3	115.0	74.7
349	90	55	2380	0.0151	0.0095	13.138	17.788	4.650	490.2	318.6	867.7	763.6	64.2	41.7
370	125	90	2395	0.0294	0.0142	19.352	25	5.648	399.0	259.4	658.4	579.4	68.9	44.8
380	85	65	2310	0.0131	0.0054	9.484	11.83	2.346	431.0	280.2	723.5	636.7	67.7	44.0
357	115	80	2380	0.0247	0.0128	14.382	19.897	5.515	432.3	281.0	581.8	512.0	84.4	54.9
344	100	50	2405	0.0189	0.0142	11.768	18.01	6.242	440.6	286.4	623.0	548.3	80.4	52.2
390	115	60	2390	0.0248	0.0181	13.656	18.874	5.218	288.8	187.7	550.1	484.1	59.7	38.8
375	95	65	2370	0.0168	0.0089	11.498	16.357	4.859	543.8	353.5	684.4	602.3	90.3	58.7
361	85	60	2390	0.0136	0.0068	10.317	13.755	3.438	505.3	328.4	760.7	669.4	75.5	49.1
364	80	65	2390	0.0120	0.0041	10.056	13.504	3.448	844.5	549.0	837.1	736.6	114.7	74.5
363	105	80	2400	0.0208	0.0087	15.272	19.992	4.720	541.4	351.9	734.9	646.7	83.7	54.4
369	105	90	2382	0.0206	0.0055	15.667	20.67	5.003	914.3	594.3	759.6	668.4	136.8	88.9
345	105	80	2400	0.0208	0.0087	11.18	16.16	4.980	571.2	371.3	538.0	473.4	120.7	78.4
356	120	90	2400	0.0271	0.0119	18.261	23.421	5.160	434.5	282.4	672.8	592.0	73.4	47.7
342	90	65	2400	0.0153	0.0073	10.928	14.537	3.609	494.1	321.2	715.7	629.9	78.4	51.0
379	80	55	2380	0.0120	0.0063	9.843	13.177	3.334	528.5	343.5	822.8	724.0	73.0	47.4
353	85	65	2400	0.0136	0.0057	9.26	11.509	2.249	397.7	258.5	679.9	598.3	66.5	43.2
384	90	60	2397	0.0152	0.0085	9.04	12.282	3.242	382.7	248.7	592.8	521.7	73.4	47.7
383	110	70	2410	0.0229	0.0136	14.74	20.5	5.760	422.7	274.7	643.6	566.4	74.6	48.5
368	120	80	2360	0.0267	0.0148	16.42	22.317	5.897	397.7	258.5	615.2	541.4	73.5	47.7
362	85	65	2395	0.0136	0.0056	8.06	10.63	2.570	455.4	296.0	593.1	521.9	87.3	56.7
378	100	80	2376	0.0187	0.0067	10.807	14.854	4.047	602.4	391.6	579.1	509.6	118.2	76.8
366	80	70	2400	0.0121	0.0028	9.954	13.355	3.401	1202.9	781.9	825.1	726.1	165.7	107.7
359	95	80	2395	0.0170	0.0049	9.684	14.249	4.565	924.5	600.9	570.4	502.0	184.2	119.7
360	80	70	2390	0.0120	0.0028	8.692	10.454	1.762	625.8	406.8	723.5	636.7	98.3	63.9
Mean											**675**		**89.1**	**57.9**
S.D.													**30.7**	**19.9**

C. maculata debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
349	100	55	2410	0.0189	0.0132	21.305	24.282	2.977	225.5	146.6	1125.6	990.5	22.8	14.8
367	85	30	2415	0.0137	0.0120	12.948	16.074	3.126	260.6	169.4	944.8	831.5	31.3	20.4
359	90	50	2445	0.0156	0.0108	17.102	18.971	1.869	173.8	113.0	1099.5	967.6	18.0	11.7
355	90	45	2420	0.0154	0.0115	15.356	17.617	2.261	195.8	127.3	997.4	877.7	22.3	14.5
370	95	50	2410	0.0171	0.0124	18.197	21.203	3.006	243.4	158.2	1065.2	937.4	26.0	16.9
351	100	60	2423	0.0190	0.0122	16.52	18.579	2.059	169.1	109.9	868.1	763.9	22.1	14.4
342	80	40	2410	0.0121	0.0091	11.303	12.99	1.687	185.7	120.7	933.1	821.1	22.6	14.7
343	90	40	2415	0.0154	0.0123	14.024	16.693	2.669	216.5	140.7	912.8	803.3	27.0	17.5
360	70	30	2410	0.0093	0.0076	8.358	10.77	2.412	318.6	207.1	901.2	793.0	40.2	26.1
353	110	70	2418	0.0230	0.0137	25.538	27.595	2.057	150.4	97.8	1111.4	978.0	15.4	10.0
350	90	60	2411	0.0153	0.0085	17.229	19.389	2.160	253.5	164.8	1123.3	988.5	25.6	16.7
345	75	35	2410	0.0106	0.0083	10.552	12.879	2.327	279.4	181.6	991.1	872.1	32.0	20.8
364	105	60	2415	0.0209	0.0141	17.636	19.96	2.324	165.0	107.3	843.4	742.2	22.2	14.5
362	80	40	2420	0.0122	0.0091	11.59	13.22	1.630	178.7	116.1	952.8	838.5	21.3	13.9
365	95	50	2410	0.0171	0.0124	16.8	19.241	2.441	197.6	128.5	983.5	865.4	22.8	14.8
358	95	40	2405	0.0170	0.0140	14.064	17.33	3.266	232.9	151.4	825.0	726.0	32.1	20.8
352	85	55	2415	0.0137	0.0080	14.739	16.511	1.772	222.4	144.6	1075.5	946.5	23.5	15.3
354	80	45	2430	0.0122	0.0083	11.528	12.836	1.308	156.7	101.8	943.8	830.5	18.9	12.3
369	100	60	2425	0.0190	0.0122	18.842	20.677	1.835	150.5	97.9	989.3	870.6	17.3	11.2
344	85	40	2415	0.0137	0.0107	13.699	15.649	1.950	182.8	118.8	999.6	879.7	20.8	13.5
357	90	70	2400	0.0153	0.0060	14.188	15.317	1.129	187.2	121.7	929.3	817.7	22.9	14.9
366	80	25	2425	0.0122	0.0110	9.334	12.101	2.767	251.6	163.5	765.7	673.9	37.3	24.3
341	110	70	2408	0.0229	0.0136	20.162	21.88	1.718	126.2	82.0	881.1	775.3	16.3	10.6
346	100	55	2415	0.0190	0.0132	17.85	20.367	2.517	190.3	123.7	941.1	828.2	23.0	14.9
348	90	65	2438	0.0155	0.0074	13.967	15.123	1.156	155.8	101.3	900.5	792.5	19.7	12.8
368	95	50	2410	0.0171	0.0124	17.785	20.445	2.660	215.4	140.0	1041.1	916.2	23.5	15.3
347	90	50	2432	0.0155	0.0107	16.741	18.855	2.114	197.6	128.5	1082.0	952.2	20.8	13.5
361	95	40	2437	0.0173	0.0142	16.998	19.88	2.882	202.8	131.8	984.0	865.9	23.4	15.2
356	75	45	2440	0.0108	0.0069	11.003	12.37	1.367	198.1	128.8	1020.7	898.2	22.1	14.3
363	80	50	2415	0.0121	0.0074	11.239	12.567	1.328	179.5	116.7	925.9	814.7	22.0	14.3
Mean											**972**		**23.8**	**15.5**
S.D.													**5.7**	**3.7**

E. pilularis debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
362	75	55	2580	0.0114	0.0053	10.26	12.536	2.276	432.0	236.2	900.2	792.1	54.5	35.4
368	100	80	2465	0.0194	0.0070	13.36	15.893	2.533	363.4	279.4	690.1	607.3	59.8	38.9
361	95	75	2523	0.0179	0.0067	14.872	17.768	2.896	429.8	220.9	831.6	731.8	58.7	38.2
366	75	55	2500	0.0110	0.0051	8.924	10.659	1.735	339.9	173.2	808.0	711.0	47.8	31.1
367	90	70	2510	0.0160	0.0063	9.79	11.471	1.681	266.5	256.0	613.1	539.5	49.4	32.1
353	110	80	2505	0.0238	0.0112	19.655	24.071	4.416	393.8	317.8	825.6	726.6	54.2	35.2
356	100	75	2510	0.0197	0.0086	18.585	22.802	4.217	488.9	214.5	942.8	829.6	58.9	38.3
343	105	70	2490	0.0216	0.0120	24.511	28.463	3.952	329.9	165.4	1136.8	1000.4	33.0	21.4
369	80	50	2505	0.0126	0.0077	10.548	12.5	1.952	254.4	394.1	837.7	737.2	34.5	22.4
370	105	90	2475	0.0214	0.0057	16.37	19.817	3.447	606.2	359.4	763.8	672.2	90.2	58.6
364	100	75	2482	0.0195	0.0085	14.545	19.261	4.716	553.0	259.0	746.1	656.6	84.2	54.7
359	95	75	2550	0.0181	0.0068	11.493	14.206	2.713	398.4	205.9	635.9	559.5	71.2	46.3
341	110	90	2520	0.0239	0.0079	11.416	13.924	2.508	316.8	195.7	476.7	419.5	75.5	49.1
363	110	80	2533	0.0241	0.0113	20.19	23.604	3.414	301.1	243.9	838.7	738.1	40.8	26.5
354	110	65	2490	0.0237	0.0154	19.503	25.281	5.778	375.2	434.3	824.2	725.3	51.7	33.6
360	70	55	2492	0.0096	0.0037	8.499	10.951	2.452	668.2	278.0	886.2	779.9	85.7	55.7
348	115	95	2490	0.0259	0.0082	27.452	30.965	3.513	427.7	275.5	1061.4	934.1	45.8	29.8
352	105	80	2492	0.0216	0.0091	19.535	23.372	3.837	423.9	233.5	905.3	796.7	53.2	34.6
349	90	65	2535	0.0161	0.0077	11.879	14.65	2.771	359.2	292.3	736.6	648.2	55.4	36.0
351	110	90	2500	0.0238	0.0079	15.372	18.904	3.532	449.7	466.3	647.0	569.4	79.0	51.3
350	105	90	2460	0.0213	0.0057	13.594	17.648	4.054	717.4	324.3	638.2	561.6	127.7	83.0
355	135	110	2270	0.0325	0.0109	18.041	23.489	5.448	498.9	312.9	555.2	488.6	102.1	66.4
357	115	95	2525	0.0262	0.0083	25.189	29.198	4.009	481.3	233.2	960.4	845.2	56.9	37.0
365	115	90	2500	0.0260	0.0101	24.318	27.929	3.611	358.8	236.2	936.5	824.1	43.5	28.3
Mean											**800**		**63.1**	**41.0**
S.D.													**22.6**	**14.7**

E. dunnii debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
334	95	40	2395	0.0170	0.0140	11.765	15.648	11.765	15.648	180.7	693.0	609.9	45.6	29.6
354	75	30	2390	0.0106	0.0089	8.214	13.046	8.214	13.046	354.1	777.9	684.6	79.6	51.7
335	110	65	2405	0.0229	0.0149	17.795	21.84	17.795	21.84	176.8	778.6	685.2	39.7	25.8
357	120	75	2400	0.0271	0.0165	21.339	26.822	21.339	26.822	215.5	786.2	691.8	47.9	31.1
356	90	35	2405	0.0153	0.0130	10.468	15.158	10.468	15.158	234.8	684.2	602.1	60.0	39.0
336	85	50	2390	0.0136	0.0089	10.398	13.9	10.398	13.9	256.6	766.7	674.7	58.5	38.0
337	90	50	2395	0.0152	0.0105	9.432	12.325	9.432	12.325	178.5	619.0	544.8	50.4	32.8
359	80	40	2400	0.0121	0.0090	7.922	10.474	7.922	10.474	183.3	656.7	577.9	48.8	31.7
355	90	50	2398	0.0153	0.0105	11.208	15.691	11.208	15.691	276.3	734.7	646.5	65.7	42.7
338	120	60	2400	0.0271	0.0204	19.46	27.295	19.46	27.295	250.2	716.9	630.9	61.0	39.7
361	95	50	2420	0.0172	0.0124	13.48	16.568	13.48	16.568	161.8	785.8	691.5	36.0	23.4
364	110	40	2395	0.0228	0.0198	14.955	20.244	14.955	20.244	174.1	657.1	578.2	46.3	30.1
350	120	75	2400	0.0271	0.0165	21.294	25.755	21.294	25.755	175.3	784.5	690.4	39.1	25.4
362	80	35	2393	0.0120	0.0097	8.892	11.507	8.892	11.507	174.8	739.2	650.5	41.3	26.9
352	125	55	2430	0.0298	0.0240	20.002	26.717	20.002	26.717	181.5	670.7	590.3	47.3	30.8
339	95	45	2395	0.0170	0.0132	11.764	16.32	11.764	16.32	224.9	693.0	609.8	56.7	36.9
363	115	75	2394	0.0249	0.0143	15.927	18.282	15.927	18.282	107.1	640.5	563.6	29.2	19.0
349	95	30	2388	0.0169	0.0152	11.604	16.11	11.604	16.11	192.2	685.5	603.3	49.0	31.9
340	115	65	2400	0.0249	0.0170	20.032	25.723	20.032	25.723	218.1	803.6	707.1	47.4	30.8
351	95	45	2420	0.0172	0.0133	10.284	14.549	10.284	14.549	208.4	599.5	527.6	60.8	39.5
360	125	50	2400	0.0295	0.0247	20.648	28.306	20.648	28.306	201.2	701.1	616.9	50.2	32.6
347	80	40	2402	0.0121	0.0091	7.192	11.239	7.192	11.239	290.5	595.7	524.2	85.3	55.4
346	75	40	2390	0.0106	0.0076	8.414	11.59	8.414	11.59	273.2	796.9	701.3	59.9	39.0
353	95	45	2445	0.0173	0.0134	13.173	16.98	13.173	16.98	184.1	760.1	668.9	42.3	27.5
341	135	85	2400	0.0344	0.0207	26.27	31.999	26.27	31.999	179.6	764.7	672.9	41.1	26.7
342	100	50	2386	0.0187	0.0141	15.579	20.488	15.579	20.488	227.0	831.3	731.6	47.7	31.0
345	125	65	2405	0.0295	0.0215	23.066	28.57	23.066	28.57	166.1	781.5	687.7	37.2	24.2
344	105	50	2390	0.0207	0.0160	15.203	21.018	15.203	21.018	236.2	734.6	646.5	56.2	36.5
348	110	50	2398	0.0228	0.0181	15.688	20.946	15.688	20.946	189.0	688.4	605.8	48.0	31.2
Mean											**722**		**51.0**	**33.1**
S.D.													**12.3**	**8.0**

E. cladocalyx debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
476	80	65	2380	0.0120	0.0041	11.94	13.109	1.169	287.5	186.9	998.1	878.3	32.7	21.3
481	85	55	2400	0.0136	0.0079	11.832	13.266	1.434	181.1	117.7	868.8	764.5	23.7	15.4
475	80	60	2370	0.0119	0.0052	10.765	11.903	1.138	218.3	141.9	903.6	795.2	27.5	17.8
468	80	60	2398	0.0121	0.0053	11.99	13.402	1.412	267.8	174.0	994.7	875.4	30.6	19.9
487	90	70	2402	0.0153	0.0060	15.722	17.052	1.330	220.3	143.2	1028.9	905.4	24.3	15.8
469	95	75	2387	0.0169	0.0064	15.157	16.475	1.318	206.8	134.4	895.8	788.3	26.2	17.0
463	100	80	2425	0.0190	0.0069	17.129	18.76	1.631	237.9	154.6	899.4	791.4	30.1	19.5
483	90	60	2415	0.0154	0.0085	15.16	16.4	1.240	145.3	94.4	986.8	868.3	16.7	10.9
494	90	70	2358	0.0150	0.0059	13.028	14.316	1.288	217.3	141.3	868.5	764.3	28.4	18.5
490	85	60	2418	0.0137	0.0069	11.846	13.266	1.420	206.3	134.1	863.4	759.7	27.1	17.6
492	95	75	2400	0.0170	0.0064	14.198	15.636	1.438	224.4	145.8	834.6	734.4	30.6	19.9
464	80	65	2428	0.0122	0.0041	9.398	10.455	1.057	254.8	165.6	770.0	677.6	37.6	24.4
482	110	90	2358	0.0224	0.0074	21.718	23.788	2.070	279.4	181.6	969.2	852.9	32.8	21.3
496	100	75	2300	0.0181	0.0079	16.39	18	1.610	203.7	132.4	907.3	798.4	25.5	16.6
497	85	70	2410	0.0137	0.0044	12.548	13.567	1.019	231.5	150.5	917.5	807.4	28.7	18.6
499	105	90	2410	0.0209	0.0055	19.476	21.206	1.730	312.5	203.1	933.3	821.3	38.0	24.7
488	90	65	2420	0.0154	0.0074	14.635	16.055	1.420	192.8	125.3	950.6	836.5	23.0	15.0
498	95	70	2400	0.0170	0.0078	15.38	16.935	1.555	200.0	130.0	904.1	795.6	25.1	16.3
462	95	80	2420	0.0172	0.0050	16.118	17.854	1.736	347.9	226.2	939.6	826.9	42.1	27.4
485	80	65	2315	0.0116	0.0040	10.88	11.922	1.042	263.5	171.3	935.0	822.8	32.0	20.8
471	90	70	2312	0.0147	0.0058	13.23	14.646	1.416	243.7	158.4	899.5	791.6	30.8	20.0
493	100	75	2413	0.0190	0.0083	18.16	19.94	1.780	214.7	139.5	958.2	843.2	25.5	16.5
495	90	70	2370	0.0151	0.0060	13.351	14.664	1.313	220.4	143.3	885.5	779.2	28.3	18.4
489	105	85	2440	0.0211	0.0073	18.268	20.115	1.847	253.6	164.9	864.6	760.9	33.3	21.7
478	115	90	2390	0.0248	0.0096	21.162	23.032	1.870	194.4	126.3	852.5	750.2	25.9	16.8
453	85	70	2420	0.0137	0.0044	12.612	14.18	1.568	354.8	230.6	918.4	808.2	43.9	28.5
470	105	90	2410	0.0209	0.0055	18.312	19.622	1.310	236.6	153.8	877.5	772.2	30.6	19.9
477	100	80	2352	0.0185	0.0067	16.19	17.732	1.542	231.9	150.7	876.4	771.3	30.1	19.5
486	95	70	2418	0.0171	0.0078	16.415	17.854	1.439	183.7	119.4	957.7	842.8	21.8	14.2
472	85	70	2420	0.0137	0.0044	13.63	15.008	1.378	311.8	202.7	992.6	873.4	35.7	23.2
Mean											**915**		**29.6**	**19.3**
S.D.													**5.9**	**3.8**

A. mearnsii debarked + gang-nailed

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									PEC	≡HTC			PEC	≡HTC
356	85	55	2460	0.0140	0.0081	11.775	14.705	2.930	361.1	234.7	843.5	742.3	48.6	31.6
361	75	40	2440	0.0108	0.0077	7.604	10.216	2.612	338.6	220.1	705.4	620.8	54.6	35.5
374	75	55	2425	0.0107	0.0050	8.44	10.003	1.563	315.6	205.2	787.8	693.3	45.5	29.6
366	75	35	2410	0.0106	0.0083	9.886	11.989	2.103	252.5	164.1	928.5	817.1	30.9	20.1
345	95	40	2470	0.0175	0.0144	13.241	17.536	4.295	298.2	193.8	756.3	665.5	44.8	29.1
367	95	60	2405	0.0170	0.0102	10.261	13.633	3.372	329.1	213.9	601.9	529.7	62.1	40.4
344	70	40	2450	0.0094	0.0063	8.206	10.147	1.941	305.7	198.7	870.3	765.9	39.9	25.9
379	95	40	2408	0.0171	0.0140	10.779	13.543	2.764	196.8	127.9	631.5	555.7	35.4	23.0
384	90	50	2365	0.0150	0.0104	11.804	14.487	2.683	257.9	167.7	784.6	690.4	37.4	24.3
351	90	50	2450	0.0156	0.0108	14.697	17.426	2.729	253.3	164.6	942.9	829.8	30.5	19.8
350	95	45	2475	0.0175	0.0136	14.211	18.349	4.138	304.1	197.7	810.1	712.8	42.7	27.7
357	90	40	2415	0.0154	0.0123	12.982	17.426	4.444	360.5	234.3	845.0	743.6	48.5	31.5
386	85	40	2470	0.0140	0.0109	9.285	12.705	3.420	313.4	203.7	662.5	583.0	53.8	34.9
371	90	25	2380	0.0151	0.0140	11.015	14.225	3.210	229.7	149.3	727.5	640.2	35.9	23.3
370	80	40	2420	0.0122	0.0091	9.076	12.064	2.988	327.5	212.9	746.1	656.6	49.9	32.4
389	80	40	2385	0.0120	0.0090	10.935	13.639	2.704	300.7	195.5	912.1	802.7	37.5	24.4
388	85	35	2460	0.0140	0.0116	12.284	15.726	3.442	296.9	193.0	880.0	774.4	38.3	24.9
385	90	35	2435	0.0155	0.0131	11.837	15.428	3.591	273.1	177.5	764.1	672.4	40.6	26.4
373	100	45	2360	0.0185	0.0148	14.47	17.469	2.999	202.9	131.9	780.7	687.0	29.5	19.2
353	90	55	2460	0.0156	0.0098	11.117	13.569	2.452	250.1	162.5	710.4	625.1	40.0	26.0
380	115	65	2420	0.0251	0.0171	19.107	22.901	3.794	221.8	144.2	760.1	668.9	33.2	21.6
369	120	65	2430	0.0275	0.0194	20.586	24.904	4.318	222.4	144.5	749.1	659.2	33.7	21.9
364	105	55	2405	0.0208	0.0151	15.446	19.199	3.753	248.4	161.4	741.7	652.7	38.1	24.7
341	90	55	2440	0.0155	0.0097	11.191	13.201	2.010	206.7	134.3	720.9	634.4	32.6	21.2
347	85	45	2460	0.0140	0.0100	9.596	12.87	3.274	325.9	211.8	687.4	604.9	53.9	35.0
352	95	40	2460	0.0174	0.0143	15.664	19.741	4.077	284.2	184.7	898.3	790.5	36.0	23.4
375	95	60	2430	0.0172	0.0104	16.18	19.08	2.900	280.1	182.1	939.4	826.6	33.9	22.0
376	90	50	2405	0.0153	0.0106	11.96	14.469	2.509	237.2	154.2	781.7	687.9	34.5	22.4
377	90	50	2410	0.0153	0.0106	10.69	13.803	3.113	293.7	190.9	697.2	613.6	47.9	31.1
359	95	55	2420	0.0172	0.0114	12.342	15.453	3.111	272.8	177.3	719.5	633.2	43.1	28.0
Mean											**780**		**41.1**	**26.7**
S.D.													**8.3**	**5.4**

E. grandis bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	≡HTC			Total	≡HTC
395	75	40	2280	0.0101	0.0072	6.274	8.678	2.404	333.5	233.5	622.9	548.1	60.9	42.6
406	80	10	2400	0.0121	0.0119	6.148	12.696	6.548	551.4	386.0	509.6	448.5	123.0	86.1
393	75	50	2375	0.0105	0.0058	6.84	9.714	2.874	493.0	345.1	651.9	573.7	85.9	60.2
399	75	40	2380	0.0105	0.0075	7.068	10.98	3.912	520.0	364.0	672.2	591.5	87.9	61.5
408	80	20	2390	0.0120	0.0113	6.789	12.104	5.315	471.9	330.3	565.1	497.3	94.9	66.4
402	75	0	2435	0.0108	0.0108	7.086	11.396	4.310	400.7	280.5	658.7	579.7	69.1	48.4
420	75	0	2385	0.0105	0.0105	7.03	11.75	4.720	448.0	313.6	667.2	587.1	76.3	53.4
412	80	0	2380	0.0120	0.0120	8.55	13.719	5.169	432.1	302.5	714.7	628.9	68.7	48.1
397	75	25	2380	0.0105	0.0093	6.006	10.49	4.484	479.8	335.8	571.2	502.7	95.4	66.8
418	90	30	2420	0.0154	0.0137	8.772	15.981	7.209	526.8	368.8	569.8	501.4	105.1	73.5
403	80	50	2340	0.0118	0.0072	7.567	10.86	3.293	459.4	321.6	643.3	566.1	81.2	56.8
419	80	30	2390	0.0120	0.0103	6.874	11.612	4.738	458.9	321.2	572.2	503.5	91.1	63.8
415	75	25	2390	0.0106	0.0094	6.801	11.592	4.791	510.5	357.3	644.1	566.8	90.1	63.0
391	75	15	2370	0.0105	0.0101	5.836	9.077	3.241	322.4	225.7	557.4	490.5	65.7	46.0
404	85	45	2510	0.0142	0.0103	7.392	10.786	3.394	331.1	231.8	519.0	456.7	72.5	50.7
413	90	45	2380	0.0151	0.0114	7.419	10.095	2.676	235.7	165.0	490.0	431.2	54.7	38.3
394	95	55	2360	0.0167	0.0111	10.379	14.4	4.021	361.6	253.1	620.4	546.0	66.2	46.4
414	85	40	2410	0.0137	0.0106	8.79	15.11	6.320	593.6	415.5	642.8	565.6	104.9	73.5
409	90	40	2390	0.0152	0.0122	8.965	14.216	5.251	430.4	301.3	589.6	518.9	82.9	58.1
410	80	15	2360	0.0119	0.0114	6.871	11.15	4.279	373.9	261.7	579.2	509.7	73.3	51.3
407	70	15	2345	0.0090	0.0086	6.496	11.762	5.266	611.6	428.1	719.8	633.4	96.6	67.6
398	95	55	2375	0.0168	0.0112	9.224	14.541	5.317	475.1	332.6	547.9	482.2	98.5	69.0
405	90	45	2350	0.0150	0.0112	7.809	11.38	3.571	318.5	222.9	522.3	459.7	69.3	48.5
416	80	50	2170	0.0109	0.0066	7.544	11.492	3.948	594.0	415.8	691.6	608.6	97.6	68.3
417	80	0	2390	0.0120	0.0120	6.814	13.03	6.216	517.4	362.2	567.2	499.1	103.7	72.6
411	75	30	2355	0.0104	0.0087	6.448	9.142	2.694	308.3	215.8	619.8	545.4	56.5	39.6
400	85	0	2380	0.0135	0.0135	6.81	12.732	5.922	438.5	306.9	504.2	443.7	98.8	69.2
392	80	0	2400	0.0121	0.0121	6.53	10.95	4.420	366.4	256.5	541.3	476.3	76.9	53.8
401	90	30	2345	0.0149	0.0133	8.248	13.974	5.726	431.8	302.3	552.9	486.5	88.8	62.1
396	80	40	2375	0.0119	0.0090	7.744	11.662	3.918	437.6	306.3	648.7	570.8	76.7	53.7
Mean											**599**		**83.7**	**58.6**
S.D.													**16.2**	**11.3**

E. globulus bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	HTC			Total	HTC
420	105	35	2400	0.0208	0.0185	12.359	21.451	9.092	492.2	344.5	594.7	523.3	94.0	65.8
399	100	20	2399	0.0188	0.0181	11.948	22.04	10.092	557.9	390.6	634.1	558.0	100.0	70.0
403	115	35	2375	0.0247	0.0224	16.288	28.072	11.784	526.5	368.5	660.3	581.0	90.6	63.4
417	85	30	2380	0.0135	0.0118	9.054	14.509	5.455	461.4	323.0	670.4	590.0	78.2	54.7
414	100	30	2380	0.0187	0.0170	9.07	14.542	5.472	321.7	225.2	485.2	427.0	75.3	52.7
406	85	0	2380	0.0135	0.0135	9.783	15.753	5.970	442.0	309.4	724.4	637.5	69.3	48.5
397	105	35	2365	0.0205	0.0182	13.165	19.842	6.677	366.8	256.8	642.9	565.7	64.8	45.4
401	85	30	2350	0.0133	0.0117	7.42	12.362	4.942	423.3	296.3	556.4	489.7	86.5	60.5
411	90	30	2420	0.0154	0.0137	11.083	19.391	8.308	607.1	425.0	719.9	633.5	95.8	67.1
415	95	35	2345	0.0166	0.0144	11.135	19.25	8.115	564.9	395.4	669.9	589.5	95.8	67.1
409	105	0	2370	0.0205	0.0205	13.125	23.202	10.077	491.0	343.7	639.6	562.8	87.2	61.1
412	90	0	2370	0.0151	0.0151	9.765	16.616	6.851	454.4	318.1	647.7	569.9	79.7	55.8
394	110	25	2190	0.0208	0.0197	12.33	21.322	8.992	455.6	318.9	592.4	521.3	87.4	61.2
405	110	15	2380	0.0226	0.0222	11.731	21.221	9.490	427.5	299.3	518.7	456.4	93.7	65.6
402	100	30	2380	0.0187	0.0170	12.628	20.599	7.971	468.6	328.0	675.6	594.5	78.8	55.2
410	105	25	2395	0.0207	0.0196	12.755	23.282	10.527	538.1	376.7	615.0	541.2	99.4	69.6
400	130	50	2380	0.0316	0.0269	14.655	28.65	13.995	519.9	363.9	463.9	408.2	127.4	89.2
392	90	30	2380	0.0151	0.0135	9.101	17.891	8.790	653.1	457.2	601.1	529.0	123.5	86.4
395	110	20	2355	0.0224	0.0216	14.333	26.642	12.309	568.8	398.2	640.4	563.6	100.9	70.6
419	110	0	2420	0.0230	0.0230	14.7	22.452	7.752	337.1	236.0	639.2	562.5	59.9	41.9
416	110	30	2365	0.0225	0.0208	15.238	26.231	10.993	528.4	369.9	678.0	596.6	88.6	62.0
393	95	30	2330	0.0165	0.0149	12.795	17.88	5.085	342.0	239.4	774.7	681.8	50.2	35.1
418	110	20	2400	0.0228	0.0221	14.051	25.5	11.449	519.1	363.4	616.1	542.1	95.8	67.0
413	110	25	2375	0.0226	0.0214	15.916	24.383	8.467	395.6	276.9	705.2	620.6	63.7	44.6
398	120	25	2360	0.0267	0.0255	15.38	26.54	11.160	437.1	306.0	576.2	507.1	86.2	60.3
404	85	30	2370	0.0134	0.0118	10.103	13.9	3.797	322.5	225.8	751.2	661.1	48.8	34.1
391	105	0	2350	0.0203	0.0203	12.703	22.728	10.025	492.7	344.9	624.3	549.4	89.7	62.8
Mean											**634**		**85.6**	**59.9**
S.D.													**18.3**	**12.8**

C. maculata bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	HTC			Total	HTC
401	85	45	2410	0.0137	0.0098	10.906	12.47	1.564	158.9	111.2	797.5	701.8	22.6	15.8
402	75	45	2530	0.0112	0.0072	10.532	11.278	0.746	104.3	73.0	942.3	829.2	12.6	8.8
413	85	45	2490	0.0141	0.0102	10.587	12.25	1.663	163.5	114.5	749.3	659.4	24.8	17.4
397	90	45	2390	0.0152	0.0114	12.254	13.58	1.326	116.3	81.4	805.9	709.2	16.4	11.5
412	90	50	2375	0.0151	0.0104	11.825	12.903	1.078	103.2	72.2	782.6	688.7	15.0	10.5
405	110	70	2350	0.0223	0.0133	16.762	19.16	2.398	180.5	126.3	750.6	660.5	27.3	19.1
398	105	60	2525	0.0219	0.0147	17.351	19.82	2.469	167.7	117.4	793.6	698.4	24.0	16.8
415	80	60	2465	0.0124	0.0054	11.463	12.156	0.693	127.8	89.5	925.1	814.1	15.7	11.0
411	65	55	2445	0.0081	0.0023	6.059	6.72	0.661	286.8	200.8	746.8	657.2	43.6	30.6
418	80	55	2380	0.0120	0.0063	7.649	9.446	1.797	284.8	199.4	639.4	562.7	50.6	35.4
414	90	55	2425	0.0154	0.0097	9.896	10.872	0.976	101.0	70.7	641.5	564.5	17.9	12.5
391	100	55	2310	0.0181	0.0127	12.188	13.38	1.192	94.2	65.9	671.8	591.2	15.9	11.2
399	85	15	2360	0.0134	0.0130	9.017	12.552	3.535	272.5	190.7	673.3	592.5	46.0	32.2
417	90	60	2555	0.0163	0.0090	13.13	14.682	1.552	171.9	120.3	807.8	710.9	24.2	16.9
419	110	60	2370	0.0225	0.0158	18.72	21.312	2.592	163.8	114.7	831.2	731.4	22.4	15.7
404	105	55	2390	0.0207	0.0150	17.792	19.38	1.588	105.7	74.0	859.7	756.6	14.0	9.8
396	75	30	2430	0.0107	0.0090	8.966	10.05	1.084	120.2	84.1	835.2	735.0	16.4	11.4
416	90	50	2310	0.0147	0.0102	11.186	12.438	1.252	123.2	86.3	761.2	669.8	18.4	12.9
410	110	70	2445	0.0232	0.0138	16.659	17.638	0.979	70.8	49.6	717.0	630.9	11.2	7.9
393	70	30	2350	0.0090	0.0074	8.62	9.62	1.000	135.5	94.8	953.1	838.8	16.1	11.3
406	105	65	2450	0.0212	0.0131	16.935	18.408	1.473	112.6	78.8	798.3	702.5	16.0	11.2
420	100	50	2400	0.0188	0.0141	15.049	16.63	1.581	111.8	78.3	798.4	702.6	15.9	11.1
407	95	60	2465	0.0175	0.0105	12.996	15.109	2.113	201.2	140.8	743.8	654.5	30.7	21.5
395	80	45	2380	0.0120	0.0082	9.935	11.175	1.240	151.6	106.1	830.5	730.8	20.7	14.5
392	65	25	2390	0.0079	0.0068	6.966	7.634	0.668	98.9	69.2	878.4	773.0	12.8	9.0
394	90	45	2385	0.0152	0.0114	11.4	12.352	0.952	83.7	58.6	751.3	661.2	12.7	8.9
409	90	45	2500	0.0159	0.0119	12.403	14.406	2.003	167.9	117.5	779.9	686.3	24.5	17.1
408	105	60	2380	0.0206	0.0139	16.244	17.975	1.731	124.7	87.3	788.2	693.6	18.0	12.6
403	85	40	2425	0.0138	0.0107	9.508	10.707	1.199	111.9	78.3	691.0	608.0	18.4	12.9
400	100	70	2390	0.0188	0.0096	14.258	16.505	2.247	234.7	164.3	759.6	668.4	35.1	24.6
Mean											**783**		**22.0**	**15.4**
S.D.													**9.9**	**7.0**

E. pilularis bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	HTC			Total	HTC
397	140	100	2500	0.0385	0.0188	20.519	24.067	3.548	188.2	131.8	533.2	469.2	40.1	28.1
402	105	65	2510	0.0217	0.0134	11.538	15.369	3.831	285.8	200.0	530.9	467.2	61.2	42.8
396	100	55	2520	0.0198	0.0138	10.56	12.973	2.413	174.8	122.4	533.5	469.5	37.2	26.1
408	100	65	2520	0.0198	0.0114	10.674	12.841	2.167	189.6	132.7	539.3	474.6	39.9	28.0
406	105	65	2470	0.0214	0.0132	12.038	15.35	3.312	251.1	175.7	562.8	495.3	50.7	35.5
419	130	80	2500	0.0332	0.0206	19.298	24.2	4.902	237.8	166.4	581.6	511.8	46.5	32.5
409	100	60	2520	0.0198	0.0127	10.927	12.692	1.765	139.3	97.5	552.1	485.8	28.7	20.1
400	95	60	2520	0.0179	0.0107	10.302	13.058	2.756	256.7	179.7	576.7	507.5	50.6	35.4
404	95	65	2630	0.0186	0.0099	10.964	13.52	2.556	257.8	180.5	588.1	517.6	49.8	34.9
399	90	50	2515	0.0160	0.0111	7.593	9.6	2.007	181.4	127.0	474.6	417.6	43.4	30.4
418	85	70	2620	0.0149	0.0048	8.239	9.73	1.491	311.6	218.2	554.2	487.7	63.9	44.7
393	85	65	2500	0.0142	0.0059	9.303	10.479	1.176	199.6	139.8	655.8	577.1	34.6	24.2
394	140	95	2470	0.0380	0.0205	20.271	25.702	5.431	264.7	185.3	533.1	469.2	56.4	39.5
395	125	90	2525	0.0310	0.0149	14.969	18.17	3.201	214.5	150.2	483.1	425.1	50.5	35.3
398	130	95	2530	0.0336	0.0156	19.036	21.289	2.253	144.0	100.8	566.9	498.8	28.9	20.2
420	85	60	2530	0.0144	0.0072	8.489	9.865	1.376	191.0	133.7	591.3	520.3	36.7	25.7
405	120	90	2450	0.0277	0.0121	14.677	16.39	1.713	141.3	98.9	529.7	466.1	30.3	21.2
391	85	50	2565	0.0146	0.0095	10.252	12.435	2.183	229.3	160.5	704.4	619.8	37.0	25.9
403	105	75	2500	0.0216	0.0106	12.412	14.244	1.832	172.8	120.9	573.4	504.6	34.2	24.0
407	85	60	2585	0.0147	0.0074	9.056	11.214	2.158	293.2	205.3	617.4	543.3	54.0	37.8
417	75	45	2500	0.0110	0.0071	6.6	7.772	1.172	165.8	116.1	597.6	525.9	31.5	22.1
416	100	65	2560	0.0201	0.0116	11.861	15.028	3.167	272.8	190.9	589.9	519.1	52.5	36.8
412	90	50	2510	0.0160	0.0110	8.36	10.127	1.767	160.1	112.0	523.5	460.7	34.7	24.3
413	115	65	2560	0.0266	0.0181	14.42	20.018	5.598	309.4	216.6	542.3	477.2	64.8	45.4
410	110	80	2490	0.0237	0.0111	15.068	18.805	3.737	335.2	234.7	636.8	560.4	59.8	41.9
414	130	100	2535	0.0336	0.0137	18.299	21.82	3.521	256.3	179.4	543.8	478.6	53.6	37.5
415	105	85	2630	0.0228	0.0078	12.755	15.262	2.507	319.4	223.6	560.1	492.9	64.8	45.4
Mean											**566**		**45.8**	**32.1**
S.D.													**11.5**	**8.0**

E. cladocalyx bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	HTC			Total	HTC
352	75	65	2350	0.0104	0.0026	10.35	11.28	0.930	359.9	251.9	996.9	877.3	41.0	28.7
396	95	65	2430	0.0172	0.0092	16.23	17.9	1.670	182.3	127.6	942.3	829.2	22.0	15.4
356	85	70	2435	0.0138	0.0044	11.78	12.748	0.968	217.7	152.4	852.5	750.2	29.0	20.3
382	100	80	2375	0.0187	0.0067	18.822	20.629	1.807	269.1	188.4	1009.0	888.0	30.3	21.2
398	80	65	2415	0.0121	0.0041	11.199	12.114	0.915	221.8	155.3	922.6	811.8	27.3	19.1
367	100	75	2410	0.0189	0.0083	18.388	20.166	1.778	214.7	150.3	971.5	854.9	25.1	17.6
392	80	65	2360	0.0119	0.0040	11.668	12.403	0.735	182.3	127.6	983.6	865.6	21.1	14.7
375	90	70	2380	0.0151	0.0060	13.085	14.022	0.937	156.6	109.7	864.2	760.5	20.6	14.4
363	100	80	2435	0.0191	0.0069	22.422	24.492	2.070	300.7	210.5	1172.4	1031.7	29.1	20.4
393	85	65	2455	0.0139	0.0058	13.735	15.138	1.403	242.5	169.8	985.9	867.6	28.0	19.6
390	95	65	2215	0.0157	0.0084	12.865	13.953	1.088	130.3	91.2	819.4	721.1	18.1	12.6
389	105	80	2395	0.0207	0.0087	17.514	20.512	2.998	344.6	241.2	844.5	743.2	46.4	32.5
359	85	75	2435	0.0138	0.0031	12.92	13.602	0.682	222.9	156.0	935.1	822.8	27.1	19.0
400	85	65	2400	0.0136	0.0057	13.692	15.586	1.894	334.9	234.5	1005.4	884.7	37.9	26.5
397	85	65	2305	0.0131	0.0054	11.904	13.02	1.116	205.5	143.8	910.1	800.9	25.7	18.0
380	75	60	2425	0.0107	0.0039	10.455	11.635	1.180	306.0	214.2	975.9	858.8	35.6	24.9
395	90	60	2445	0.0156	0.0086	14.635	16.123	1.488	172.2	120.5	940.9	828.0	20.8	14.6
378	95	75	2400	0.0170	0.0064	16.98	18.039	1.059	165.2	115.7	998.1	878.4	18.8	13.2
371	90	70	2375	0.0151	0.0060	14.678	16.035	1.357	227.3	159.1	971.5	854.9	26.6	18.6
362	85	70	2410	0.0137	0.0044	14.018	14.628	0.610	138.6	97.0	1025.0	902.0	15.4	10.8
374	95	65	2455	0.0174	0.0093	17.031	18.666	1.635	176.7	123.7	978.7	861.3	20.5	14.4
388	100	80	2335	0.0183	0.0066	16.667	17.722	1.055	159.8	111.9	908.8	799.8	20.0	14.0
391	85	55	2395	0.0136	0.0079	12.283	14.639	2.356	298.2	208.8	903.8	795.3	37.5	26.2
354	80	65	2425	0.0122	0.0041	12.906	13.977	1.071	258.5	181.0	1058.8	931.7	27.7	19.4
386	90	70	2370	0.0151	0.0060	14.314	15.225	0.911	152.9	107.1	949.4	835.4	18.3	12.8
385	90	75	2415	0.0154	0.0047	13.86	14.759	0.899	191.5	134.1	902.1	793.9	24.1	16.9
387	90	70	2370	0.0151	0.0060	12.792	14.092	1.300	218.3	152.8	848.4	746.6	29.2	20.5
379	105	85	2420	0.0210	0.0072	18.013	19.965	1.952	270.3	189.2	859.6	756.5	35.7	25.0
Mean											**948**		**27.1**	**19.0**
S.D.													**7.5**	**5.3**

A. mearnsii bark-on

Post No.	Diameter (mm)	Heartwood diameter (mm)	Length (mm)	Post volume (m^3)	Treatable volume (m^3)	Initial Wt (kg)	Final Wt (kg)	Pick up (kg)	Retention (kg/m^3)		Air-dry density (kg/m^3)	Oven-dry density (kg/m^3)	Retention (%m/m)	
									Total	HTC			Total	HTC
413	85	40	2455	0.0139	0.0108	11.492	12.834	1.342	123.7	86.6	824.9	725.9	17.0	11.9
409	75	35	2510	0.0111	0.0087	8.376	10.13	1.754	202.2	141.6	755.4	664.7	30.4	21.3
412	110	80	2480	0.0236	0.0111	21.153	24.43	3.277	295.2	206.6	897.5	789.8	37.4	26.2
419	100	60	2485	0.0195	0.0125	22.909	25.017	2.108	168.8	118.1	1173.8	1032.9	16.3	11.4
398	75	60	2430	0.0107	0.0039	8.088	9.84	1.752	453.3	317.3	753.4	663.0	68.4	47.9
414	70	45	2410	0.0093	0.0054	9.194	10.203	1.009	185.4	129.8	991.3	872.3	21.3	14.9
408	80	40	2380	0.0120	0.0090	9.429	10.146	0.717	79.9	55.9	788.2	693.6	11.5	8.1
411	105	55	2510	0.0217	0.0158	16.519	20.112	3.593	227.8	159.5	760.0	668.8	34.1	23.8
417	90	65	2450	0.0156	0.0075	8.67	9.93	1.260	169.0	118.3	556.3	489.5	34.5	24.2
406	105	45	2415	0.0209	0.0171	17.872	21.76	3.888	227.8	159.4	854.6	752.1	30.3	21.2
420	115	45	2485	0.0258	0.0219	21.48	25.096	3.616	165.4	115.8	832.2	732.3	22.6	15.8
407	110	50	2435	0.0231	0.0184	21.705	23.902	2.197	119.7	83.8	938.0	825.4	14.5	10.1
392	95	50	2390	0.0169	0.0122	14.199	16.673	2.474	202.0	141.4	838.2	737.6	27.4	19.2
400	130	65	2415	0.0321	0.0240	25.062	26.616	1.554	64.6	45.2	781.8	688.0	9.4	6.6
395	85	45	2420	0.0137	0.0099	9.9	11.772	1.872	189.4	132.6	720.9	634.4	29.9	20.9
410	95	50	2420	0.0172	0.0124	14.525	16.616	2.091	168.6	118.0	846.8	745.2	22.6	15.8
418	130	80	2455	0.0326	0.0202	23.599	27.901	4.302	212.5	148.7	724.2	637.3	33.3	23.3
393	80	35	2385	0.0120	0.0097	9.817	11.134	1.317	135.9	95.1	818.9	720.6	18.9	13.2
403	95	50	2420	0.0172	0.0124	11.503	13.191	1.688	136.1	95.3	670.6	590.1	23.1	16.1
404	70	45	2430	0.0094	0.0055	10.17	11.465	1.295	236.0	165.2	1087.5	957.0	24.7	17.3
405	95	60	2430	0.0172	0.0104	15.803	17.692	1.889	182.4	127.7	917.5	807.4	22.6	15.8
396	100	70	2380	0.0187	0.0095	16.74	17.994	1.254	131.5	92.1	895.5	788.1	16.7	11.7
402	95	55	2415	0.0171	0.0114	12.918	14.82	1.902	167.1	117.0	754.6	664.1	25.2	17.6
397	80	45	2370	0.0119	0.0081	9.769	10.969	1.200	147.4	103.1	820.0	721.6	20.4	14.3
394	80	40	2380	0.0120	0.0090	11.026	12.871	1.845	205.6	143.9	921.7	811.1	25.4	17.7
401	110	75	2425	0.0230	0.0123	15.929	18.03	2.101	170.4	119.3	691.2	608.3	28.0	19.6
399	80	45	2470	0.0124	0.0085	9.447	10.512	1.065	125.5	87.8	760.9	669.6	18.7	13.1
391	95	55	2350	0.0167	0.0111	11.533	13.324	1.791	161.7	113.2	692.4	609.3	26.5	18.6
416	105	45	2450	0.0212	0.0173	16.724	19.23	2.506	144.7	101.3	788.3	693.7	20.9	14.6
415	85	60	2460	0.0140	0.0070	14.606	16.099	1.493	213.2	149.2	1046.3	920.8	23.2	16.2
Mean											**830**		**25.2**	**17.6**
S.D.													**10.4**	**7.3**

APPENDIX B ACQ retention analysis and penetration evaluation

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. grandis* debark only								
92231	*E. grandis* A56	0.452	0.198	0.65	Unpenetrated	Satisfactory	H3	0.92
92232	*E. grandis* A57	0.510	0.286	0.80	Unpenetrated	Satisfactory	H3	0.136
92233	*E. grandis* A58	0.522	0.337	0.86	Unpenetrated	Satisfactory	H3	
92234	*E. grandis* A66	0.610	0.323	0.93	Unpenetrated	Satisfactory	H3	
92235	*E. grandis* A67	0.756	0.302	1.06	Unpenetrated	Satisfactory	H4	
92236	*E. grandis* A73	0.680	0.355	1.04	Unpenetrated	Satisfactory	H4	
92237	*E. grandis* A77	0.578	0.277	0.86	Unpenetrated	Satisfactory	H3	
92238	*E. grandis* A80	0.569	0.364	0.93	Unpenetrated	Satisfactory	H3	
92239	*E. grandis* A82	0.604	0.321	0.93	Unpenetrated	Satisfactory	H3	
92240	*E. grandis* A83	0.560	0.286	0.85	Unpenetrated	Satisfactory	H3	
92241	*E. grandis* A86	0.775	0.335	1.11	Unpenetrated	Satisfactory	H4	
92242	*E. grandis* A89	0.784	0.386	1.17	Unpenetrated	Satisfactory	H4	
92243	*E. grandis* A90	0.561	0.349	0.91	Unpenetrated	Satisfactory	H3	
92244	*E. grandis* A91	0.601	0.295	0.90	Unpenetrated	Satisfactory	H3	
92245	*E. grandis* A95	0.688	0.353	1.04	Unpenetrated	Satisfactory	H4	
92246	*E. grandis* A96	0.497	0.286	0.78	Unpenetrated	Satisfactory	H3	
92247	*E. grandis* A98	0.637	0.338	0.98	Unpenetrated	Satisfactory	H4	
92248	*E. grandis* A99	0.476	0.242	0.72	Unpenetrated	Satisfactory	H3	
92249	*E. grandis* A100	0.741	0.377	1.12	Unpenetrated	Satisfactory	H4	
92250	*E. grandis* A102	0.565	0.292	0.86	Unpenetrated	Satisfactory	H3	
ACQ-treated *E. grandis* debark + gang-nail								
92924	*E. grandis* A 128	0.535	0.308	0.84	Unpenetrated	Satisfactory	H3	0.93
92925	*E. grandis* A 129	0.418	0.210	0.63	Unpenetrated	Satisfactory	H3	0.167
92926	*E. grandis* A 131	0.589	0.277	0.87	Unpenetrated	Satisfactory	H3	
92927	*E. grandis* A 132	0.589	0.309	0.90	Unpenetrated	Satisfactory	H3	
92928	*E. grandis* A 138	0.513	0.274	0.79	Unpenetrated	Satisfactory	H3	
92929	*E. grandis* A 140	0.640	0.306	0.95	Unpenetrated	Satisfactory	H3	
92930	*E. grandis* A 142	0.659	0.355	1.01	Unpenetrated	Satisfactory	H4	
92931	*E. grandis* A 145	0.442	0.192	0.63	Unpenetrated	Satisfactory	H3	
92932	*E. grandis* A 146	0.469	0.309	0.78	Unpenetrated	Satisfactory	H3	
92933	*E. grandis* A 151	0.593	0.301	0.89	Unpenetrated	Satisfactory	H3	
92934	*E. grandis* A 152	0.627	0.401	1.03	No Heartwood	Satisfactory	H4	
92935	*E. grandis* A 155	0.672	0.321	0.99	No Heartwood	Satisfactory	H4	
92936	*E. grandis* A 157	0.746	0.343	1.09	Unpenetrated	Satisfactory	H4	
92937	*E. grandis* A 158	0.650	0.346	1.00	No Heartwood	Satisfactory	H4	
92938	*E. grandis* A 159	0.674	0.374	1.05	Unpenetrated	Satisfactory	H4	
92939	*E. grandis* A 161	0.694	0.419	1.11	No Heartwood	Satisfactory	H4	
92940	*E. grandis* A 162	0.820	0.446	1.27	No Heartwood	Satisfactory	H4	
92941	*E. grandis* A 165	0.545	0.304	0.85	Unpenetrated	Satisfactory	H3	
92942	*E. grandis* A 169	0.737	0.386	1.12	Unpenetrated	Satisfactory	H4	
92943	*E. grandis* A 170	0.481	0.258	0.74	Unpenetrated	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. grandis* bark-on								
92944	*E. grandis* A 172	0.588	0.258	0.85	Unpenetrated	Satisfactory	H3	1.00
92945	*E. grandis* A 173	0.596	0.323	0.92	No Heartwood	Satisfactory	H3	0.225
92946	*E. grandis* A 176	0.687	0.343	1.03	Unpenetrated	Satisfactory	H4	
92947	*E. grandis* A 178	0.661	0.293	0.95	Unpenetrated	Satisfactory	H3	
92948	*E. grandis* A 180	0.872	0.398	1.27	Unpenetrated	Satisfactory	H4	
92949	*E. grandis* A 181	0.648	0.344	0.99	Unpenetrated	Satisfactory	H4	
92950	*E. grandis* A 183	0.703	0.294	1.00	No Heartwood	Satisfactory	H4	
92951	*E. grandis* A 184	0.467	0.289	0.76	Unpenetrated	Satisfactory	H3	
92952	*E. grandis* A 185	0.649	0.358	1.01	Unpenetrated	Satisfactory	H4	
92953	*E. grandis* A 186	0.571	0.329	0.90	Unpenetrated	Satisfactory	H3	
92954	*E. grandis* A 187	0.749	0.313	1.06	No Heartwood	Satisfactory	H4	
92955	*E. grandis* A 188	0.684	0.312	1.00	Unpenetrated	Satisfactory	H4	
92956	*E. grandis* A 189	0.747	1.030	1.78	No Heartwood	Satisfactory	H5	
92957	*E. grandis* A 190	0.715	0.372	1.09	Unpenetrated	Satisfactory	H4	
92958	*E. grandis* A 193	0.748	0.349	1.10	No Heartwood	Satisfactory	H4	
92959	*E. grandis* A 194	0.735	0.342	1.08	No Heartwood	Satisfactory	H4	
92960	*E. grandis* A 195	0.628	0.340	0.97	Unpenetrated	Satisfactory	H3	
92961	*E. grandis* A 196	0.538	0.222	0.76	Unpenetrated	Satisfactory	H3	
92962	*E. grandis* A 198	0.563	0.293	0.86	Unpenetrated	Satisfactory	H3	
92963	*E. grandis* A 200	0.538	0.188	0.73	Unpenetrated	Satisfactory	H3	
ACQ-treated *E. grandis* microwave dried								
92964	*E. grandis* A 505	0.750	0.543	1.29	No Heartwood	Satisfactory	H4	1.21
92965	*E. grandis* A 509	0.686	0.386	1.07	No Heartwood	Satisfactory	H4	0.161
92966	*E. grandis* A 515	0.687	0.449	1.14	No Heartwood	Satisfactory	H4	
92967	*E. grandis* A 519	0.704	0.439	1.14	No Heartwood	Satisfactory	H4	
92968	*E. grandis* A 532	0.642	0.431	1.07	No Heartwood	Satisfactory	H4	
92969	*E. grandis* A 557	0.728	0.515	1.24	Unpenetrated	Satisfactory	H4	
92970	*E. grandis* A 562	0.717	0.508	1.23	No Heartwood	Satisfactory	H4	
92971	*E. grandis* A 563	0.592	0.399	0.99	No Heartwood	Satisfactory	H4	
92972	*E. grandis* A 568	0.844	0.603	1.45	No Heartwood	Satisfactory	H4	
92973	*E. grandis* A 570	0.715	0.538	1.25	No Heartwood	Satisfactory	H4	
92974	*E. grandis* A 572	0.702	0.476	1.18	No Heartwood	Satisfactory	H4	
92975	*E. grandis* A 573	0.766	0.594	1.36	Some penetrated	Satisfactory	H4	
92976	*E. grandis* A 577	0.627	0.411	1.04	No Heartwood	Satisfactory	H4	
92977	*E. grandis* A 579	0.732	0.527	1.26	No Heartwood	Satisfactory	H4	
92978	*E. grandis* A 582	0.827	0.553	1.38	No Heartwood	Satisfactory	H4	
92979	*E. grandis* A 583	0.756	0.592	1.35	No Heartwood	Satisfactory	H4	
92980	*E. grandis* A 587	0.477	0.330	0.81	No Heartwood	Satisfactory	H3	
92981	*E. grandis* A 592	0.810	0.596	1.41	No Heartwood	Satisfactory	H4	
92982	*E. grandis* A 598	0.775	0.578	1.35	No Heartwood	Satisfactory	H4	
92983	*E. grandis* A 599	0.720	0.548	1.27	No Heartwood	Satisfactory	H4	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/ SD
ACQ-treated *E. globulus* debark only								
92251	*E. globulus* B24	0.404	0.262	0.67	Unknown	Satisfactory	H3	0.86
92252	*E. globulus* B46	0.573	0.314	0.89	Unknown	Satisfactory	H3	0.099
92253	*E. globulus* B47	0.568	0.355	0.92	Unknown	Satisfactory	H3	
92254	*E. globulus* B48	0.563	0.347	0.91	Unknown	Satisfactory	H3	
92255	*E. globulus* B50	0.464	0.384	0.85	Unknown	Satisfactory	H3	
92256	*E. globulus* B56	0.506	0.371	0.88	Unknown	Satisfactory	H3	
92257	*E. globulus* B57	0.526	0.361	0.89	Unknown	Satisfactory	H3	
92258	*E. globulus* B63	0.482	0.352	0.83	Unknown	Satisfactory	H3	
92259	*E. globulus* B69	0.472	0.313	0.79	Unknown	5% unpenetrated	H3	
92260	*E. globulus* B70	0.475	0.332	0.81	Unknown	Satisfactory	H3	
92261	*E. globulus* B74	0.481	0.329	0.81	Unknown	Satisfactory	H3	
92262	*E. globulus* B77	0.347	0.251	0.60	Unknown	Satisfactory	H3	
92263	*E. globulus* B79	0.543	0.362	0.91	Unknown	Satisfactory	H3	
92264	*E. globulus* B81	0.634	0.385	1.02	Unknown	Satisfactory	H4	
92265	*E. globulus* B82	0.572	0.361	0.93	Unknown	<5% unpenetrated	H3	
92266	*E. globulus* B84	0.563	0.391	0.95	Unknown	Satisfactory	H3	
92267	*E. globulus* B89	0.565	0.294	0.86	Unknown	<5% unpenetrated	H3	
92268	*E. globulus* B90	0.594	0.365	0.96	Unknown	Satisfactory	H3	
92269	*E. globulus* B94	0.589	0.366	0.96	Unknown	Satisfactory	H3	
92270	*E. globulus* B59	0.508	0.335	0.84	Unknown	Satisfactory	H3	
ACQ-treated *E. globulus* debark + gang-nail								
92984	*E. globulus* B 121	0.708	0.476	1.18	Unknown	Satisfactory	H4	0.79
92985	*E. globulus* B 123	0.419	0.282	0.70	Unknown	Satisfactory	H3	0.151
92986	*E. globulus* B 130	0.526	0.334	0.86	Unknown	Satisfactory	H3	
92987	*E. globulus* B 131	0.516	0.354	0.87	Unknown	Satisfactory	H3	
92988	*E. globulus* B 132	0.560	0.347	0.91	Unknown	Satisfactory	H3	
92989	*E. globulus* B 133	0.382	0.255	0.64	Unknown	Satisfactory	H3	
92990	*E. globulus* B 135	0.419	0.256	0.68	Unknown	Satisfactory	H3	
92991	*E. globulus* B 136	0.498	0.341	0.84	Unknown	Satisfactory	H3	
92992	*E. globulus* B 138	0.640	0.408	1.05	Unknown	Satisfactory	H4	
92993	*E. globulus* B 142	0.312	0.189	0.50	Unknown	Satisfactory	H3	
92994	*E. globulus* B 146	0.475	0.324	0.80	Unknown	Satisfactory	H3	
92995	*E. globulus* B 151	0.486	0.312	0.80	Unknown	Satisfactory	H3	
92996	*E. globulus* B 154	0.481	0.325	0.81	Unknown	Satisfactory	H3	
92997	*E. globulus* B 157	0.506	0.343	0.85	Unknown	Satisfactory	H3	
92998	*E. globulus* B 160	0.488	0.298	0.79	Unknown	Satisfactory	H3	
92999	*E. globulus* B 162	0.477	0.297	0.77	Unknown	Satisfactory	H3	
93000	*E. globulus* B 163	0.440	0.247	0.69	Unknown	Satisfactory	H3	
93001	*E. globulus* B 166	0.345	0.249	0.59	Unknown	Satisfactory	H3	
93002	*E. globulus* B 167	0.473	0.297	0.77	Unknown	Satisfactory	H3	
93003	*E. globulus* B 169	0.496	0.269	0.77	Unknown	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. globulus* bark-on								
93004	*E. globulus* B 171	0.492	0.268	0.76	Unknown	Satisfactory	H3	0.93
93005	*E. globulus* B 173	0.465	0.295	0.76	Unknown	Satisfactory	H3	0.157
93006	*E. globulus* B 176	0.535	0.301	0.84	Unknown	Satisfactory	H3	
93007	*E. globulus* B 178	0.473	0.285	0.76	Unknown	Satisfactory	H3	
93008	*E. globulus* B 179	0.569	0.330	0.90	Unknown	Satisfactory	H3	
93009	*E. globulus* B 180	0.581	0.305	0.89	Unknown	Satisfactory	H3	
93010	*E. globulus* B 183	0.559	0.326	0.89	Unknown	Satisfactory	H3	
93011	*E. globulus* B 184	0.587	0.295	0.88	Unknown	Satisfactory	H3	
93012	*E. globulus* B 185	0.532	0.292	0.82	Unknown	Satisfactory	H3	
93013	*E. globulus* B 186	0.553	0.332	0.89	Unknown	Satisfactory	H3	
93014	*E. globulus* B 188	0.689	0.411	1.10	Unknown	Satisfactory	H4	
93015	*E. globulus* B 189	0.646	0.391	1.04	Unknown	Satisfactory	H4	
93016	*E. globulus* B 190	0.709	0.450	1.16	Unknown	Satisfactory	H4	
93017	*E. globulus* B 191	0.503	0.275	0.78	Unknown	Satisfactory	H3	
93018	*E. globulus* B 193	0.549	0.338	0.89	Unknown	Satisfactory	H3	
93019	*E. globulus* B 195	0.459	0.321	0.78	Unknown	Satisfactory	H3	
93020	*E. globulus* B 197	0.916	0.434	1.35	Unknown	Satisfactory	H4	
93021	*E. globulus* B 198	0.635	0.346	0.98	Unknown	Satisfactory	H4	
93022	*E. globulus* B 199	0.712	0.385	1.10	Unknown	Satisfactory	H4	
93023	*E. globulus* B 200	0.636	0.356	0.99	Unknown	Satisfactory	H4	
ACQ-treated *E. globulus* microwave dried								
93024	*E. globulus* B 506	0.508	0.292	0.80	Unknown	Satisfactory	H3	0.85
93025	*E. globulus* B 510	0.476	0.349	0.83	Unknown	Satisfactory	H3	0.149
93026	*E. globulus* B 516	0.550	0.316	0.87	Unknown	Satisfactory	H3	
93027	*E. globulus* B 518	0.519	0.324	0.84	Unknown	Satisfactory	H3	
93028	*E. globulus* B 524	0.440	0.268	0.71	Unknown	Satisfactory	H3	
93029	*E. globulus* B 528	0.436	0.268	0.70	Unknown	Satisfactory	H3	
93030	*E. globulus* B 532	0.559	0.361	0.92	Unknown	Satisfactory	H3	
93031	*E. globulus* B 533	0.506	0.338	0.84	Unknown	Satisfactory	H3	
93032	*E. globulus* B 542	0.498	0.309	0.81	Unknown	Satisfactory	H3	
93033	*E. globulus* B 546	0.552	0.349	0.90	Unknown	Satisfactory	H3	
93034	*E. globulus* B 547	0.666	0.463	1.13	Unknown	Satisfactory	H4	
93035	*E. globulus* B 558	0.552	0.365	0.92	Unknown	Satisfactory	H3	
93036	*E. globulus* B 560	0.590	0.388	0.98	Unknown	Satisfactory	H4	
93037	*E. globulus* B 569	0.212	0.172	0.38	Unknown	Satisfactory	H2	
93038	*E. globulus* B 571	0.517	0.350	0.87	Unknown	Satisfactory	H3	
93039	*E. globulus* B 576	0.641	0.409	1.05	Unknown	Satisfactory	H4	
93040	*E. globulus* B 586	0.505	0.359	0.86	Unknown	Satisfactory	H3	
93041	*E. globulus* B 594	0.460	0.356	0.82	Unknown	Satisfactory	H3	
93042	*E. globulus* B 597	0.588	0.353	0.94	Unknown	Satisfactory	H3	
93043	*E. globulus* B 602	0.484	0.346	0.83	Unknown	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *C. maculata* debark only								
92271	*C. maculata* C51	0.161	0.099	0.26	Unpenetrated	Satisfactory	H1	0.27
92272	*C. maculata* C52	0.215	0.131	0.35	Unpenetrated	Satisfactory	H2	0.052
92273	*C. maculata* C54	0.141	0.101	0.24	Unpenetrated	Satisfactory	H1	
92274	*C. maculata* C55	0.172	0.097	0.27	Unpenetrated	Satisfactory	H1	
92275	*C. maculata* C56	0.206	0.132	0.34	Unpenetrated	Satisfactory	H1	
92276	*C. maculata* C57	0.177	0.116	0.29	Unpenetrated	Satisfactory	H1	
92277	*C. maculata* C58	0.167	0.086	0.25	Unpenetrated	Satisfactory	H1	
92278	*C. maculata* C60	0.189	0.118	0.31	Unpenetrated	Satisfactory	H1	
92279	*C. maculata* C65	0.147	0.100	0.25	Unpenetrated	Satisfactory	H1	
92280	*C. maculata* C66	0.153	0.085	0.24	Unpenetrated	Satisfactory	H1	
92281	*C. maculata* C67	0.187	0.143	0.33	Unpenetrated	Satisfactory	H1	
92282	*C. maculata* C68	0.204	0.101	0.31	Unpenetrated	Satisfactory	H1	
92283	*C. maculata* C70	0.144	0.084	0.23	Unpenetrated	Satisfactory	H1	
92284	*C. maculata* C73	0.114	0.093	0.21	Unpenetrated	Patchy but OK	H1	
92285	*C. maculata* C74	0.094	0.050	0.14	Unpenetrated	Patchy but OK	H1	
92286	*C. maculata* C75	0.184	0.115	0.30	Unpenetrated	Satisfactory	H1	
92287	*C. maculata* C76	0.183	0.099	0.28	Unpenetrated	Satisfactory	H1	
92288	*C. maculata* C78	0.139	0.082	0.22	Unpenetrated	Satisfactory	H1	
92289	*C. maculata* C79	0.191	0.138	0.33	Unpenetrated	Satisfactory	H1	
92290	*C. maculata* C80	0.217	0.101	0.32	Unpenetrated	Satisfactory	H1	
ACQ-treated *C. maculata* debark + gang-nail								
92291	*C. maculata* C121	0.148	0.087	0.24	Unpenetrated	Satisfactory	H1	0.25
92292	*C. maculata* C123	0.140	0.083	0.22	Unpenetrated	Satisfactory	H1	0.051
92293	*C. maculata* C125	0.140	0.066	0.21	Unpenetrated	Satisfactory	H1	
92294	*C. maculata* C126	0.159	0.067	0.23	Unpenetrated	<5% unpenetrated	H1	
92295	*C. maculata* C127	0.171	0.111	0.28	Unpenetrated	5% unpenetrated	H1	
92296	*C. maculata* C128	0.166	0.051	0.22	Unpenetrated	5% unpenetrated	H1	
92297	*C. maculata* C130	0.262	0.132	0.39	Unpenetrated	Satisfactory	H3	
92298	*C. maculata* C131	0.169	0.065	0.23	Unpenetrated	Satisfactory	H1	
92299	*C. maculata* C133	0.155	0.112	0.27	Unpenetrated	Satisfactory	H1	
92300	*C. maculata* C135	0.196	0.115	0.31	Unpenetrated	Satisfactory	H1	
92301	*C. maculata* C136	0.179	0.107	0.29	Unpenetrated	Satisfactory	H1	
92302	*C. maculata* C138	0.114	0.049	0.16	Unpenetrated	Satisfactory	H1	
92303	*C. maculata* C140	0.218	0.081	0.30	Unpenetrated	5% unpenetrated	H1	
92304	*C. maculata* C141	0.150	0.080	0.23	Unpenetrated	Satisfactory	H1	
92305	*C. maculata* C143	0.180	0.097	0.28	Unpenetrated	Satisfactory	H1	
92306	*C. maculata* C146	0.142	0.082	0.22	Unpenetrated	Satisfactory	H1	
92307	*C. maculata* C147	0.132	0.049	0.18	Unpenetrated	Satisfactory	H1	
92308	*C. maculata* C148	0.147	0.097	0.24	Unpenetrated	Satisfactory	H1	
92309	*C. maculata* C149	0.159	0.112	0.27	Unpenetrated	Satisfactory	H1	
92310	*C. maculata* C150	0.200	0.081	0.28	Unpenetrated	Satisfactory	H1	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/ SD
ACQ-treated *C. maculata* bark-on								
92311	*C. maculata* C171	0.231	0.164	0.40	Unpenetrated	Satisfactory	H3	0.42
92312	*C. maculata* C172	0.263	0.173	0.44	Unpenetrated	Satisfactory	H3	0.070
92313	*C. maculata* C173	0.216	0.167	0.38	Unpenetrated	Satisfactory	H2	
92314	*C. maculata* C174	0.268	0.220	0.49	Unpenetrated	Satisfactory	H3	
92315	*C. maculata* C178	0.229	0.142	0.37	Unpenetrated	Satisfactory	H2	
92316	*C. maculata* C179	0.237	0.175	0.41	Unpenetrated	Satisfactory	H3	
92317	*C. maculata* C180	0.189	0.138	0.33	Unpenetrated	Satisfactory	H2	
92318	*C. maculata* C181	0.252	0.157	0.41	Unpenetrated	Satisfactory	H3	
92319	*C. maculata* C182	0.271	0.144	0.42	Unpenetrated	Satisfactory	H3	
92320	*C. maculata* C183	0.189	0.165	0.35	Unpenetrated	Satisfactory	H2	
92321	*C. maculata* C184	0.292	0.242	0.53	Unpenetrated	Satisfactory	H3	
92322	*C. maculata* C185	0.245	0.206	0.45	Unpenetrated	Satisfactory	H3	
92323	*C. maculata* C186	0.318	0.243	0.56	Unpenetrated	Satisfactory	H3	
92324	*C. maculata* C187	0.222	0.195	0.42	Unpenetrated	Satisfactory	H3	
92325	*C. maculata* C189	0.194	0.110	0.30	Unpenetrated	Satisfactory	H2	
92326	*C. maculata* C192	0.291	0.213	0.50	Unpenetrated	Satisfactory	H3	
92327	*C. maculata* C194	0.220	0.151	0.37	Unpenetrated	Satisfactory	H2	
92328	*C. maculata* C197	0.295	0.222	0.52	Unpenetrated	Satisfactory	H3	
92329	*C. maculata* C198	0.201	0.165	0.37	Unpenetrated	Satisfactory	H2	
92330	*C. maculata* C200	0.234	0.152	0.39	Unpenetrated	Satisfactory	H3	
ACQ-treated *E. pilularis* debark only								
93266	*E. pilularis* D51	0.429	0.215	0.64	Unpenetrated	Satisfactory	H3	0.66
93267	*E. pilularis* D54	0.483	0.225	0.71	Unpenetrated	Satisfactory	H3	0.226
93268	*E. pilularis* D55	0.508	0.264	0.77	Unpenetrated	Satisfactory	H3	
93269	*E. pilularis* D56	0.810	0.316	1.13	Unpenetrated	Satisfactory	H4	
93270	*E. pilularis* D57	0.419	0.200	0.62	Unpenetrated	Satisfactory	H3	
93271	*E. pilularis* D58	0.214	0.107	0.32	Unpenetrated	Satisfactory	H1	
93272	*E. pilularis* D60	0.563	0.339	0.90	Unpenetrated	Satisfactory	H3	
93273	*E. pilularis* D62	0.285	0.131	0.42	Unpenetrated	Satisfactory	H3	
93274	*E. pilularis* D66	0.375	0.231	0.61	Unpenetrated	Satisfactory	H3	
93275	*E. pilularis* D67	0.349	0.216	0.57	Unpenetrated	Satisfactory	H3	
93276	*E. pilularis* D68	0.223	0.134	0.36	Unpenetrated	Satisfactory	H2	
93277	*E. pilularis* D69	0.246	0.134	0.38	Unpenetrated	Satisfactory	H2	
93278	*E. pilularis* D70	0.485	0.223	0.71	Unpenetrated	Satisfactory	H3	
93279	*E. pilularis* D71	0.316	0.202	0.52	Unpenetrated	Satisfactory	H3	
93280	*E. pilularis* D74	0.308	0.183	0.49	Unpenetrated	Satisfactory	H3	
93281	*E. pilularis* D75	0.541	0.335	0.88	Unpenetrated	Satisfactory	H3	
93282	*E. pilularis* D76	0.414	0.283	0.70	Unpenetrated	Satisfactory	H3	
93283	*E. pilularis* D78	0.674	0.346	1.02	Unpenetrated	Satisfactory	H4	
93284	*E. pilularis* D79	0.327	0.230	0.56	Unpenetrated	Satisfactory	H3	
93285	*E. pilularis* D80	0.588	0.362	0.95	Unpenetrated	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. pilularis* debark + gang-nail								
92331	*E. pilularis* D121	0.507	0.310	0.82	Unpenetrated	Satisfactory	H3	0.48
92332	*E. pilularis* D122	0.268	0.155	0.42	Unpenetrated	Satisfactory	H3	0.152
92333	*E. pilularis* D123	0.210	0.098	0.31	Unpenetrated	Satisfactory	H1	
92334	*E. pilularis* D126	0.269	0.201	0.47	Unpenetrated	Satisfactory	H3	
92335	*E. pilularis* D127	0.251	0.149	0.40	Unpenetrated	Satisfactory	H3	
92336	*E. pilularis* D131	0.250	0.160	0.41	Unpenetrated	Satisfactory	H3	
92337	*E. pilularis* D132	0.322	0.200	0.52	Unpenetrated	Satisfactory	H3	
92338	*E. pilularis* D134	0.308	0.218	0.53	Unpenetrated	Satisfactory	H3	
92339	*E. pilularis* D136	0.395	0.253	0.65	Unpenetrated	Satisfactory	H3	
92340	*E. pilularis* D138	0.118	0.095	0.21	Unpenetrated	Satisfactory	H1	
92341	*E. pilularis* D139	0.259	0.210	0.47	Unpenetrated	Satisfactory	H3	
92342	*E. pilularis* D140	0.440	0.332	0.77	Unpenetrated	Satisfactory	H3	
92343	*E. pilularis* D141	0.247	0.129	0.38	Unpenetrated	Patchy but OK	H2	
92344	*E. pilularis* D142	0.326	0.270	0.60	Unpenetrated	Satisfactory	H3	
92345	*E. pilularis* D145	0.191	0.118	0.31	Unpenetrated	Satisfactory	H1	
92346	*E. pilularis* D146	0.344	0.245	0.59	Unpenetrated	Satisfactory	H3	
92347	*E. pilularis* D147	0.291	0.211	0.50	Unpenetrated	Satisfactory	H3	
92348	*E. pilularis* D148	0.273	0.166	0.44	Unpenetrated	Satisfactory	H3	
92349	*E. pilularis* D149	0.290	0.214	0.50	Unpenetrated	Satisfactory	H3	
92350	*E. pilularis* D150	0.213	0.116	0.33	Unpenetrated	Patchy but OK	H1	
ACQ-treated *E. pilularis* bark-on								
92351	*E. pilularis* D171	0.415	0.180	0.60	Unpenetrated	Satisfactory	H3	0.68
92352	*E. pilularis* D173	0.374	0.220	0.59	Unpenetrated	Satisfactory	H3	0.125
92353	*E. pilularis* D175	0.491	0.269	0.76	Unpenetrated	Satisfactory	H3	
92354	*E. pilularis* D176	0.463	0.230	0.69	Unpenetrated	Satisfactory	H3	
92355	*E. pilularis* D179	0.383	0.211	0.59	Unpenetrated	Satisfactory	H3	
92356	*E. pilularis* D180	0.350	0.209	0.56	Unpenetrated	Satisfactory	H3	
92357	*E. pilularis* D181	0.361	0.241	0.60	Unpenetrated	Satisfactory	H3	
92358	*E. pilularis* D182	0.267	0.204	0.47	Unpenetrated	Satisfactory	H3	
92359	*E. pilularis* D185	0.443	0.276	0.72	Unpenetrated	Satisfactory	H3	
92360	*E. pilularis* D186	0.525	0.286	0.81	Unpenetrated	Satisfactory	H3	
92361	*E. pilularis* D187	0.395	0.269	0.66	Unpenetrated	Satisfactory	H3	
92362	*E. pilularis* D189	0.548	0.304	0.85	Unpenetrated	Patchy but OK	H3	
92363	*E. pilularis* D190	0.604	0.332	0.94	Unpenetrated	Satisfactory	H3	
92364	*E. pilularis* D192	0.503	0.340	0.84	Unpenetrated	Satisfactory	H3	
92365	*E. pilularis* D193	0.354	0.201	0.56	Unpenetrated	Satisfactory	H3	
92366	*E. pilularis* D194	0.324	0.249	0.57	Unpenetrated	Satisfactory	H3	
92367	*E. pilularis* D195	0.374	0.210	0.58	Unpenetrated	Satisfactory	H3	
92368	*E. pilularis* D196	0.357	0.237	0.59	Unpenetrated	Satisfactory	H3	
92369	*E. pilularis* D199	0.516	0.299	0.82	Unpenetrated	Satisfactory	H3	
92370	*E. pilularis* D200	0.420	0.297	0.72	Unpenetrated	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. dunnii* debark only								
92371	*E. dunnii* E102	0.370	0.195	0.57	NA	Satisfactory	H3	0.62
92372	*E. dunnii* E103	0.547	0.277	0.82	NA	Satisfactory	H3	0.103
92373	*E. dunnii* E104	0.429	0.251	0.68	NA	Satisfactory	H3	
92374	*E. dunnii* E105	0.446	0.237	0.68	NA	Satisfactory	H3	
92375	*E. dunnii* E106	0.432	0.283	0.72	NA	Satisfactory	H3	
92376	*E. dunnii* E107	0.417	0.269	0.69	NA	Satisfactory	H3	
92377	*E. dunnii* E108	0.461	0.202	0.66	NA	Satisfactory	H3	
92378	*E. dunnii* E109	0.378	0.202	0.58	NA	Satisfactory	H3	
92379	*E. dunnii* E110	0.445	0.209	0.65	NA	Satisfactory	H3	
92380	*E. dunnii* E111	0.524	0.310	0.83	NA	Satisfactory	H3	
92381	*E. dunnii* E114	0.382	0.234	0.62	NA	Satisfactory	H3	
92382	*E. dunnii* E116	0.347	0.225	0.57	NA	Satisfactory	H3	
92383	*E. dunnii* E117	0.301	0.203	0.50	NA	Satisfactory	H3	
92384	*E. dunnii* E118	0.276	0.171	0.45	NA	Satisfactory	H3	
92385	*E. dunnii* E120	0.333	0.177	0.51	NA	Satisfactory	H3	
92386	*E. dunnii* E122	0.354	0.238	0.59	NA	Satisfactory	H3	
92387	*E. dunnii* E123	0.345	0.218	0.56	NA	Satisfactory	H3	
92388	*E. dunnii* E125	0.475	0.216	0.69	NA	Satisfactory	H3	
92389	*E. dunnii* E128	0.362	0.241	0.60	NA	Satisfactory	H3	
92390	*E. dunnii* E130	0.305	0.176	0.48	NA	Satisfactory	H3	
ACQ-treated *E. dunnii* debark + gang-nail								
92391	*E. dunnii* E133	0.302	0.158	0.46	NA	Satisfactory	H3	0.70
92392	*E. dunnii* E134	0.325	0.177	0.50	NA	Satisfactory	H3	0.141
92393	*E. dunnii* E135	0.355	0.220	0.58	NA	Satisfactory	H3	
92394	*E. dunnii* E136	0.611	0.305	0.92	NA	Satisfactory	H3	
92395	*E. dunnii* E137	0.349	0.209	0.56	NA	Satisfactory	H3	
92396	*E. dunnii* E138	0.394	0.197	0.59	NA	Satisfactory	H3	
92397	*E. dunnii* E141	0.610	0.320	0.93	NA	Satisfactory	H3	
92398	*E. dunnii* E142	0.353	0.214	0.57	NA	Satisfactory	H3	
92399	*E. dunnii* E148	0.467	0.252	0.72	NA	Satisfactory	H3	
92400	*E. dunnii* E151	0.561	0.299	0.86	NA	Satisfactory	H3	
92401	*E. dunnii* E152	0.476	0.171	0.65	NA	Satisfactory	H3	
92402	*E. dunnii* E153	0.473	0.259	0.73	NA	Satisfactory	H3	
92403	*E. dunnii* E156	0.428	0.243	0.67	NA	Satisfactory	H3	
92404	*E. dunnii* E157	0.498	0.273	0.77	NA	Satisfactory	H3	
92405	*E. dunnii* E158	0.394	0.233	0.63	NA	Satisfactory	H3	
92406	*E. dunnii* E161	0.600	0.307	0.91	NA	Satisfactory	H3	
92407	*E. dunnii* E164	0.447	0.244	0.69	NA	Satisfactory	H3	
92408	*E. dunnii* E165	0.465	0.276	0.74	NA	Satisfactory	H3	
92409	*E. dunnii* E169	0.526	0.318	0.84	NA	Satisfactory	H3	
92410	*E. dunnii* E173	0.368	0.243	0.61	NA	Satisfactory	H3	
92411	*E. dunnii* E178	0.599	0.342	0.94	NA	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *E. cladocalyx* debark only								
92412	*E. cladocalyx* F120	0.211	0.158	0.37	Unpenetrated	Satisfactory	H2	0.38
92413	*E. cladocalyx* F127	0.221	0.184	0.41	Unpenetrated	Patchy but OK	H3	0.105
92414	*E. cladocalyx* F128	0.119	0.060	0.18	Unpenetrated	Patchy but OK	H1	
92415	*E. cladocalyx* F129	0.173	0.155	0.33	Unpenetrated	Satisfactory	H1	
92416	*E. cladocalyx* F132	0.173	0.101	0.27	Unpenetrated	Satisfactory	H1	
92417	*E. cladocalyx* F137	0.181	0.132	0.31	Unpenetrated	Satisfactory	H1	
92418	*E. cladocalyx* F139	0.190	0.163	0.35	Unpenetrated	Satisfactory	H2	
92419	*E. cladocalyx* F145	0.164	0.132	0.30	Unpenetrated	Satisfactory	H1	
92420	*E. cladocalyx* F146	0.217	0.120	0.34	Unpenetrated	Satisfactory	H1	
92421	*E. cladocalyx* F153	0.190	0.150	0.34	Unpenetrated	Satisfactory	H1	
92422	*E. cladocalyx* F155	0.188	0.168	0.36	Unpenetrated	Satisfactory	H2	
92423	*E. cladocalyx* F158	0.211	0.136	0.35	Unpenetrated	Satisfactory	H2	
92424	*E. cladocalyx* F160	0.336	0.257	0.59	Unpenetrated	Satisfactory	H3	
92425	*E. cladocalyx* F166	0.233	0.158	0.39	Unpenetrated	Satisfactory	H3	
92426	*E. cladocalyx* F170	0.281	0.210	0.49	Unpenetrated	Satisfactory	H3	
92427	*E. cladocalyx* F171	0.340	0.241	0.58	Unpenetrated	Satisfactory	H3	
92428	*E. cladocalyx* F172	0.236	0.182	0.42	Unpenetrated	Satisfactory	H3	
92429	*E. cladocalyx* F176	0.175	0.128	0.30	Unpenetrated	Satisfactory	H1	
92430	*E. cladocalyx* F178	0.309	0.240	0.55	Unpenetrated	Satisfactory	H3	
92431	*E. cladocalyx* F179	0.221	0.196	0.42	Unpenetrated	Satisfactory	H3	
ACQ-treated *E. cladocalyx* debarked + gang-nail								
93064	*E. cladocalyx* F 408	0.261	0.051	0.31	Unpenetrated	Satisfactory	H1	0.35
93065	*E. cladocalyx* F 410	0.255	0.052	0.31	Unpenetrated	Unsatisfactory	H1	0.079
93066	*E. cladocalyx* F 413	0.218	0.069	0.29	Unpenetrated	Satisfactory	H1	
93067	*E. cladocalyx* F 415	0.310	0.068	0.38	Unpenetrated	Satisfactory	H2	
93068	*E. cladocalyx* F 417	0.269	0.081	0.35	Unpenetrated	Unsatisfactory	H2	
93069	*E. cladocalyx* F 419	0.287	0.083	0.37	Unpenetrated	Satisfactory	H2	
93070	*E. cladocalyx* F 420	0.275	0.345	0.62	Unpenetrated	Satisfactory	H3	
93071	*E. cladocalyx* F 421	0.258	0.100	0.36	Unpenetrated	Satisfactory	H2	
93072	*E. cladocalyx* F 425	0.218	0.068	0.29	Unpenetrated	Satisfactory	H1	
93073	*E. cladocalyx* F 428	0.248	0.091	0.34	Unpenetrated	Satisfactory	H1	
93074	*E. cladocalyx* F 431	0.245	0.083	0.33	Unpenetrated	Satisfactory	H1	
93075	*E. cladocalyx* F 436	0.252	0.066	0.32	Unpenetrated	Satisfactory	H1	
93076	*E. cladocalyx* F 438	0.256	0.086	0.34	Unpenetrated	Satisfactory	H1	
93077	*E. cladocalyx* F 439	0.245	0.069	0.31	Unpenetrated	Unsatisfactory	H1	
93078	*E. cladocalyx* F 441	0.298	0.082	0.38	Unpenetrated	Satisfactory	H2	
93079	*E. cladocalyx* F 442	0.160	0.034	0.19	Unpenetrated	Unsatisfactory	H1	
93080	*E. cladocalyx* F 446	0.241	0.068	0.31	Unpenetrated	Satisfactory	H1	
93081	*E. cladocalyx* F 448	0.263	0.100	0.36	Unpenetrated	Satisfactory	H2	
93082	*E. cladocalyx* F 449	0.270	0.097	0.37	Unpenetrated	Satisfactory	H2	
93083	*E. cladocalyx* F 450	0.304	0.103	0.41	Unpenetrated	Satisfactory	H3	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean /SD
ACQ-treated *E. cladocalyx* bark-on								
93044	*E. cladocalyx* F 302	0.221	0.099	0.32	Unpenetrated	Unsatisfactory	H1	0.43
93045	*E. cladocalyx* F 304	0.255	0.121	0.38	Unpenetrated	Unsatisfactory	H2	0.070
93046	*E. cladocalyx* F 306	0.306	0.102	0.41	Unpenetrated	Satisfactory	H3	
93047	*E. cladocalyx* F 307	0.294	0.151	0.45	Unpenetrated	Unsatisfactory	H3	
93048	*E. cladocalyx* F 308	0.317	0.184	0.50	Unpenetrated	Satisfactory	H3	
93049	*E. cladocalyx* F 309	0.284	0.168	0.45	Unpenetrated	Satisfactory	H3	
93050	*E. cladocalyx* F 310	0.267	0.154	0.42	Unpenetrated	Unsatisfactory	H3	
93051	*E. cladocalyx* F 311	0.257	0.134	0.39	Unpenetrated	Unsatisfactory	H3	
93052	*E. cladocalyx* F 312	0.248	0.120	0.37	Unpenetrated	Unsatisfactory	H2	
93053	*E. cladocalyx* F 313	0.225	0.102	0.33	Unpenetrated	Satisfactory	H1	
93054	*E. cladocalyx* F 315	0.241	0.120	0.36	Unpenetrated	Satisfactory	H2	
93055	*E. cladocalyx* F 317	0.286	0.185	0.47	Unpenetrated	Satisfactory	H3	
93056	*E. cladocalyx* F 318	0.270	0.179	0.45	Unpenetrated	Satisfactory	H3	
93057	*E. cladocalyx* F 320	0.290	0.168	0.46	Unpenetrated	Unsatisfactory	H3	
93058	*E. cladocalyx* F 321	0.298	0.185	0.48	Unpenetrated	Unsatisfactory	H3	
93059	*E. cladocalyx* F 323	0.268	0.135	0.40	Unpenetrated	Satisfactory	H3	
93060	*E. cladocalyx* F 326	0.294	0.149	0.44	Unpenetrated	Unsatisfactory	H3	
93061	*E. cladocalyx* F 327	0.250	0.168	0.42	Unpenetrated	Satisfactory	H3	
93062	*E. cladocalyx* F 328	0.290	0.168	0.46	Unpenetrated	Unsatisfactory	H3	
93063	*E. cladocalyx* F 329	0.383	0.254	0.64	Unpenetrated	Satisfactory	H3	
ACQ-treated *A. mearnsii* debark only								
92432	*A. mearnsii* G61	0.220	0.172	0.39	Unpenetrated	Satisfactory	H3	0.34
92433	*A. mearnsii* G64	0.208	0.172	0.38	Unpenetrated	Satisfactory	H2	0.041
92434	*A. mearnsii* G65	0.222	0.161	0.38	Unpenetrated	Satisfactory	H2	
92435	*A. mearnsii* G66	0.194	0.130	0.32	Unpenetrated	Satisfactory	H1	
92436	*A. mearnsii* G67	0.177	0.121	0.30	Unpenetrated	Satisfactory	H1	
92437	*A. mearnsii* G68	0.188	0.154	0.34	Unpenetrated	Satisfactory	H1	
92438	*A. mearnsii* G70	0.194	0.142	0.34	Unpenetrated	Satisfactory	H1	
92439	*A. mearnsii* G72	0.260	0.180	0.44	Unpenetrated	Satisfactory	H3	
92440	*A. mearnsii* G74	0.245	0.108	0.35	Unpenetrated	Satisfactory	H2	
92441	*A. mearnsii* G78	0.148	0.113	0.26	Unpenetrated	Satisfactory	H1	
92442	*A. mearnsii* G81	0.180	0.136	0.32	Unpenetrated	Satisfactory	H1	
92443	*A. mearnsii* G88	0.201	0.141	0.34	Unpenetrated	Satisfactory	H1	
92444	*A. mearnsii* G90	0.187	0.145	0.33	Unpenetrated	Satisfactory	H1	
92445	*A. mearnsii* G91	0.183	0.131	0.31	Unpenetrated	Satisfactory	H1	
92446	*A. mearnsii* G92	0.225	0.171	0.40	Unpenetrated	Satisfactory	H3	
92447	*A. mearnsii* G93	0.208	0.128	0.34	Unpenetrated	Satisfactory	H1	
92448	*A. mearnsii* G96	0.180	0.135	0.32	Unpenetrated	Satisfactory	H1	
92449	*A. mearnsii* G97	0.211	0.122	0.33	Unpenetrated	Satisfactory	H1	
92450	*A. mearnsii* G110	0.195	0.116	0.31	Unpenetrated	Satisfactory	H1	
92451	*A. mearnsii* G117	0.187	0.108	0.30	Unpenetrated	Satisfactory	H1	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean /SD
ACQ-treated *A. mearnsii* debark + gang-nail								
93084	*A. mearnsii* G 121	0.148	0.078	0.23	Unpenetrated	Satisfactory	H1	0.25
93085	*A. mearnsii* G 122	0.100	0.085	0.19	Unpenetrated	Satisfactory	H1	0.029
93086	*A. mearnsii* G 123	0.171	0.118	0.29	Unpenetrated	Satisfactory	H1	
93087	*A. mearnsii* G 124	0.157	0.103	0.26	Unpenetrated	Satisfactory	H1	
93088	*A. mearnsii* G 125	0.168	0.100	0.27	Unpenetrated	Satisfactory	H1	
93089	*A. mearnsii* G 127	0.131	0.102	0.23	Unpenetrated	Satisfactory	H1	
93090	*A. mearnsii* G 128	0.186	0.086	0.27	Unpenetrated	Satisfactory	H1	
93091	*A. mearnsii* G 132	0.151	0.117	0.27	Unpenetrated	Satisfactory	H1	
93092	*A. mearnsii* G 134	0.170	0.116	0.29	Unpenetrated	Satisfactory	H1	
93093	*A. mearnsii* G 138	0.138	0.085	0.22	Unpenetrated	Satisfactory	H1	
93094	*A. mearnsii* G 139	0.147	0.100	0.25	Unpenetrated	Satisfactory	H1	
93095	*A. mearnsii* G 140	0.143	0.103	0.25	Unpenetrated	Satisfactory	H1	
93096	*A. mearnsii* G 145	0.138	0.102	0.24	Unpenetrated	Satisfactory	H1	
93097	*A. mearnsii* G 146	0.124	0.103	0.23	Unpenetrated	Satisfactory	H1	
93098	*A. mearnsii* G 149	0.162	0.135	0.30	Unpenetrated	Satisfactory	H1	
93099	*A. mearnsii* G 151	0.149	0.083	0.23	Unpenetrated	Satisfactory	H1	
93100	*A. mearnsii* G 153	0.163	0.119	0.28	Unpenetrated	Satisfactory	H1	
93101	*A. mearnsii* G 154	0.160	0.103	0.26	Unpenetrated	Satisfactory	H1	
93102	*A. mearnsii* G 158	0.166	0.117	0.28	Unpenetrated	Satisfactory	H1	
93103	*A. mearnsii* G 160	0.128	0.100	0.23	Unpenetrated	Satisfactory	H1	
ACQ-treated *A. mearnsii* bark-on								
93104	*A. mearnsii* G 119	0.236	0.150	0.39	Unpenetrated	Satisfactory	H2	0.21
93105	*A. mearnsii* G 171	0.126	0.084	0.21	Unpenetrated	Satisfactory	H1	0.061
93106	*A. mearnsii* G 172	0.125	0.069	0.19	Unpenetrated	Unsatisfactory	H1	
93107	*A. mearnsii* G 173	0.203	0.104	0.31	Unpenetrated	Satisfactory	H1	
93108	*A. mearnsii* G 174	0.131	0.065	0.20	Unpenetrated	Satisfactory	H1	
93109	*A. mearnsii* G 175	0.198	0.100	0.30	Unpenetrated	Satisfactory	H1	
93110	*A. mearnsii* G 176	0.130	0.066	0.20	Unpenetrated	Unsatisfactory	H1	
93111	*A. mearnsii* G 178	0.143	0.032	0.18	Unpenetrated	Satisfactory	H1	
93112	*A. mearnsii* G 181	0.144	0.065	0.21	Unpenetrated	Unsatisfactory	H1	
93113	*A. mearnsii* G 182	0.143	0.071	0.21	Unpenetrated	Satisfactory	H1	
93114	*A. mearnsii* G 183	0.145	0.048	0.19	Unpenetrated	Satisfactory	H1	
93115	*A. mearnsii* G 186	0.131	0.050	0.18	Unpenetrated	Unsatisfactory	H1	
93116	*A. mearnsii* G 189	0.115	0.066	0.18	Unpenetrated	Satisfactory	H1	
93117	*A. mearnsii* G 192	0.173	0.098	0.27	Unpenetrated	Unsatisfactory	H1	
93118	*A. mearnsii* G 193	0.119	0.050	0.17	Unpenetrated	Satisfactory	H1	
93119	*A. mearnsii* G 194	0.110	0.017	0.13	Unpenetrated	Satisfactory	<H1	
93120	*A. mearnsii* G 196	0.139	0.065	0.20	Unpenetrated	Satisfactory	H1	
93121	*A. mearnsii* G 198	0.131	0.083	0.21	Unpenetrated	Unsatisfactory	H1	
93122	*A. mearnsii* G 199	0.115	0.049	0.16	Unpenetrated	Satisfactory	<H1	
93123	*A. mearnsii* G 200	0.087	0.049	0.14	Unpenetrated	Unsatisfactory	<H1	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean /SD
ACQ-treated *P. elliottii* dried in open								
92472	*P. elliottii* H151	0.486	0.317	0.80	No Heartwood	Satisfactory	H3	0.81
92473	*P. elliottii* H152	0.539	0.308	0.85	No Heartwood	Satisfactory	H3	0.092
92474	*P. elliottii* H153	0.600	0.300	0.90	No Heartwood	Satisfactory	H4	
92475	*P. elliottii* H154	0.558	0.328	0.89	No Heartwood	Satisfactory	H4	
92476	*P. elliottii* H155	0.541	0.321	0.86	Unpenetrated	Satisfactory	H3	
92477	*P. elliottii* H156	0.557	0.320	0.88	Unpenetrated	Satisfactory	H3	
92478	*P. elliottii* H159	0.554	0.278	0.83	Unpenetrated	Satisfactory	H3	
92479	*P. elliottii* H160	0.504	0.308	0.81	No Heartwood	Satisfactory	H3	
92480	*P. elliottii* H162	0.456	0.211	0.67	Unpenetrated	Satisfactory	H3	
92481	*P. elliottii* H163	0.522	0.241	0.76	Unpenetrated	Satisfactory	H3	
92482	*P. elliottii* H164	0.465	0.197	0.66	Unpenetrated	Satisfactory	H3	
92483	*P. elliottii* H167	0.560	0.178	0.74	No Heartwood	Satisfactory	H3	
92484	*P. elliottii* H169	0.461	0.211	0.67	Unpenetrated	Satisfactory	H3	
92485	*P. elliottii* H170	0.462	0.188	0.65	Unpenetrated	Satisfactory	H3	
92486	*P. elliottii* H172	0.563	0.385	0.95	No Heartwood	Satisfactory	H4	
92487	*P. elliottii* H173	0.568	0.283	0.85	Unpenetrated	Satisfactory	H3	
92488	*P. elliottii* H175	0.577	0.310	0.89	Unpenetrated	Satisfactory	H4	
92489	*P. elliottii* H176	0.558	0.333	0.89	No Heartwood	Satisfactory	H4	
92490	*P. elliottii* H178	0.576	0.327	0.90	No Heartwood	Satisfactory	H4	
92491	*P. elliottii* H180	0.505	0.287	0.79	No Heartwood	Satisfactory	H3	
ACQ-treated *P. elliottii* end-sealed								
92452	*P. elliottii* H71	0.467	0.217	0.68	Unpenetrated	Satisfactory	H3	0.76
92453	*P. elliottii* H73	0.436	0.334	0.77	No Heartwood	Satisfactory	H3	0.093
92454	*P. elliottii* H75	0.500	0.243	0.74	Unpenetrated	Satisfactory	H3	
92455	*P. elliottii* H77	0.467	0.279	0.75	Unpenetrated	Satisfactory	H3	
92456	*P. elliottii* H78	0.502	0.322	0.82	Unpenetrated	Satisfactory	H3	
92457	*P. elliottii* H79	0.361	0.240	0.60	Unpenetrated	Satisfactory	H3	
92458	*P. elliottii* H80	0.491	0.285	0.78	Unpenetrated	Satisfactory	H3	
92459	*P. elliottii* H81	0.525	0.347	0.87	No Heartwood	Satisfactory	H3	
92460	*P. elliottii* H85	0.444	0.247	0.69	Unpenetrated	Satisfactory	H3	
92461	*P. elliottii* H86	0.432	0.289	0.72	Unpenetrated	Satisfactory	H3	
92462	*P. elliottii* H87	0.569	0.332	0.90	No Heartwood	Satisfactory	H4	
92463	*P. elliottii* H88	0.543	0.301	0.84	Unpenetrated	Satisfactory	H3	
92464	*P. elliottii* H89	0.490	0.260	0.75	No Heartwood	Satisfactory	H3	
92465	*P. elliottii* H90	0.448	0.252	0.70	Unpenetrated	Satisfactory	H3	
92466	*P. elliottii* H91	0.407	0.204	0.61	Unpenetrated	Satisfactory	H3	
92467	*P. elliottii* H92	0.433	0.272	0.71	No Heartwood	Satisfactory	H3	
92468	*P. elliottii* H95	0.540	0.270	0.81	Unpenetrated	Satisfactory	H3	
92469	*P. elliottii* H96	0.526	0.331	0.86	No Heartwood	Satisfactory	H3	
92470	*P. elliottii* H99	0.464	0.232	0.70	No Heartwood	Satisfactory	H3	
92471	*P. elliottii* H100	0.592	0.362	0.95	Unpenetrated	Satisfactory	H4	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean /SD
ACQ-treated *P. elliottii* dried in shade								
92571	*P. elliottii* H24	0.629	0.287	0.92	NA	Satisfactory	H4	0.90
92572	*P. elliottii* H25	0.544	0.328	0.87	NA	Satisfactory	H3	0.127
92573	*P. elliottii* H26	0.638	0.334	0.97	NA	Satisfactory	H4	
92574	*P. elliottii* H27	0.649	0.308	0.96	NA	Satisfactory	H4	
92575	*P. elliottii* H28	0.523	0.293	0.82	NA	Satisfactory	H3	
92576	*P. elliottii* H30	0.554	0.218	0.77	NA	Satisfactory	H3	
92577	*P. elliottii* H31	0.794	0.391	1.19	NA	Satisfactory	H4	
92578	*P. elliottii* H32	0.678	0.366	1.04	NA	Satisfactory	H4	
92579	*P. elliottii* H33	0.628	0.344	0.97	NA	Satisfactory	H4	
92580	*P. elliottii* H34	0.644	0.369	1.01	NA	Satisfactory	H4	
92581	*P. elliottii* H36	0.647	0.320	0.97	NA	Satisfactory	H4	
92582	*P. elliottii* H37	0.678	0.323	1.00	NA	Satisfactory	H4	
92583	*P. elliottii* H38	0.645	0.315	0.96	NA	Satisfactory	H4	
92584	*P. elliottii* H40	0.516	0.242	0.76	NA	Satisfactory	H3	
92585	*P. elliottii* H41	0.538	0.303	0.84	NA	Satisfactory	H3	
92586	*P. elliottii* H42	0.576	0.323	0.90	NA	Satisfactory	H4	
92587	*P. elliottii* H44	0.523	0.336	0.86	NA	Satisfactory	H3	
92588	*P. elliottii* H46	0.535	0.333	0.87	NA	Satisfactory	H3	
92589	*P. elliottii* H48	0.383	0.231	0.61	NA	Satisfactory	H3	
92590	*P. elliottii* H49	0.456	0.278	0.73	NA	Satisfactory	H3	
ACQ-treated *A. cunninghamii* dried in open								
92532	*A. cunninghamii* J152	0.791	0.455	1.25	NA	Unsatisfactory	H4	1.38
92533	*A. cunninghamii* J154	0.801	0.502	1.30	NA	Unsatisfactory	H4	0.140
92534	*A. cunninghamii* J155	1.063	0.530	1.59	NA	Satisfactory	H5	
92535	*A. cunninghamii* J156	0.782	0.421	1.20	NA	Satisfactory	H4	
92536	*A. cunninghamii* J157	0.855	0.486	1.34	NA	Satisfactory	H4	
92537	*A. cunninghamii* J158	0.885	0.477	1.36	NA	Satisfactory	H4	
92538	*A. cunninghamii* J160	0.910	0.324	1.23	NA	Unsatisfactory	H4	
92539	*A. cunninghamii* J162	0.969	0.415	1.38	NA	Satisfactory	H4	
92540	*A. cunninghamii* J163	0.829	0.403	1.23	NA	Unsatisfactory	H4	
92541	*A. cunninghamii* J164	0.874	0.532	1.41	NA	Unsatisfactory	H5	
92542	*A. cunninghamii* J165	1.051	0.650	1.70	NA	Satisfactory	H5	
92543	*A. cunninghamii* J166	0.877	0.694	1.57	NA	Satisfactory	H5	
92544	*A. cunninghamii* J168	0.820	0.563	1.38	NA	Unsatisfactory	H4	
92545	*A. cunninghamii* J169	0.751	0.559	1.31	NA	Satisfactory	H4	
92546	*A. cunninghamii* J172	0.852	0.615	1.47	NA	Unsatisfactory	H5	
92547	*A. cunninghamii* J173	0.795	0.542	1.34	NA	Unsatisfactory	H4	
92548	*A. cunninghamii* J175	0.664	0.514	1.18	NA	Unsatisfactory	H4	
92549	*A. cunninghamii* J176	0.914	0.533	1.45	NA	Satisfactory	H5	
92550	*A. cunninghamii* J177	0.886	0.572	1.46	NA	Unsatisfactory	H5	

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart penetration	Sap penetration	Hazard class	Mean/ SD
ACQ-treated *A. cunninghamii* end sealed								
92512	*A. cunninghamii* J75	0.769	0.542	1.31	NA	Satisfactory	H4	1.51
92513	*A. cunninghamii* J77	1.001	0.640	1.64	NA	Satisfactory	H5	0.204
92514	*A. cunninghamii* J78	1.116	0.675	1.79	NA	Satisfactory	H5	
92515	*A. cunninghamii* J79	0.838	0.591	1.43	NA	Satisfactory	H5	
92516	*A. cunninghamii* J80	1.044	0.587	1.63	NA	Satisfactory	H5	
92517	*A. cunninghamii* J81	1.099	0.635	1.73	NA	Satisfactory	H5	
92518	*A. cunninghamii* J83	0.842	0.561	1.40	NA	Unsatisfactory	H4	
92519	*A. cunninghamii* J84	0.992	0.467	1.46	NA	Unsatisfactory	H5	
92520	*A. cunninghamii* J85	0.964	0.639	1.60	NA	Satisfactory	H5	
92521	*A. cunninghamii* J86	0.876	0.539	1.42	NA	Satisfactory	H5	
92522	*A. cunninghamii* J88	1.015	0.628	1.64	NA	Satisfactory	H5	
92523	*A. cunninghamii* J89	1.212	0.576	1.79	NA	Satisfactory	H5	
92524	*A. cunninghamii* J91	1.119	0.623	1.74	NA	Satisfactory	H5	
92525	*A. cunninghamii* J92	0.859	0.544	1.40	NA	Satisfactory	H4	
92526	*A. cunninghamii* J94	0.917	0.524	1.44	NA	Satisfactory	H5	
92527	*A. cunninghamii* J95	0.821	0.537	1.36	NA	Satisfactory	H4	
92528	*A. cunninghamii* J96	0.809	0.640	1.45	NA	Satisfactory	H5	
92529	*A. cunninghamii* J97	0.828	0.528	1.36	NA	Unsatisfactory	H4	
92530	*A. cunninghamii* J99	1.023	0.582	1.61	NA	Satisfactory	H5	
92531	*A. cunninghamii* J100	0.564	0.374	0.94	NA	Unsatisfactory	H4	
ACQ-treated *A. cunninghamii* dried in shade								
92492	*A. cunninghamii* J21	0.430	0.350	0.780	NA	80%	H3	0.87
92493	*A. cunninghamii* J22	0.269	0.244	0.513	NA	50%	H3	0.187
92494	*A. cunninghamii* J23	0.327	0.222	0.549	NA	75%	H3	
92495	*A. cunninghamii* J26	0.437	0.229	0.666	NA	60%	H3	
92496	*A. cunninghamii* J29	0.488	0.419	0.907	NA	90%	H4	
92497	*A. cunninghamii* J31	0.556	0.407	0.963	NA	90%	H4	
92498	*A. cunninghamii* J33	0.456	0.323	0.779	NA	50%	H3	
92499	*A. cunninghamii* J34	0.584	0.554	1.138	NA	75%	H4	
92500	*A. cunninghamii* J35	0.549	0.428	0.977	NA	75%	H4	
92501	*A. cunninghamii* J38	0.586	0.454	1.040	NA	75%	H4	
92502	*A. cunninghamii* J39	0.612	0.458	1.070	NA	80%	H4	
92503	*A. cunninghamii* J40	0.550	0.390	0.940	NA	100%	H4	
92504	*A. cunninghamii* J42	0.459	0.314	0.773	NA	100%	H3	
92505	*A. cunninghamii* J43	0.420	0.311	0.731	NA	50%	H3	
92506	*A. cunninghamii* J45	0.434	0.296	0.730	NA	50%	H3	
92507	*A. cunninghamii* J46	0.560	0.452	1.012	NA	75%	H4	
92508	*A. cunninghamii* J47	0.673	0.444	1.117	NA	60%	H4	
92509	*A. cunninghamii* J48	0.657	0.458	1.115	NA	75%	H4	
92510	*A. cunninghamii* J49	0.410	0.312	0.722	NA	90%	H3	
92511	*A. cunninghamii* J50	0.487	0.355	0.842	NA	75%	H3	
Mean penetration into sapwood						74%		

Lab #	Sample info	% m/m Cu	% m/m DDAC	% m/m TAE	Heart Penetration	Sap penetration	Hazard class	Mean/SD
ACQ-treated *P. radiata* dried in open								
93286	*P. radiata* K2	0.875	0.671	1.55	No Heartwood	Satisfactory	H5	1.60
93287	*P. radiata* K3	0.912	0.630	1.54	No Heartwood	Satisfactory	H5	0.163
93288	*P. radiata* K5	0.874	0.574	1.45	No Heartwood	Satisfactory	H5	
93289	*P. radiata* K7	0.878	0.693	1.57	No Heartwood	Satisfactory	H5	
93290	*P. radiata* K13	0.881	0.486	1.37	No Heartwood	Satisfactory	H4	
93291	*P. radiata* K14	0.701	0.546	1.25	No Heartwood	Satisfactory	H4	
93292	*P. radiata* K18	0.982	0.780	1.76	No Heartwood	Satisfactory	H5	
93293	*P. radiata* K20	1.021	0.739	1.76	No Heartwood	Satisfactory	H5	
93294	*P. radiata* K21	1.045	0.692	1.74	No Heartwood	Satisfactory	H5	
93295	*P. radiata* K23	1.040	0.708	1.75	No Heartwood	Satisfactory	H5	
93296	*P. radiata* K24	0.821	0.692	1.51	No Heartwood	Satisfactory	H5	
93297	*P. radiata* K29	1.211	0.615	1.83	No Heartwood	Satisfactory	H5	
93298	*P. radiata* K31	1.069	0.764	1.83	No Heartwood	Satisfactory	H5	
93299	*P. radiata* K34	1.014	0.523	1.54	No Heartwood	Satisfactory	H5	
93300	*P. radiata* K35	0.853	0.671	1.52	No Heartwood	Satisfactory	H5	
93301	*P. radiata* K37	0.905	0.679	1.58	No Heartwood	Satisfactory	H5	
93302	*P. radiata* K44	1.104	0.723	1.83	No Heartwood	Satisfactory	H5	
93303	*P. radiata* K55	1.005	0.680	1.69	No Heartwood	Satisfactory	H5	
93304	*P. radiata* K56	0.921	0.541	1.46	No Heartwood	Satisfactory	H5	
93305	*P. radiata* K105	0.933	0.644	1.58	No Heartwood	Satisfactory	H5	

Lab #	Sample info	% m/m Cu	% m/m Cr	% m/m As	% m/m TAE	Heart Penetration	Sap penetration	Hazard class
CCA-treated *P. radiata* dried in open								
92800	*P. radiata* K151	0.221	0.324	0.290	0.84	Satisfactory	Satisfactory	H4
92801	*P. radiata* K152	0.237	0.357	0.320	0.91	Satisfactory	Satisfactory	H4
92802	*P. radiata* K153	0.197	0.295	0.260	0.75	Satisfactory	Satisfactory	H4
92803	*P. radiata* K155	0.197	0.312	0.291	0.80	Satisfactory	Satisfactory	H4
92804	*P. radiata* K157	0.193	0.319	0.281	0.79	Satisfactory	Satisfactory	H4
92805	*P. radiata* K160	0.197	0.330	0.285	0.81	Satisfactory	Satisfactory	H4
92806	*P. radiata* K162	0.190	0.297	0.271	0.76	Satisfactory	Satisfactory	H4
92807	*P. radiata* K163	0.237	0.304	0.291	0.83	Satisfactory	Satisfactory	H4
92808	*P. radiata* K164	0.176	0.277	0.261	0.71	Satisfactory	Satisfactory	H4
92809	*P. radiata* K165	0.212	0.349	0.323	0.88	Satisfactory	Satisfactory	H4
92810	*P. radiata* K166	0.209	0.330	0.308	0.85	Satisfactory	Satisfactory	H4
92811	*P. radiata* K167	0.205	0.339	0.310	0.85	Satisfactory	Satisfactory	H4
92812	*P. radiata* K169	0.191	0.292	0.260	0.74	Satisfactory	Satisfactory	H4
92813	*P. radiata* K170	0.199	0.322	0.295	0.82	Satisfactory	Satisfactory	H4
92814	*P. radiata* K172	0.211	0.351	0.311	0.87	Satisfactory	Satisfactory	H4
92815	*P. radiata* K174	0.184	0.307	0.282	0.77	Satisfactory	Satisfactory	H4
92816	*P. radiata* K177	0.165	0.271	0.249	0.69	Satisfactory	Satisfactory	H4
92817	*P. radiata* K179	0.168	0.292	0.253	0.71	Satisfactory	Satisfactory	H4
92818	*P. radiata* K180	0.203	0.332	0.294	0.83	Satisfactory	Satisfactory	H4
92819	*P. radiata* K195	0.235	0.376	0.346	0.96	Satisfactory	Satisfactory	H4

APPENDIX C Species, treatment and drying method of posts tested at DPI Mildura

Bundle Type	Species	Species Name	Preservative	Drying method			
				Debarked only	Bark-on	Microwaved	Gang-nailed
1	A	*E. grandis*	PEC	Yes	No	No	No
2	A	*E. grandis*	PEC	Yes	No	Yes	No
3	B	*E. globulus*	PEC	Yes	No	No	No
4	B	*E. globulus*	PEC	Yes	No	Yes	No
5	C	*C. maculata*	PEC	Yes	No	No	No
6	D	*E. pilularis*	PEC	Yes	No	No	No
7	E	*E. dunnii*	PEC	Yes	No	No	No
8	F	*E. cladocalyx*	PEC	Yes	No	No	No
9	G	*A. mearnsii*	PEC	Yes	No	No	No
10	A	*E. grandis*	PEC	Yes	No	No	Yes
11	B	*E. globulus*	PEC	Yes	No	No	Yes
12	F	*E. cladocalyx*	PEC	Yes	No	No	Yes
13	G	*A. mearnsii*	PEC	Yes	No	No	Yes
14	A	*E. grandis*	CREO	No	Yes	No	No
15	B	*E. globulus*	CREO	No	Yes	No	No
16	F	*E. cladocalyx*	CREO	No	Yes	No	No
17	G	*A. mearnsii*	CREO	No	Yes	No	No
18	A	*E. grandis*	ACQ	Yes	No	No	No
19	A	*E. grandis*	ACQ	Yes	No	Yes	No
20	B	*E. globulus*	ACQ	Yes	No	No	No
21	B	*E. globulus*	ACQ	Yes	No	Yes	No
22	C	*C. maculata*	ACQ	Yes	No	No	No
23	D	*E. pilularis*	ACQ	Yes	No	No	No
24	E	*E. dunnii*	ACQ	Yes	No	No	No
25	F	*E. cladocalyx*	ACQ	Yes	No	No	No
26	G	*A. mearnsii*	ACQ	Yes	No	No	No
27	H	*P. elliottii*	ACQ	Yes	No	No	No
28	J	*A. cunninghamii*	ACQ	Yes	No	No	No
29	K	*P. radiata*	ACQ	Yes	No	No	No
30	A	*E. grandis*	ACQ	Yes	No	No	Yes
31	B	*E. globulus*	ACQ	Yes	No	No	Yes
32	F	*E. cladocalyx*	ACQ	Yes	No	No	Yes
33	G	*A. mearnsii*	ACQ	Yes	No	No	Yes
34	A	*E. grandis*	ACQ	No	Yes	No	No
35	B	*E. globulus*	ACQ	No	Yes	No	No
36	F	*E. cladocalyx*	ACQ	No	Yes	No	No
37	G	*A. mearnsii*	ACQ	No	Yes	No	No
38	K	*P. radiata*	CCA	Yes	No	No	No

APPENDIX D Bending strength using cantilever test and surface quality evaluation at DPI Mildura

Posts were tested in a random sequence according to the post ID number.

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
847	A043	18	A	ACQ	TRUE	FALSE	NO	23	90	1	0	0	0	OK	270	377	86	3698	83
31	A048	18	A	ACQ	TRUE	FALSE	NO	1	4	2	1	3	3	OK	300	380	95	3728	61
1072	A055	18	A	ACQ	TRUE	FALSE	NO	29	113	9	0	0	0	OK	250	229	80	2246	64
749	A059	18	A	ACQ	TRUE	FALSE	NO	20	79	8	0	0	0	OK	300	383	95	3757	62
918	A060	18	A	ACQ	TRUE	FALSE	NO	25	97	6	0	0	0	OK	282	319	90	3129	62
787	A064	18	A	ACQ	TRUE	FALSE	NO	21	83	8	0	0	0	OK	294	323	94	3169	55
962	A065	18	A	ACQ	TRUE	FALSE	NO	26	102	3	0	0	0	OK	272	374	87	3669	81
1026	A068	18	A	ACQ	TRUE	FALSE	NO	27	108	10	2	5	9	OK	332	468	106	4591	55
550	A070	18	A	ACQ	TRUE	FALSE	NO	15	58	8	0	0	0	OK	255	307	81	3012	80
578	A071	18	A	ACQ	TRUE	FALSE	NO	16	61	8	0	0	0	OK	275	305	88	2992	64
623	A072	18	A	ACQ	TRUE	FALSE	NO	17	66	5	0	0	0	OK	256	310	81	3041	80
463	A076	18	A	ACQ	TRUE	FALSE	NO	13	49	7	1	2	2	OK	311	307	99	3012	44
657	A101	18	A	ACQ	TRUE	FALSE	NO	18	70	1	0	0	0	OK	273	338	87	3316	72
506	A104	18	A	ACQ	TRUE	FALSE	NO	14	54	2	1	3	3	OK	260	368	83	3610	91
236	A105	18	A	ACQ	TRUE	FALSE	NO	7	25	8	0	0	0	OK	244	215	78	2109	64
226	A106	18	A	ACQ	TRUE	FALSE	NO	6	24	8	1	2	2	OK	260	262	83	2570	65
334	A107	18	A	ACQ	TRUE	FALSE	NO	9	36	2	0	0	0	OK	279	301	89	2953	60
432	A108	18	A	ACQ	TRUE	FALSE	NO	12	46	5	0	0	0	OK	275	241	88	2364	50
1063	A109	18	A	ACQ	TRUE	FALSE	NO	28	112	9	0	0	0	OK	270	281	86	2757	62
900	A110	18	A	ACQ	TRUE	FALSE	NO	24	95	7	1	2	2	OK	295	400	94	3924	68
61	A112	18	A	ACQ	TRUE	FALSE	NO	2	7	3	1	2	2	OK	235	188	75	1844	63
94	A113	18	A	ACQ	TRUE	FALSE	NO	3	10	8	1	2	2	OK	250	206	80	2021	57

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
278	A114	18	A	ACQ	TRUE	FALSE	NO	8	30	2	1	2	2	OK	315	586	100	5749	81
823	A115	18	A	ACQ	TRUE	FALSE	NO	22	87	6	0	0	0	OK	262	233	83	2286	56
187	A116	18	A	ACQ	TRUE	FALSE	NO	5	20	7	0	0	0	OK	260	281	83	2757	69
398	A117	18	A	ACQ	TRUE	FALSE	NO	11	42	9	2	4	6	OK	249	280	79	2747	79
148	A118	18	A	ACQ	TRUE	FALSE	NO	4	16	6	1	2	2	OK	270	216	86	2119	48
708	A119	18	A	ACQ	TRUE	FALSE	NO	19	75	5	0	0	0	OK	256	294	81	2884	76
363	A120	18	A	ACQ	TRUE	FALSE	NO	10	39	2	1	5	5	OK	275	278	88	2727	58
1042	A128	30	A	ACQ	TRUE	TRUE	NO	28	110	7	1	2	2	OK	315	393	100	3855	55
975	A129	30	A	ACQ	TRUE	TRUE	NO	26	103	6	1	4	4	OK	310	439	99	4307	64
910	A131	30	A	ACQ	TRUE	TRUE	NO	24	96	8	0	0	0	OK	307	387	98	3796	58
549	A132	30	A	ACQ	TRUE	TRUE	NO	15	58	7	0	0	0	OK	300	408	95	4002	66
1096	A133	30	A	ACQ	TRUE	TRUE	NO	29	116	4	0	0	0	OK	334	459	106	4503	53
643	A138	30	A	ACQ	TRUE	TRUE	NO	17	68	6	0	0	0	OK	315	441	100	4326	61
465	A140	30	A	ACQ	TRUE	TRUE	NO	13	49	9	0	0	0	OK	315	401	100	3934	56
1110	A142	30	A	ACQ	TRUE	TRUE	NO	30	117	10	1	5	5	OK	285	388	91	3806	73
709	A143	30	A	ACQ	TRUE	TRUE	NO	19	75	6	0	0	0	OK	279	207	89	2031	41
78	A145	30	A	ACQ	TRUE	TRUE	NO	3	9	2	0	0	0	OK	292	345	93	3384	60
929	A146	30	A	ACQ	TRUE	TRUE	NO	25	98	7	0	0	0	OK	267	207	85	2031	47
133	A147	30	A	ACQ	TRUE	TRUE	NO	4	15	1	0	0	0	OK	310	433	99	4248	63
677	A148	30	A	ACQ	TRUE	TRUE	NO	18	72	3	0	0	0	OK	265	294	84	2884	69
351	A151	30	A	ACQ	TRUE	TRUE	NO	10	37	9	0	0	0	OK	275	265	88	2600	55
418	A152	30	A	ACQ	TRUE	TRUE	NO	11	44	10	0	0	0	OK	277	339	88	3326	69
219	A153	30	A	ACQ	TRUE	TRUE	NO	6	24	1	0	0	0	OK	285	329	91	3227	62
305	A155	30	A	ACQ	TRUE	TRUE	NO	9	33	1	0	0	0	OK	273	265	87	2600	56
189	A157	30	A	ACQ	TRUE	TRUE	NO	5	20	9	0	0	0	OK	240	208	76	2040	65
428	A158	30	A	ACQ	TRUE	TRUE	NO	12	46	1	0	0	0	OK	282	285	90	2796	55

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
845	A159	30	A	ACQ	TRUE	TRUE	NO	23	89	9	1	6	6	OK	265	302	84	2963	70
767	A160	30	A	ACQ	TRUE	TRUE	NO	21	81	7	0	0	0	OK	290	241	92	2364	43
1002	A161	30	A	ACQ	TRUE	TRUE	NO	27	106	5	1	3	3	OK	283	318	90	3120	61
813	A162	30	A	ACQ	TRUE	TRUE	NO	22	86	6	0	0	0	OK	285	204	91	2001	38
745	A163	30	A	ACQ	TRUE	TRUE	NO	20	79	4	1	3	3	OK	275	326	88	3198	68
590	A164	30	A	ACQ	TRUE	TRUE	NO	16	63	1	1	5	5	OK	320	354	102	3473	47
5	A165	30	A	ACQ	TRUE	TRUE	NO	1	1	5	0	0	0	OK	295	417	94	4091	70
46	A166	30	A	ACQ	TRUE	TRUE	NO	2	5	8	1	5	5	OK	320	504	102	4944	67
499	A168	30	A	ACQ	TRUE	TRUE	NO	14	53	5	0	0	0	OK	301	396	96	3885	63
245	A169	30	A	ACQ	TRUE	TRUE	NO	7	26	8	1	5	5	OK	295	360	94	3532	61
271	A170	30	A	ACQ	TRUE	TRUE	NO	8	29	5	0	0	0	OK	289	392	92	3846	70
595	A171	34	A	ACQ	FALSE	FALSE	NO	16	63	6	0	0	0	OK	275	316	88	3100	66
936	A172	34	A	ACQ	FALSE	FALSE	NO	25	99	5	0	0	0	OK	284	167	90	1638	32
1050	A173	34	A	ACQ	FALSE	FALSE	NO	28	111	6	0	0	0	OK	251	184	80	1805	50
1122	A174	34	A	ACQ	FALSE	FALSE	NO	30	119	3	1	3	3	OK	248	241	79	2364	69
456	A175	34	A	ACQ	FALSE	FALSE	NO	12	48	10	0	0	0	OK	284	361	90	3541	68
688	A176	34	A	ACQ	FALSE	FALSE	NO	19	73	4	1	2	2	OK	235	237	75	2325	79
257	A177	34	A	ACQ	FALSE	FALSE	NO	7	28	1	2	5	7	OK	255	312	81	3061	82
661	A178	34	A	ACQ	FALSE	FALSE	NO	18	70	5	1	3	3	OK	275	211	88	2070	44
316	A179	34	A	ACQ	FALSE	FALSE	NO	9	34	3	1	4	4	OK	237	172	75	1687	56
755	A180	34	A	ACQ	FALSE	FALSE	NO	20	80	4	0	0	0	OK	274	289	87	2835	61
269	A181	34	A	ACQ	FALSE	FALSE	NO	8	29	3	1	4	4	OK	260	334	83	3277	82
403	A182	34	A	ACQ	FALSE	FALSE	NO	11	43	4	1	4	4	OK	298	147	95	1442	24
193	A183	34	A	ACQ	FALSE	FALSE	NO	6	21	3	0	0	0	OK	270	171	86	1678	38
516	A184	34	A	ACQ	FALSE	FALSE	NO	14	55	3	1	6	6	OK	292	444	93	4356	77
818	A185	34	A	ACQ	FALSE	FALSE	NO	22	87	1	0	0	0	OK	290	274	92	2688	49

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
644	A186	34	A	ACQ	FALSE	FALSE	NO	17	68	7	1	7	7	OK	254	218	81	2139	58
967	A187	34	A	ACQ	FALSE	FALSE	NO	26	102	8	1	2	2	OK	258	213	82	2090	54
1078	A188	34	A	ACQ	FALSE	FALSE	NO	29	114	5	1	4	4	OK	265	314	84	3080	73
895	A189	34	A	ACQ	FALSE	FALSE	NO	24	95	2	0	0	0	OK	263	164	84	1609	39
543	A190	34	A	ACQ	FALSE	FALSE	NO	15	58	1	1	4	4	OK	225	197	72	1933	75
174	A191	34	A	ACQ	FALSE	FALSE	NO	5	19	3	1	3	3	OK	318	387	101	3796	52
366	A192	34	A	ACQ	FALSE	FALSE	NO	10	39	5	1	3	3	OK	270	237	86	2325	52
135	A193	34	A	ACQ	FALSE	FALSE	NO	4	15	3	1	5	5	OK	292	281	93	2757	49
992	A194	34	A	ACQ	FALSE	FALSE	NO	27	105	4	2	3	5	OK	275	121	88	1187	25
474	A195	34	A	ACQ	FALSE	FALSE	NO	13	50	9	1	3	3	OK	270	271	86	2659	60
854	A196	34	A	ACQ	FALSE	FALSE	NO	23	90	8	1	6	6	OK	271	313	86	3071	68
762	A197	34	A	ACQ	FALSE	FALSE	NO	21	81	2	0	0	0	OK	290	342	92	3355	61
100	A198	34	A	ACQ	FALSE	FALSE	NO	3	11	5	1	5	5	OK	285	344	91	3375	64
8	A199	34	A	ACQ	FALSE	FALSE	NO	1	1	8	0	0	0	OK	275	289	88	2835	60
52	A200	34	A	ACQ	FALSE	FALSE	NO	2	6	4	1	2	2	OK	280	250	89	2453	49
1111	A283	1	A	PEC	TRUE	FALSE	NO	30	118	1	0	0	0	OK	268	299	85	2933	67
684	A287	1	A	PEC	TRUE	FALSE	NO	18	72	10	0	0	0	OK	257	248	82	2433	63
33	A294	1	A	PEC	TRUE	FALSE	NO	1	4	4	0	0	0	OK	260	209	83	2050	52
405	A301	1	A	PEC	TRUE	FALSE	NO	11	43	6	0	0	0	OK	264	236	84	2315	56
738	A302	1	A	PEC	TRUE	FALSE	NO	20	78	6	0	0	0	OK	232	175	74	1717	61
527	A303	1	A	PEC	TRUE	FALSE	NO	14	56	4	0	0	0	OK	294	344	94	3375	59
490	A304	1	A	PEC	TRUE	FALSE	NO	13	52	6	1	2	2	OK	350	526	111	5160	53
557	A305	1	A	PEC	TRUE	FALSE	NO	15	59	5	0	0	0	OK	277	264	88	2590	54
142	A306	1	A	PEC	TRUE	FALSE	NO	4	15	10	0	0	0	OK	273	356	87	3492	76
370	A307	1	A	PEC	TRUE	FALSE	NO	10	39	9	0	0	0	OK	305	320	97	3139	49
455	A309	1	A	PEC	TRUE	FALSE	NO	12	48	9	0	0	0	OK	280	350	89	3434	69

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. grandis										
999	A311	1	A	PEC	TRUE	FALSE	NO	27	106	2	2	5	9	OK	296	427	94	4189	71
903	A312	1	A	PEC	TRUE	FALSE	NO	24	96	1	0	0	0	OK	256	303	81	2972	78
48	A313	1	A	PEC	TRUE	FALSE	NO	2	5	10	0	0	0	OK	282	361	90	3541	70
835	A316	1	A	PEC	TRUE	FALSE	NO	22	88	8	1	4	4	OK	260	290	83	2845	72
1065	A317	1	A	PEC	TRUE	FALSE	NO	29	113	2	0	0	0	OK	255	231	81	2266	60
197	A318	1	A	PEC	TRUE	FALSE	NO	6	21	7	0	0	0	OK	256	272	81	2668	70
237	A320	1	A	PEC	TRUE	FALSE	NO	7	25	9	0	0	0	OK	249	250	79	2453	70
1027	A322	1	A	PEC	TRUE	FALSE	NO	28	109	1	0	0	0	OK	270	240	86	2354	53
721	A324	1	A	PEC	TRUE	FALSE	NO	19	76	8	0	0	0	OK	261	253	83	2482	62
276	A325	1	A	PEC	TRUE	FALSE	NO	8	29	10	0	0	0	OK	286	273	91	2678	51
789	A328	1	A	PEC	TRUE	FALSE	NO	21	84	1	0	0	0	OK	282	308	90	3021	60
928	A332	1	A	PEC	TRUE	FALSE	NO	25	98	6	0	0	0	OK	317	452	101	4434	62
871	A334	1	A	PEC	TRUE	FALSE	NO	23	92	6	0	0	0	OK	260	333	83	3267	82
580	A335	1	A	PEC	TRUE	FALSE	NO	16	62	1	0	0	0	OK	265	250	84	2453	58
112	A336	1	A	PEC	TRUE	FALSE	NO	3	12	7	0	0	0	OK	255	213	81	2090	56
337	A337	1	A	PEC	TRUE	FALSE	NO	9	36	5	1	4	4	OK	256	296	81	2904	77
960	A338	1	A	PEC	TRUE	FALSE	NO	26	102	1	0	0	0	OK	290	369	92	3620	66
630	A339	1	A	PEC	TRUE	FALSE	NO	17	67	3	0	0	0	OK	242	221	77	2168	68
165	A340	1	A	PEC	TRUE	FALSE	NO	5	18	4	0	0	0	OK	280	340	89	3335	67
307	A353	10	A	PEC	TRUE	TRUE	NO	9	33	3	0	0	0	OK	323	440	103	4316	57
30	A355	10	A	PEC	TRUE	TRUE	NO	1	4	1	0	0	0	OK	345	642	110	6298	68
884	A357	10	A	PEC	TRUE	TRUE	NO	24	93	10	1	4	4	OK	350	635	111	6229	64
615	A358	10	A	PEC	TRUE	TRUE	NO	17	65	7	0	0	0	OK	300	284	95	2786	46
804	A359	10	A	PEC	TRUE	TRUE	NO	22	85	6	0	0	0	OK	300	485	95	4758	78
1076	A360	10	A	PEC	TRUE	TRUE	NO	29	114	3	1	2	2	OK	325	434	103	4258	55
1118	A360	10	A	PEC	TRUE	TRUE	NO	30	118	9	0	0	0	OK	294	277	94	2717	47

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
712	A361	10	A	PEC	TRUE	TRUE	NO	19	75	9	0	0	0	OK	290	339	92	3326	60
760	A362	10	A	PEC	TRUE	TRUE	NO	20	80	9	0	0	0	OK	351	408	112	4002	41
607	A363	10	A	PEC	TRUE	TRUE	NO	16	64	9	0	0	0	OK	321	388	102	3806	51
664	A364	10	A	PEC	TRUE	TRUE	NO	18	70	8	0	0	0	OK	302	311	96	3051	49
117	A365	10	A	PEC	TRUE	TRUE	NO	4	13	3	1	2	2	OK	315	452	100	4434	63
440	A367	10	A	PEC	TRUE	TRUE	NO	12	47	4	0	0	0	OK	315	586	100	5749	81
155	A368	10	A	PEC	TRUE	TRUE	NO	5	17	3	0	0	0	OK	270	277	86	2717	61
290	A369	10	A	PEC	TRUE	TRUE	NO	8	31	5	0	0	0	OK	295	390	94	3826	66
95	A370	10	A	PEC	TRUE	TRUE	NO	3	10	9	0	0	0	OK	280	271	89	2659	54
764	A371	10	A	PEC	TRUE	TRUE	NO	21	81	4	0	0	0	OK	301	425	96	4169	68
511	A373	10	A	PEC	TRUE	TRUE	NO	14	54	7	1	3	3	OK	320	378	102	3708	50
492	A374	10	A	PEC	TRUE	TRUE	NO	13	52	8	0	0	0	OK	320	444	102	4356	59
222	A375	10	A	PEC	TRUE	TRUE	NO	6	24	4	0	0	0	OK	294	415	94	4071	71
863	A376	10	A	PEC	TRUE	TRUE	NO	23	91	8	0	0	0	OK	315	410	100	4022	57
1029	A377	10	A	PEC	TRUE	TRUE	NO	28	109	3	0	0	0	OK	294	402	94	3944	69
265	A378	10	A	PEC	TRUE	TRUE	NO	7	28	9	0	0	0	OK	254	240	81	2354	64
1000	A380	10	A	PEC	TRUE	TRUE	NO	27	106	3	0	0	0	OK	300	412	95	4042	66
948	A385	10	A	PEC	TRUE	TRUE	NO	25	100	7	0	0	0	OK	286	348	91	3414	65
972	A386	10	A	PEC	TRUE	TRUE	NO	26	103	3	0	0	0	OK	297	395	95	3875	65
407	A387	10	A	PEC	TRUE	TRUE	NO	11	43	8	1	10	10	Reject	282	279	90	2737	54
358	A388	10	A	PEC	TRUE	TRUE	NO	10	38	6	0	0	0	OK	292	316	93	3100	55
51	A389	10	A	PEC	TRUE	TRUE	NO	2	6	3	0	0	0	OK	290	392	92	3846	70
567	A390	10	A	PEC	TRUE	TRUE	NO	15	60	6	0	0	0	OK	340	573	108	5621	63
519	A391	14	A	CREO	FALSE	FALSE	NO	14	55	6	0	0	0	OK	246	281	78	2757	82
49	A392	14	A	CREO	FALSE	FALSE	NO	2	6	1	0	0	0	OK	253	214	81	2099	57
1133	A393	14	A	CREO	FALSE	FALSE	NO	30	120	5	1	4	4	OK	266	263	85	2580	61

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. grandis										
904	A394	14	A	CREO	FALSE	FALSE	NO	24	96	2	2	4	7	OK	321	453	102	4444	59
600	A395	14	A	CREO	FALSE	FALSE	NO	16	64	2	0	0	0	OK	250	322	80	3159	89
707	A396	14	A	CREO	FALSE	FALSE	NO	19	75	4	0	0	0	OK	285	370	91	3630	69
1039	A397	14	A	CREO	FALSE	FALSE	NO	28	110	3	0	0	0	OK	259	324	82	3178	81
217	A398	14	A	CREO	FALSE	FALSE	NO	6	23	8	2	2	4	OK	315	435	100	4267	60
800	A399	14	A	CREO	FALSE	FALSE	NO	22	85	2	0	0	0	OK	265	309	84	3031	72
536	A400	14	A	CREO	FALSE	FALSE	NO	15	57	4	0	0	0	OK	277	191	88	1874	39
491	A401	14	A	CREO	FALSE	FALSE	NO	13	52	7	2	2	4	OK	294	416	94	4081	71
996	A402	14	A	CREO	FALSE	FALSE	NO	27	105	8	1	4	4	OK	267	309	85	3031	70
348	A403	14	A	CREO	FALSE	FALSE	NO	10	37	6	0	0	0	OK	275	314	88	3080	65
136	A404	14	A	CREO	FALSE	FALSE	NO	4	15	4	1	2	2	OK	290	340	92	3335	60
21	A405	14	A	CREO	FALSE	FALSE	NO	1	3	2	0	0	0	OK	275	378	88	3708	79
1079	A406	14	A	CREO	FALSE	FALSE	NO	29	114	6	0	0	0	OK	277	206	88	2021	42
783	A407	14	A	CREO	FALSE	FALSE	NO	21	83	4	1	2	2	OK	275	228	88	2237	48
848	A408	14	A	CREO	FALSE	FALSE	NO	23	90	2	1	2	2	OK	270	258	86	2531	57
730	A409	14	A	CREO	FALSE	FALSE	NO	20	77	8	0	0	0	OK	300	357	95	3502	57
620	A410	14	A	CREO	FALSE	FALSE	NO	17	66	2	0	0	0	OK	263	205	84	2011	49
280	A411	14	A	CREO	FALSE	FALSE	NO	8	30	4	0	0	0	OK	250	267	80	2619	74
965	A412	14	A	CREO	FALSE	FALSE	NO	26	102	6	0	0	0	OK	277	244	88	2394	50
427	A413	14	A	CREO	FALSE	FALSE	NO	12	45	9	0	0	0	OK	265	303	84	2972	71
233	A414	14	A	CREO	FALSE	FALSE	NO	7	25	5	0	0	0	OK	315	335	100	3286	46
414	A415	14	A	CREO	FALSE	FALSE	NO	11	44	6	0	0	0	OK	260	266	83	2609	66
101	A416	14	A	CREO	FALSE	FALSE	NO	3	11	6	1	2	2	OK	285	370	91	3630	69
326	A417	14	A	CREO	FALSE	FALSE	NO	9	35	3	1	2	2	OK	266	120	85	1177	28
926	A418	14	A	CREO	FALSE	FALSE	NO	25	98	4	0	0	0	OK	321	367	102	3600	48
649	A419	14	A	CREO	FALSE	FALSE	NO	18	69	3	0	0	0	OK	270	250	86	2453	55

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
										E. grandis									
159	A420	14	A	CREO	FALSE	FALSE	NO	5	17	7	0	0	0	OK	255	228	81	2237	60
921	A502	19	A	ACQ	TRUE	FALSE	YES	25	97	9	0	0	0	OK	244	240	78	2354	72
539	A503	19	A	ACQ	TRUE	FALSE	YES	15	57	7	1	5	5	OK	260	271	83	2659	67
681	A505	19	A	ACQ	TRUE	FALSE	YES	18	72	7	1	5	5	OK	250	227	80	2227	63
369	A506	19	A	ACQ	TRUE	FALSE	YES	10	39	8	1	3	3	OK	235	189	75	1854	63
446	A507	2	A	PEC	TRUE	FALSE	YES	12	47	10	1	2	2	OK	270	298	86	2923	66
898	A509	19	A	ACQ	TRUE	FALSE	YES	24	95	5	1	3	3	OK	275	252	88	2472	53
508	A511	19	A	ACQ	TRUE	FALSE	YES	14	54	4	1	5	5	OK	237	190	75	1864	62
779	A512	2	A	PEC	TRUE	FALSE	YES	21	82	10	0	0	0	OK	250	275	80	2698	76
547	A513	2	A	PEC	TRUE	FALSE	YES	15	58	5	1	6	6	OK	295	300	94	2943	51
1048	A515	19	A	ACQ	TRUE	FALSE	YES	28	111	4	1	2	2	OK	238	217	76	2129	70
593	A516	19	A	ACQ	TRUE	FALSE	YES	16	63	4	0	0	0	OK	255	238	81	2335	62
330	A519	19	A	ACQ	TRUE	FALSE	YES	9	35	7	1	3	3	OK	290	446	92	4375	79
585	A520	2	A	PEC	TRUE	FALSE	YES	16	62	6	0	0	0	OK	265	310	84	3041	72
622	A527	2	A	PEC	TRUE	FALSE	YES	17	66	4	0	0	0	OK	296	336	94	3296	56
81	A528	2	A	PEC	TRUE	FALSE	YES	3	9	5	0	0	0	OK	292	436	93	4277	76
289	A532	19	A	ACQ	TRUE	FALSE	YES	8	31	4	0	0	0	OK	245	218	78	2139	64
23	A533	2	A	PEC	TRUE	FALSE	YES	1	3	4	0	0	0	OK	285	398	91	3904	75
834	A533	19	A	ACQ	TRUE	FALSE	YES	22	88	7	0	0	0	OK	271	326	86	3198	71
907	A535	2	A	PEC	TRUE	FALSE	YES	24	96	5	0	0	0	OK	260	241	83	2364	59
396	A536	2	A	PEC	TRUE	FALSE	YES	11	42	7	1	2	2	OK	291	330	93	3237	58
47	A540	2	A	PEC	TRUE	FALSE	YES	2	5	9	0	0	0	OK	278	256	88	2511	52
517	A542	2	A	PEC	TRUE	FALSE	YES	14	55	4	0	0	0	OK	223	163	71	1599	64
1066	A548	2	A	PEC	TRUE	FALSE	YES	29	113	3	1	2	2	OK	307	372	98	3649	56
315	A551	2	A	PEC	TRUE	FALSE	YES	9	34	2	0	0	0	OK	275	317	88	3110	66
1022	A552	2	A	PEC	TRUE	FALSE	YES	27	108	6	0	0	0	OK	280	389	89	3816	77

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
861	A555	2	A	PEC	TRUE	FALSE	YES	23	91	6	0	0	0	OK	279	334	89	3277	67
404	A557	19	A	ACQ	TRUE	FALSE	YES	11	43	5	1	2	2	OK	247	211	79	2070	61
935	A559	2	A	PEC	TRUE	FALSE	YES	25	99	4	1	4	4	OK	251	226	80	2217	62
679	A561	2	A	PEC	TRUE	FALSE	YES	18	72	5	0	0	0	OK	273	287	87	2815	61
228	A562	19	A	ACQ	TRUE	FALSE	YES	6	24	10	0	0	0	OK	268	229	85	2246	52
160	A563	19	A	ACQ	TRUE	FALSE	YES	5	17	8	2	3	5	OK	283	396	90	3885	76
378	A565	2	A	PEC	TRUE	FALSE	YES	10	40	7	2	5	9	OK	270	364	86	3571	80
1051	A566	2	A	PEC	TRUE	FALSE	YES	28	111	7	1	2	2	OK	275	353	88	3463	74
169	A567	2	A	PEC	TRUE	FALSE	YES	5	18	8	0	0	0	OK	253	324	81	3178	87
1135	A568	19	A	ACQ	TRUE	FALSE	YES	30	120	7	0	0	0	OK	261	181	83	1776	44
145	A569	19	A	ACQ	TRUE	FALSE	YES	4	16	3	1	5	5	OK	280	315	89	3090	62
444	A570	19	A	ACQ	TRUE	FALSE	YES	12	47	8	1	3	3	OK	272	335	87	3286	72
241	A572	19	A	ACQ	TRUE	FALSE	YES	7	26	4	1	4	4	OK	255	278	81	2727	73
1015	A573	19	A	ACQ	TRUE	FALSE	YES	27	107	9	0	0	0	OK	257	229	82	2246	59
1125	A574	2	A	PEC	TRUE	FALSE	YES	30	119	6	0	0	0	OK	290	313	92	3071	56
979	A575	2	A	PEC	TRUE	FALSE	YES	26	103	10	1	4	4	OK	295	287	94	2815	48
106	A577	19	A	ACQ	TRUE	FALSE	YES	3	12	1	0	0	0	OK	270	266	86	2609	59
459	A578	2	A	PEC	TRUE	FALSE	YES	13	49	3	1	7	7	OK	264	311	84	3051	73
729	A581	2	A	PEC	TRUE	FALSE	YES	20	77	7	0	0	0	OK	275	368	88	3610	77
62	A582	19	A	ACQ	TRUE	FALSE	YES	2	7	4	0	0	0	OK	240	132	76	1295	41
22	A583	19	A	ACQ	TRUE	FALSE	YES	1	3	3	0	0	0	OK	265	211	84	2070	49
645	A584	19	A	ACQ	TRUE	FALSE	YES	17	68	8	0	0	0	OK	252	276	80	2708	75
693	A586	2	A	PEC	TRUE	FALSE	YES	19	73	9	0	0	0	OK	253	251	81	2462	67
795	A587	19	A	ACQ	TRUE	FALSE	YES	21	84	7	1	5	5	OK	248	290	79	2845	82
748	A588	19	A	ACQ	TRUE	FALSE	YES	20	79	7	0	0	0	OK	286	238	91	2335	44
802	A588	2	A	PEC	TRUE	FALSE	YES	22	85	4	0	0	0	OK	277	308	88	3021	63

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. grandis																			
223	A589	2	A	PEC	TRUE	FALSE	YES	6	24	5	0	0	0	OK	265	258	84	2531	60
983	A592	19	A	ACQ	TRUE	FALSE	YES	26	104	4	2	4	6	OK	255	284	81	2786	74
115	A593	2	A	PEC	TRUE	FALSE	YES	4	13	1	0	0	0	OK	280	336	89	3296	66
234	A595	2	A	PEC	TRUE	FALSE	YES	7	25	6	1	2	2	OK	251	231	80	2266	63
874	A597	19	A	ACQ	TRUE	FALSE	YES	23	92	9	0	0	0	OK	234	221	74	2168	75
478	A598	19	A	ACQ	TRUE	FALSE	YES	13	51	4	1	4	4	OK	266	301	85	2953	69
696	A599	19	A	ACQ	TRUE	FALSE	YES	19	74	2	0	0	0	OK	243	294	77	2884	89
1074	A600	19	A	ACQ	TRUE	FALSE	YES	29	114	1	1	5	5	OK	282	288	90	2825	56
E. globulus																			
422	B001	20	B	ACQ	TRUE	FALSE	NO	12	45	4	0	0	0	OK	260	301	83	2953	74
821	B005	20	B	ACQ	TRUE	FALSE	NO	22	87	4	1	15	15	Reject	355	819	113	8034	79
613	B006	20	B	ACQ	TRUE	FALSE	NO	17	65	5	1	10	10	Reject	335	650	107	6377	75
1112	B007	20	B	ACQ	TRUE	FALSE	NO	30	118	2	0	0	0	OK	291	404	93	3963	71
606	B010	20	B	ACQ	TRUE	FALSE	NO	16	64	8	1	11	11	Reject	405	991	129	9722	65
504	B011	20	B	ACQ	TRUE	FALSE	NO	14	53	10	2	3	5	OK	395	729	126	7151	51
323	B014	20	B	ACQ	TRUE	FALSE	NO	9	34	10	1	4	4	OK	370	822	118	8064	70
741	B018	20	B	ACQ	TRUE	FALSE	NO	20	78	9	2	6	11	OK	357	309	114	3031	29
494	B019	20	B	ACQ	TRUE	FALSE	NO	13	52	10	1	5	5	OK	287	476	91	4670	87
945	B020	20	B	ACQ	TRUE	FALSE	NO	25	100	4	1	3	3	OK	299	528	95	5180	86
1100	B021	20	B	ACQ	TRUE	FALSE	NO	29	116	9	0	0	0	OK	268	287	85	2815	65
1054	B022	20	B	ACQ	TRUE	FALSE	NO	28	111	10	1	5	5	OK	362	666	115	6533	61
32	B023	20	B	ACQ	TRUE	FALSE	NO	1	4	3	0	0	0	OK	276	343	88	3365	71
147	B026	20	B	ACQ	TRUE	FALSE	NO	4	16	5	1	15	15	Reject	370	630	118	6180	54
211	B027	20	B	ACQ	TRUE	FALSE	NO	6	23	2	1	6	6	OK	291	441	93	4326	78
687	B038	20	B	ACQ	TRUE	FALSE	NO	19	73	3	1	8	8	Reject	405	885	129	8682	58

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. globulus										
958	B039	20	B	ACQ	TRUE	FALSE	NO	26	101	8	1	5	5	OK	292	446	93	4375	78
410	B040	20	B	ACQ	TRUE	FALSE	NO	11	44	2	2	5	7	OK	360	756	115	7416	70
544	B041	20	B	ACQ	TRUE	FALSE	NO	15	58	2	1	10	10	Reject	369	674	117	6612	58
1011	B042	20	B	ACQ	TRUE	FALSE	NO	27	107	5	1	5	5	OK	379	804	121	7887	64
367	B043	20	B	ACQ	TRUE	FALSE	NO	10	39	6	1	7	7	OK	284	357	90	3502	68
77	B044	20	B	ACQ	TRUE	FALSE	NO	3	9	1	1	8	8	Reject	285	326	91	3198	61
653	B045	20	B	ACQ	TRUE	FALSE	NO	18	69	7	1	10	10	Reject	375	744	119	7299	61
841	B049	20	B	ACQ	TRUE	FALSE	NO	23	89	5	1	5	5	OK	325	381	103	3738	48
796	B051	20	B	ACQ	TRUE	FALSE	NO	21	84	8	1	12	12	Reject	382	781	122	7662	61
43	B053	20	B	ACQ	TRUE	FALSE	NO	2	5	5	1	10	10	Reject	430	846	137	8299	46
281	B054	20	B	ACQ	TRUE	FALSE	NO	8	30	5	1	3	3	OK	272	175	87	1717	38
891	B055	20	B	ACQ	TRUE	FALSE	NO	24	94	7	1	6	6	OK	305	513	97	5033	78
161	B064	20	B	ACQ	TRUE	FALSE	NO	5	17	9	1	4	4	OK	295	331	94	3247	56
259	B073	20	B	ACQ	TRUE	FALSE	NO	7	28	3	1	3	3	OK	305	271	97	2659	41
496	B111	31	B	ACQ	TRUE	TRUE	NO	14	53	2	0	0	0	OK	255	196	81	1923	51
920	B121	31	B	ACQ	TRUE	TRUE	NO	25	97	8	1	3	3	OK	335	450	107	4415	52
792	B122	31	B	ACQ	TRUE	TRUE	NO	21	84	4	0	0	0	OK	380	598	121	5866	47
399	B123	31	B	ACQ	TRUE	TRUE	NO	11	42	10	1	6	6	OK	345	736	110	7220	78
860	B130	31	B	ACQ	TRUE	TRUE	NO	23	91	5	0	0	0	OK	370	305	118	2992	26
807	B131	31	B	ACQ	TRUE	TRUE	NO	22	85	9	1	5	5	OK	345	415	110	4071	44
746	B132	31	B	ACQ	TRUE	TRUE	NO	20	79	5	0	0	0	OK	280	349	89	3424	69
321	B133	31	B	ACQ	TRUE	TRUE	NO	9	34	8	0	0	0	OK	305	485	97	4758	74
1102	B134	31	B	ACQ	TRUE	TRUE	NO	30	117	2	0	0	0	OK	285	262	91	2570	49
545	B135	31	B	ACQ	TRUE	TRUE	NO	15	58	3	2	3	5	OK	344	844	109	8280	90
878	B136	31	B	ACQ	TRUE	TRUE	NO	24	93	4	1	6	6	OK	292	464	93	4552	81
482	B138	31	B	ACQ	TRUE	TRUE	NO	13	51	8	0	0	0	OK	300	228	95	2237	37

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
703	B142	31	B	ACQ	TRUE	TRUE	NO	19	74	9	0	0	0	OK	342	733	109	7191	79
990	B144	31	B	ACQ	TRUE	TRUE	NO	27	105	2	0	0	0	OK	278	427	88	4189	86
194	B146	31	B	ACQ	TRUE	TRUE	NO	6	21	4	0	0	0	OK	245	257	78	2521	76
114	B148	31	B	ACQ	TRUE	TRUE	NO	3	12	9	1	2	2	OK	330	443	105	4346	53
12	B149	31	B	ACQ	TRUE	TRUE	NO	1	2	3	2	8	11	Reject	360	491	115	4817	46
831	B149	15	B	CREO	FALSE	FALSE	NO	22	88	4	2	3	6	OK	354	776	113	7613	76
452	B151	31	B	ACQ	TRUE	TRUE	NO	12	48	6	2	12	17	Reject	400	806	127	7907	55
171	B152	31	B	ACQ	TRUE	TRUE	NO	5	18	10	1	3	3	OK	276	387	88	3796	80
344	B154	31	B	ACQ	TRUE	TRUE	NO	10	37	2	2	5	9	OK	372	776	118	7613	65
76	B157	31	B	ACQ	TRUE	TRUE	NO	2	8	9	1	2	2	OK	290	301	92	2953	54
612	B158	31	B	ACQ	TRUE	TRUE	NO	17	65	4	0	0	0	OK	320	536	102	5258	71
277	B160	31	B	ACQ	TRUE	TRUE	NO	8	30	1	1	5	5	OK	305	429	97	4208	66
650	B162	31	B	ACQ	TRUE	TRUE	NO	18	69	4	0	0	0	OK	254	286	81	2806	76
1035	B163	31	B	ACQ	TRUE	TRUE	NO	28	109	9	1	5	5	OK	316	474	101	4650	65
149	B165	31	B	ACQ	TRUE	TRUE	NO	4	16	7	1	4	4	OK	345	435	110	4267	46
592	B166	31	B	ACQ	TRUE	TRUE	NO	16	63	3	0	0	0	OK	295	533	94	5229	90
1086	B167	31	B	ACQ	TRUE	TRUE	NO	29	115	4	1	3	3	OK	295	365	94	3581	62
973	B169	31	B	ACQ	TRUE	TRUE	NO	26	103	4	0	0	0	OK	277	315	88	3090	64
230	B170	31	B	ACQ	TRUE	TRUE	NO	7	25	2	0	0	0	OK	242	200	77	1962	61
476	B171	35	B	ACQ	FALSE	FALSE	NO	13	51	2	1	3	3	OK	335	355	107	3483	41
656	B172	35	B	ACQ	FALSE	FALSE	NO	18	69	10	2	3	5	OK	418	314	133	3080	19
877	B173	35	B	ACQ	FALSE	FALSE	NO	24	93	3	1	5	5	OK	330	369	105	3620	45
186	B174	35	B	ACQ	FALSE	FALSE	NO	5	20	6	1	7	7	OK	370	53	118	520	5
728	B175	35	B	ACQ	FALSE	FALSE	NO	20	77	6	1	2	2	OK	365	192	116	1884	17
360	B176	35	B	ACQ	FALSE	FALSE	NO	10	38	8	2	2	4	OK	363	622	116	6102	56
690	B177	35	B	ACQ	FALSE	FALSE	NO	19	73	6	2	6	12	OK	330	495	105	4856	60

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. globulus										
1016	B178	35	B	ACQ	FALSE	FALSE	NO	27	107	10	3	3	7	OK	320	447	102	4385	59
431	B179	35	B	ACQ	FALSE	FALSE	NO	12	46	4	3	4	8	OK	365	313	116	3071	28
118	B180	35	B	ACQ	FALSE	FALSE	NO	4	13	4	1	2	2	OK	320	343	102	3365	45
855	B181	35	B	ACQ	FALSE	FALSE	NO	23	90	9	1	15	15	Reject	370	443	118	4346	38
248	B182	35	B	ACQ	FALSE	FALSE	NO	7	27	1	1	7	7	OK	360	274	115	2688	25
1	B183	35	B	ACQ	FALSE	FALSE	NO	1	1	1	1	10	10	Reject	350	479	111	4699	48
300	B184	35	B	ACQ	FALSE	FALSE	NO	8	32	5	2	2	4	OK	347	249	110	2443	26
638	B185	35	B	ACQ	FALSE	FALSE	NO	17	68	1	2	3	5	OK	335	425	107	4169	49
306	B186	35	B	ACQ	FALSE	FALSE	NO	9	33	2	1	4	4	OK	345	348	110	3414	37
537	B187	35	B	ACQ	FALSE	FALSE	NO	15	57	5	0	0	0	OK	310	0	99	0	0
199	B188	35	B	ACQ	FALSE	FALSE	NO	6	21	9	1	3	3	OK	370	325	118	3188	28
790	B189	35	B	ACQ	FALSE	FALSE	NO	21	84	2	1	4	4	OK	404	485	129	4758	32
85	B190	35	B	ACQ	FALSE	FALSE	NO	3	9	9	1	3	3	OK	360	292	115	2865	27
1030	B191	35	B	ACQ	FALSE	FALSE	NO	28	109	4	1	5	5	OK	360	293	115	2874	27
1073	B192	35	B	ACQ	FALSE	FALSE	NO	29	113	10	1	10	10	Reject	315	392	100	3846	54
583	B193	35	B	ACQ	FALSE	FALSE	NO	16	62	4	1	7	7	OK	366	507	117	4974	45
521	B194	35	B	ACQ	FALSE	FALSE	NO	14	55	8	0	0	0	OK	340	0	108	0	0
69	B195	35	B	ACQ	FALSE	FALSE	NO	2	8	2	3	10	13	Reject	300	459	95	4503	74
924	B196	35	B	ACQ	FALSE	FALSE	NO	25	98	2	1	16	16	Reject	354	283	113	2776	28
985	B197	35	B	ACQ	FALSE	FALSE	NO	26	104	6	1	2	2	OK	293	245	93	2403	42
409	B198	35	B	ACQ	FALSE	FALSE	NO	11	44	1	1	4	4	OK	350	218	111	2139	22
825	B199	35	B	ACQ	FALSE	FALSE	NO	22	87	8	1	10	10	Reject	382	281	122	2757	22
1114	B200	35	B	ACQ	FALSE	FALSE	NO	30	118	4	3	3	7	OK	257	170	82	1668	43
1103	B221	3	B	PEC	TRUE	FALSE	NO	30	117	3	2	4	6	OK	359	688	114	6749	64
36	B222	3	B	PEC	TRUE	FALSE	NO	1	4	7	0	0	0	OK	360	567	115	5562	53
1071	B223	3	B	PEC	TRUE	FALSE	NO	29	113	8	1	3	3	OK	325	616	103	6043	78

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. globulus										
253	B226	3	B	PEC	TRUE	FALSE	NO	7	27	6	1	5	5	OK	345	787	110	7720	83
346	B227	3	B	PEC	TRUE	FALSE	NO	10	37	4	1	8	8	Reject	375	230	119	2256	19
692	B228	3	B	PEC	TRUE	FALSE	NO	19	73	8	0	0	0	OK	290	461	92	4522	82
111	B229	3	B	PEC	TRUE	FALSE	NO	3	12	6	0	0	0	OK	300	497	95	4876	80
122	B230	3	B	PEC	TRUE	FALSE	NO	4	13	8	0	0	0	OK	315	523	100	5131	73
1061	B231	3	B	PEC	TRUE	FALSE	NO	28	112	7	0	0	0	OK	274	400	87	3924	84
202	B232	3	B	PEC	TRUE	FALSE	NO	6	22	3	1	4	4	OK	396	1214	126	11909	85
570	B233	3	B	PEC	TRUE	FALSE	NO	15	60	9	1	3	3	OK	350	611	111	5994	62
425	B234	3	B	PEC	TRUE	FALSE	NO	12	45	7	2	7	10	OK	376	645	120	6327	53
507	B237	3	B	PEC	TRUE	FALSE	NO	14	54	3	0	0	0	OK	305	334	97	3277	51
596	B238	3	B	PEC	TRUE	FALSE	NO	16	63	7	0	0	0	OK	295	471	94	4621	80
733	B239	3	B	PEC	TRUE	FALSE	NO	20	78	1	0	0	0	OK	301	533	96	5229	85
299	B241	3	B	PEC	TRUE	FALSE	NO	8	32	4	0	0	0	OK	290	494	92	4846	88
327	B242	3	B	PEC	TRUE	FALSE	NO	9	35	4	1	4	4	OK	390	721	124	7073	53
883	B243	3	B	PEC	TRUE	FALSE	NO	24	93	9	0	0	0	OK	394	904	125	8868	64
641	B244	3	B	PEC	TRUE	FALSE	NO	17	68	4	0	0	0	OK	305	448	97	4395	68
489	B245	3	B	PEC	TRUE	FALSE	NO	13	52	5	1	4	4	OK	340	857	108	8407	95
933	B247	3	B	PEC	TRUE	FALSE	NO	25	99	2	0	0	0	OK	422	598	134	5866	35
385	B249	3	B	PEC	TRUE	FALSE	NO	11	41	5	1	2	2	OK	325	370	103	3630	47
178	B250	3	B	PEC	TRUE	FALSE	NO	5	19	7	0	0	0	OK	275	390	88	3826	81
953	B252	3	B	PEC	TRUE	FALSE	NO	26	101	3	1	5	5	OK	300	475	95	4660	76
865	B254	3	B	PEC	TRUE	FALSE	NO	23	91	10	1	7	7	OK	385	1125	123	11036	86
993	B255	3	B	PEC	TRUE	FALSE	NO	27	105	5	2	5	9	OK	312	481	99	4719	69
683	B256	3	B	PEC	TRUE	FALSE	NO	18	72	9	0	0	0	OK	341	773	109	7583	85
832	B258	3	B	PEC	TRUE	FALSE	NO	22	88	5	1	4	4	OK	288	508	92	4983	92
42	B259	3	B	PEC	TRUE	FALSE	NO	2	5	4	0	0	0	OK	287	467	91	4581	86

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
784	No tag	3	B	PEC	TRUE	FALSE	NO	21	83	5	0	0	0	OK	323	573	103	5621	74
2	B342	11	B	PEC	TRUE	TRUE	NO	1	1	2	0	0	0	OK	315	560	100	5494	78
1045	B344	11	B	PEC	TRUE	TRUE	NO	28	111	1	2	4	6	OK	350	587	111	5758	59
41	B345	11	B	PEC	TRUE	TRUE	NO	2	5	3	0	0	0	OK	345	602	110	5906	64
333	B347	11	B	PEC	TRUE	TRUE	NO	9	36	1	0	0	0	OK	310	474	99	4650	69
1099	B349	11	B	PEC	TRUE	TRUE	NO	29	116	8	3	2	6	OK	310	673	99	6602	98
434	B353	11	B	PEC	TRUE	TRUE	NO	12	46	7	0	0	0	OK	292	364	93	3571	63
520	B354	11	B	PEC	TRUE	TRUE	NO	14	55	7	2	8	10	Reject	368	1027	117	10075	89
797	B355	11	B	PEC	TRUE	TRUE	NO	21	84	9	1	5	5	OK	395	951	126	9329	67
184	B356	11	B	PEC	TRUE	TRUE	NO	5	20	4	0	0	0	OK	370	746	118	7318	64
605	B357	11	B	PEC	TRUE	TRUE	NO	16	64	7	1	4	4	OK	368	687	117	6739	60
885	B358	11	B	PEC	TRUE	TRUE	NO	24	94	1	0	0	0	OK	305	575	97	5641	88
480	B359	11	B	PEC	TRUE	TRUE	NO	13	51	6	0	0	0	OK	300	514	95	5042	83
206	B360	11	B	PEC	TRUE	TRUE	NO	6	22	7	2	5	9	OK	287	435	91	4267	80
384	B361	11	B	PEC	TRUE	TRUE	NO	11	41	4	0	0	0	OK	314	420	100	4120	59
713	B362	11	B	PEC	TRUE	TRUE	NO	19	75	10	0	0	0	OK	273	355	87	3483	76
131	B363	11	B	PEC	TRUE	TRUE	NO	4	14	8	0	0	0	OK	385	691	123	6779	53
286	B364	11	B	PEC	TRUE	TRUE	NO	8	31	1	0	0	0	OK	370	285	118	2796	24
828	B366	11	B	PEC	TRUE	TRUE	NO	22	88	1	0	0	0	OK	300	479	95	4699	77
553	B368	11	B	PEC	TRUE	TRUE	NO	15	59	1	0	0	0	OK	380	829	121	8132	66
758	B369	11	B	PEC	TRUE	TRUE	NO	20	80	7	2	2	3	OK	351	841	112	8250	84
674	B370	11	B	PEC	TRUE	TRUE	NO	18	71	9	2	6	8	OK	395	795	126	7799	56
989	B375	11	B	PEC	TRUE	TRUE	NO	27	105	1	0	0	0	OK	334	508	106	4983	59
619	B378	11	B	PEC	TRUE	TRUE	NO	17	66	1	2	2	4	OK	330	516	105	5062	62
235	B379	11	B	PEC	TRUE	TRUE	NO	7	25	7	0	0	0	OK	300	524	95	5140	84

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
108	B380	11	B	PEC	TRUE	TRUE	NO	3	12	3	0	0	0	OK	300	483	95	4738	78
978	B381	11	B	PEC	TRUE	TRUE	NO	26	103	9	0	0	0	OK	324	558	103	5474	71
376	B383	11	B	PEC	TRUE	TRUE	NO	10	40	5	1	4	4	OK	360	608	115	5964	57
946	B384	11	B	PEC	TRUE	TRUE	NO	25	100	5	0	0	0	OK	302	462	96	4532	73
1116	B385	11	B	PEC	TRUE	TRUE	NO	30	118	7	0	0	0	OK	275	381	88	3738	79
859	B390	11	B	PEC	TRUE	TRUE	NO	23	91	4	0	0	0	OK	385	727	123	7132	55
723	B391	15	B	CREO	FALSE	FALSE	NO	20	77	1	0	0	0	OK	352	355	112	3483	35
262	B392	15	B	CREO	FALSE	FALSE	NO	7	28	6	1	2	2	OK	320	123	102	1207	16
391	B393	15	B	CREO	FALSE	FALSE	NO	11	42	2	1	2	2	OK	340	424	108	4159	47
968	B394	15	B	CREO	FALSE	FALSE	NO	26	102	9	2	5	10	OK	365	425	116	4169	38
1082	B395	15	B	CREO	FALSE	FALSE	NO	29	114	9	2	4	6	OK	391	413	124	4052	30
146	B396	15	B	CREO	FALSE	FALSE	NO	4	16	4	1	4	4	OK	370	566	118	5552	48
714	B397	15	B	CREO	FALSE	FALSE	NO	19	76	1	0	0	0	OK	345	765	110	7505	81
672	B398	15	B	CREO	FALSE	FALSE	NO	18	71	7	1	6	6	OK	392	768	125	7534	55
913	B399	15	B	CREO	FALSE	FALSE	NO	25	97	1	1	2	2	OK	350	197	111	1933	20
546	B400	15	B	CREO	FALSE	FALSE	NO	15	58	4	0	0	0	OK	415	309	132	3031	19
39	B401	15	B	CREO	FALSE	FALSE	NO	2	5	1	0	0	0	OK	285	302	91	2963	57
303	B402	15	B	CREO	FALSE	FALSE	NO	8	32	8	1	4	4	OK	350	711	111	6975	72
1014	B403	15	B	CREO	FALSE	FALSE	NO	27	107	8	1	4	4	OK	385	446	123	4375	34
876	B404	15	B	CREO	FALSE	FALSE	NO	24	93	2	2	4	7	OK	316	517	101	5072	71
768	B405	15	B	CREO	FALSE	FALSE	NO	21	81	8	0	0	0	OK	372	301	118	2953	25
581	B406	15	B	CREO	FALSE	FALSE	NO	16	62	2	0	0	0	OK	322	364	102	3571	47
207	B408	15	B	CREO	FALSE	FALSE	NO	6	22	8	0	0	0	OK	279	346	89	3394	69
627	B409	15	B	CREO	FALSE	FALSE	NO	17	66	9	1	2	2	OK	365	378	116	3708	34
468	B410	15	B	CREO	FALSE	FALSE	NO	13	50	3	1	2	2	OK	385	407	123	3993	31
90	B411	15	B	CREO	FALSE	FALSE	NO	3	10	4	1	7	7	OK	346	305	110	2992	32

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
188	B412	15	B	CREO	FALSE	FALSE	NO	5	20	8	1	5	5	OK	325	228	103	2237	29
846	B413	15	B	CREO	FALSE	FALSE	NO	23	89	10	1	5	5	OK	361	792	115	7770	73
532	B414	15	B	CREO	FALSE	FALSE	NO	14	56	9	1	5	5	OK	319	211	102	2070	28
424	B415	15	B	CREO	FALSE	FALSE	NO	12	45	6	1	3	3	OK	320	246	102	2413	33
1034	B417	15	B	CREO	FALSE	FALSE	NO	28	109	8	1	5	5	OK	312	285	99	2796	41
352	B418	15	B	CREO	FALSE	FALSE	NO	10	37	10	2	12	17	Reject	380	455	121	4464	36
27	B420	15	B	CREO	FALSE	FALSE	NO	1	3	8	1	19	19	Reject	350	641	111	6288	65
311	B446	15	B	CREO	FALSE	FALSE	NO	9	33	7	2	5	7	OK	375	517	119	5072	43
869	B501	4	B	PEC	TRUE	FALSE	YES	23	92	4	1	4	4	OK	265	306	84	3002	71
647	B503	21	B	ACQ	TRUE	FALSE	YES	18	69	1	2	2	4	OK	281	308	89	3021	60
558	B505	4	B	PEC	TRUE	FALSE	YES	15	59	6	0	0	0	OK	260	255	83	2502	63
464	B506	21	B	ACQ	TRUE	FALSE	YES	13	49	8	1	6	6	OK	275	259	88	2541	54
518	B508	4	B	PEC	TRUE	FALSE	YES	14	55	5	1	3	3	OK	270	315	86	3090	69
287	B510	21	B	ACQ	TRUE	FALSE	YES	8	31	2	1	4	4	OK	240	136	76	1334	43
591	B511	4	B	PEC	TRUE	FALSE	YES	16	63	2	0	0	0	OK	306	414	97	4061	63
1031	B513	21	B	ACQ	TRUE	FALSE	YES	28	109	5	1	6	6	OK	290	392	92	3846	70
609	B516	21	B	ACQ	TRUE	FALSE	YES	17	65	1	1	4	4	OK	289	293	92	2874	53
599	B518	21	B	ACQ	TRUE	FALSE	YES	16	64	1	1	5	5	OK	265	308	84	3021	72
1020	B519	4	B	PEC	TRUE	FALSE	YES	27	108	4	0	0	0	OK	262	310	83	3041	75
389	B521	4	B	PEC	TRUE	FALSE	YES	11	41	9	1	4	4	OK	260	292	83	2865	72
364	B524	21	B	ACQ	TRUE	FALSE	YES	10	39	3	0	0	0	OK	247	257	79	2521	74
205	B526	4	B	PEC	TRUE	FALSE	YES	6	22	6	0	0	0	OK	208	222	66	2178	107
1013	B528	21	B	ACQ	TRUE	FALSE	YES	27	107	7	0	0	0	OK	243	300	77	2943	91
264	B530	4	B	PEC	TRUE	FALSE	YES	7	28	8	1	5	5	OK	275	232	88	2276	48
454	B532	21	B	ACQ	TRUE	FALSE	YES	12	48	8	1	5	5	OK	292	214	93	2099	37
123	B533	21	B	ACQ	TRUE	FALSE	YES	4	13	9	0	0	0	OK	262	302	83	2963	73

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
1083	B534	21	B	ACQ	TRUE	FALSE	YES	29	115	1	0	0	0	OK	275	313	88	3071	65
185	B542	21	B	ACQ	TRUE	FALSE	YES	5	20	5	1	3	3	OK	270	265	86	2600	58
285	B544	4	B	PEC	TRUE	FALSE	YES	8	30	9	1	3	3	OK	232	167	74	1638	58
238	B546	21	B	ACQ	TRUE	FALSE	YES	7	26	1	1	6	6	OK	291	311	93	3051	55
908	B547	21	B	ACQ	TRUE	FALSE	YES	24	96	6	0	0	0	OK	280	330	89	3237	65
1131	B548	4	B	PEC	TRUE	FALSE	YES	30	120	3	0	0	0	OK	239	311	76	3051	99
103	B550	4	B	PEC	TRUE	FALSE	YES	3	11	8	0	0	0	OK	255	333	81	3267	87
151	B553	4	B	PEC	TRUE	FALSE	YES	4	16	9	1	3	3	OK	285	304	91	2982	57
759	B554	21	B	ACQ	TRUE	FALSE	YES	20	80	8	1	2	2	OK	275	212	88	2080	44
96	B555	21	B	ACQ	TRUE	FALSE	YES	3	11	1	1	3	3	OK	235	207	75	2031	69
565	B558	21	B	ACQ	TRUE	FALSE	YES	15	60	4	1	4	4	OK	275	262	88	2570	55
3	B560	21	B	ACQ	TRUE	FALSE	YES	1	1	3	0	0	0	OK	255	258	81	2531	67
35	B561	4	B	PEC	TRUE	FALSE	YES	1	4	6	1	3	3	OK	260	210	83	2060	52
1127	B562	21	B	ACQ	TRUE	FALSE	YES	30	119	8	1	4	4	OK	248	256	79	2511	73
711	B565	4	B	PEC	TRUE	FALSE	YES	19	75	8	0	0	0	OK	270	307	86	3012	68
815	B566	4	B	PEC	TRUE	FALSE	YES	22	86	8	0	0	0	OK	281	232	89	2276	45
469	B567	4	B	PEC	TRUE	FALSE	YES	13	50	4	1	2	2	OK	248	175	79	1717	50
866	B569	21	B	ACQ	TRUE	FALSE	YES	23	92	1	0	0	0	OK	246	238	78	2335	69
1067	B570	4	B	PEC	TRUE	FALSE	YES	29	113	4	0	0	0	OK	258	257	82	2521	65
209	B571	21	B	ACQ	TRUE	FALSE	YES	6	22	10	1	7	7	OK	245	271	78	2659	80
60	B576	21	B	ACQ	TRUE	FALSE	YES	2	7	2	1	10	10	Reject	254	181	81	1776	48
357	B580	4	B	PEC	TRUE	FALSE	YES	10	38	5	0	0	0	OK	270	275	86	2698	61
1056	B582	4	B	PEC	TRUE	FALSE	YES	28	112	2	0	0	0	OK	267	344	85	3375	78
780	B586	21	B	ACQ	TRUE	FALSE	YES	21	83	1	0	0	0	OK	234	207	74	2031	70
646	B587	4	B	PEC	TRUE	FALSE	YES	17	68	9	0	0	0	OK	280	244	89	2394	48

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. globulus																			
718	B590	21	B	ACQ	TRUE	FALSE	YES	19	76	5	0	0	0	OK	244	286	78	2806	85
727	B591	4	B	PEC	TRUE	FALSE	YES	20	77	5	0	0	0	OK	284	444	90	4356	84
531	B593	21	B	ACQ	TRUE	FALSE	YES	14	56	8	0	0	0	OK	280	207	89	2031	41
914	B594	21	B	ACQ	TRUE	FALSE	YES	25	97	2	1	3	3	OK	283	383	90	3757	73
927	B595	4	B	PEC	TRUE	FALSE	YES	25	98	5	0	0	0	OK	249	286	79	2806	80
971	B596	4	B	PEC	TRUE	FALSE	YES	26	103	2	0	0	0	OK	253	270	81	2649	72
976	B597	21	B	ACQ	TRUE	FALSE	YES	26	103	7	0	0	0	OK	251	331	80	3247	91
412	B598	21	B	ACQ	TRUE	FALSE	YES	11	44	4	1	4	4	OK	274	280	87	2747	59
445	B600	4	B	PEC	TRUE	FALSE	YES	12	47	9	0	0	0	OK	265	308	84	3021	72
826	B602	21	B	ACQ	TRUE	FALSE	YES	22	87	9	2	5	9	OK	235	187	75	1834	63
648	B603	4	B	PEC	TRUE	FALSE	YES	18	69	2	0	0	0	OK	255	243	81	2384	64
170	B604	4	B	PEC	TRUE	FALSE	YES	5	18	9	0	0	0	OK	260	300	83	2943	74
890	B605	4	B	PEC	TRUE	FALSE	YES	24	94	6	0	0	0	OK	271	317	86	3110	69
319	B606	4	B	PEC	TRUE	FALSE	YES	9	34	6	0	0	0	OK	260	405	83	3973	100
331	B607	21	B	ACQ	TRUE	FALSE	YES	9	35	8	1	3	3	OK	240	261	76	2560	82
59	B609	4	B	PEC	TRUE	FALSE	YES	2	7	1	0	0	0	OK	255	213	81	2090	56
763	No tag	4	B	PEC	TRUE	FALSE	YES	21	81	3	0	0	0	OK	270	335	86	3286	74
C. maculata																			
754	C021	22	C	ACQ	TRUE	FALSE	NO	20	80	3	0	0	0	OK	276	573	88	5621	118
668	C022	22	C	ACQ	TRUE	FALSE	NO	18	71	3	1	3	3	OK	370	1252	118	12282	107
473	C023	22	C	ACQ	TRUE	FALSE	NO	13	50	8	1	5	5	OK	250	445	80	4365	124
224	C024	22	C	ACQ	TRUE	FALSE	NO	6	24	6	1	2	2	OK	241	398	77	3904	123
791	C025	22	C	ACQ	TRUE	FALSE	NO	21	84	3	0	0	0	OK	310	928	99	9104	135
905	C026	22	C	ACQ	TRUE	FALSE	NO	24	96	3	0	0	0	OK	285	839	91	8231	157
510	C027	22	C	ACQ	TRUE	FALSE	NO	14	54	6	1	5	5	OK	260	709	83	6955	175
415	C028	22	C	ACQ	TRUE	FALSE	NO	11	44	7	0	0	0	OK	290	805	92	7897	143

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
C. maculata																			
639	C029	22	C	ACQ	TRUE	FALSE	NO	17	68	2	1	5	5	OK	337	1568	107	15382	178
375	C030	22	C	ACQ	TRUE	FALSE	NO	10	40	4	1	4	4	OK	303	718	96	7044	112
335	C031	22	C	ACQ	TRUE	FALSE	NO	9	36	3	0	0	0	OK	275	600	88	5886	125
843	C032	22	C	ACQ	TRUE	FALSE	NO	23	89	7	2	5	7	OK	315	998	100	9790	138
685	C033	22	C	ACQ	TRUE	FALSE	NO	19	73	1	1	3	3	OK	343	1039	109	10193	112
923	C034	22	C	ACQ	TRUE	FALSE	NO	25	98	1	0	0	0	OK	306	998	97	9790	151
566	C035	22	C	ACQ	TRUE	FALSE	NO	15	60	5	1	5	5	OK	280	750	89	7358	148
443	C036	22	C	ACQ	TRUE	FALSE	NO	12	47	7	0	0	0	OK	240	421	76	4130	132
127	C037	22	C	ACQ	TRUE	FALSE	NO	4	14	4	0	0	0	OK	235	553	75	5425	185
571	C038	22	C	ACQ	TRUE	FALSE	NO	16	61	1	2	2	4	OK	250	691	80	6779	192
824	C039	22	C	ACQ	TRUE	FALSE	NO	22	87	7	1	2	2	OK	250	630	80	6180	175
24	C040	22	C	ACQ	TRUE	FALSE	NO	1	3	5	0	0	0	OK	310	1109	99	10879	161
54	C041	22	C	ACQ	TRUE	FALSE	NO	2	6	6	3	5	10	OK	293	281	93	2757	48
284	C042	22	C	ACQ	TRUE	FALSE	NO	8	30	8	0	0	0	OK	345	1282	110	12576	135
254	C043	22	C	ACQ	TRUE	FALSE	NO	7	27	7	0	0	0	OK	383	1488	122	14597	115
107	C044	22	C	ACQ	TRUE	FALSE	NO	3	12	2	0	0	0	OK	277	642	88	6298	131
1007	C045	22	C	ACQ	TRUE	FALSE	NO	27	107	1	0	0	0	OK	279	915	89	8976	183
1038	C046	22	C	ACQ	TRUE	FALSE	NO	28	110	2	0	0	0	OK	312	1031	99	10114	147
1104	C047	22	C	ACQ	TRUE	FALSE	NO	30	117	4	1	4	4	OK	295	840	94	8240	142
162	C048	22	C	ACQ	TRUE	FALSE	NO	5	18	1	0	0	0	OK	280	735	89	7210	145
1087	C049	22	C	ACQ	TRUE	FALSE	NO	29	115	5	0	0	0	OK	272	740	87	7259	160
963	C050	22	C	ACQ	TRUE	FALSE	NO	26	102	4	2	3	5	OK	305	916	97	8986	140
501	C241	5	C	PEC	TRUE	FALSE	NO	14	53	7	0	0	0	OK	312	1371	99	13450	196
1062	C242	5	C	PEC	TRUE	FALSE	NO	28	112	8	0	0	0	OK	280	583	89	5719	115
110	C243	5	C	PEC	TRUE	FALSE	NO	3	12	5	0	0	0	OK	320	1150	102	11282	152
579	C244	5	C	PEC	TRUE	FALSE	NO	16	61	9	1	2	2	OK	284	727	90	7132	138

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
C. maculata																			
71	C245	5	C	PEC	TRUE	FALSE	NO	2	8	4	0	0	0	OK	265	578	84	5670	135
295	C246	5	C	PEC	TRUE	FALSE	NO	8	31	10	0	0	0	OK	246	579	78	5680	169
406	C247	5	C	PEC	TRUE	FALSE	NO	11	43	7	0	0	0	OK	283	477	90	4679	91
691	C248	5	C	PEC	TRUE	FALSE	NO	19	73	7	1	6	6	OK	236	369	75	3620	122
740	C249	5	C	PEC	TRUE	FALSE	NO	20	78	8	0	0	0	OK	289	622	92	6102	112
806	C250	5	C	PEC	TRUE	FALSE	NO	22	85	8	1	6	6	OK	270	500	86	4905	110
631	C251	5	C	PEC	TRUE	FALSE	NO	17	67	4	0	0	0	OK	320	859	102	8427	114
6	C252	5	C	PEC	TRUE	FALSE	NO	1	1	6	0	0	0	OK	335	1450	107	14225	167
654	C253	5	C	PEC	TRUE	FALSE	NO	18	69	8	2	2	4	OK	337	1543	107	15137	175
461	C254	5	C	PEC	TRUE	FALSE	NO	13	49	5	0	0	0	OK	293	473	93	4640	82
266	C255	5	C	PEC	TRUE	FALSE	NO	7	28	10	0	0	0	OK	320	1063	102	10428	141
886	C256	5	C	PEC	TRUE	FALSE	NO	24	94	2	1	3	3	OK	343	866	109	8495	93
1023	C257	5	C	PEC	TRUE	FALSE	NO	27	108	7	0	0	0	OK	273	695	87	6818	148
312	C258	5	C	PEC	TRUE	FALSE	NO	9	33	8	1	5	5	OK	333	982	106	9633	115
964	C259	5	C	PEC	TRUE	FALSE	NO	26	102	5	0	0	0	OK	258	533	82	5229	135
190	C260	5	C	PEC	TRUE	FALSE	NO	5	20	10	0	0	0	OK	300	826	95	8103	133
192	C261	5	C	PEC	TRUE	FALSE	NO	6	21	2	0	0	0	OK	286	615	91	6033	114
849	C262	5	C	PEC	TRUE	FALSE	NO	23	90	3	1	2	2	OK	255	664	81	6514	174
1094	C263	5	C	PEC	TRUE	FALSE	NO	29	116	2	1	5	5	OK	295	559	94	5484	94
128	C264	5	C	PEC	TRUE	FALSE	NO	4	14	5	0	0	0	OK	355	1175	113	11527	114
919	C265	5	C	PEC	TRUE	FALSE	NO	25	97	7	4	15	30	Reject	370	909	118	8917	78
770	C266	5	C	PEC	TRUE	FALSE	NO	21	82	1	0	0	0	OK	320	1240	102	12164	164
442	C267	5	C	PEC	TRUE	FALSE	NO	12	47	6	0	0	0	OK	337	1437	107	14097	163
343	C268	5	C	PEC	TRUE	FALSE	NO	10	37	1	0	0	0	OK	335	774	107	7593	89
1134	C269	5	C	PEC	TRUE	FALSE	NO	30	120	6	1	15	15	Reject	392	1135	125	11134	82
568	C270	5	C	PEC	TRUE	FALSE	NO	15	60	7	2	5	8	OK	360	1128	115	11066	105

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. pilularis																			
227	D021	23	D	ACQ	TRUE	FALSE	NO	6	24	9	0	0	0	OK	441	1283	140	12586	65
64	D022	23	D	ACQ	TRUE	FALSE	NO	2	7	6	0	0	0	OK	306	772	97	7573	117
379	D023	23	D	ACQ	TRUE	FALSE	NO	10	40	8	0	0	0	OK	275	353	88	3463	74
535	D024	23	D	ACQ	TRUE	FALSE	NO	15	57	3	2	3	6	OK	320	521	102	5111	69
13	D025	23	D	ACQ	TRUE	FALSE	NO	1	2	4	1	13	13	Reject	460	590	146	5788	26
487	D026	23	D	ACQ	TRUE	FALSE	NO	13	52	3	1	12	12	Reject	417	915	133	8976	55
437	D027	23	D	ACQ	TRUE	FALSE	NO	12	47	1	1	4	4	OK	290	318	92	3120	57
522	D028	23	D	ACQ	TRUE	FALSE	NO	14	55	9	1	8	8	Reject	385	617	123	6053	47
183	D029	23	D	ACQ	TRUE	FALSE	NO	5	20	3	1	10	10	Reject	450	934	143	9163	44
298	D030	23	D	ACQ	TRUE	FALSE	NO	8	32	3	1	2	2	OK	339	1157	108	11350	129
836	D031	23	D	ACQ	TRUE	FALSE	NO	22	88	9	1	6	6	OK	465	983	148	9643	42
766	D032	23	D	ACQ	TRUE	FALSE	NO	21	81	6	4	2	7	OK	420	1418	134	13911	83
922	D033	23	D	ACQ	TRUE	FALSE	NO	25	97	10	2	4	8	OK	295	457	94	4483	77
610	D034	23	D	ACQ	TRUE	FALSE	NO	17	65	2	1	3	3	OK	380	1017	121	9977	80
1095	D035	23	D	ACQ	TRUE	FALSE	NO	29	116	3	2	2	4	OK	258	425	82	4169	107
734	D036	23	D	ACQ	TRUE	FALSE	NO	20	78	2	1	10	10	Reject	392	588	125	5768	42
322	D037	23	D	ACQ	TRUE	FALSE	NO	9	34	9	2	2	4	OK	360	984	115	9653	91
862	D038	23	D	ACQ	TRUE	FALSE	NO	23	91	7	2	4	7	OK	461	1154	147	11321	51
1123	D039	23	D	ACQ	TRUE	FALSE	NO	30	119	4	3	4	9	OK	346	739	110	7250	77
416	D040	23	D	ACQ	TRUE	FALSE	NO	11	44	8	1	9	9	Reject	360	588	115	5768	55
137	D041	23	D	ACQ	TRUE	FALSE	NO	4	15	5	0	0	0	OK	364	1160	116	11380	104
659	D042	23	D	ACQ	TRUE	FALSE	NO	18	70	3	1	2	2	OK	330	677	105	6641	82
700	D043	23	D	ACQ	TRUE	FALSE	NO	19	74	6	2	3	5	OK	368	395	117	3875	34
1040	D044	23	D	ACQ	TRUE	FALSE	NO	28	110	4	2	4	6	OK	335	1163	107	11409	134
105	D045	23	D	ACQ	TRUE	FALSE	NO	3	11	10	0	0	0	OK	315	524	100	5140	73
1003	D046	23	D	ACQ	TRUE	FALSE	NO	27	106	6	0	0	0	OK	457	2188	145	21464	99

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									E. pilularis										
255	D047	23	D	ACQ	TRUE	FALSE	NO	7	27	8	1	10	10	Reject	415	935	132	9172	57
969	D048	23	D	ACQ	TRUE	FALSE	NO	26	102	10	0	0	0	OK	425	1721	135	16883	97
889	D049	23	D	ACQ	TRUE	FALSE	NO	24	94	5	0	0	0	OK	422	1623	134	15922	94
584	D050	23	D	ACQ	TRUE	FALSE	NO	16	62	5	0	0	0	OK	485	1466	154	14381	56
10	D119	26	G	ACQ	TRUE	FALSE	NO	1	2	1	2	7	10	OK	285	512	91	5023	96
805	D241	6	D	PEC	TRUE	FALSE	NO	22	85	7	1	3	3	OK	341	598	109	5866	65
715	D242	6	D	PEC	TRUE	FALSE	NO	19	76	2	2	8	16	Reject	420	1108	134	10869	65
629	D243	6	D	PEC	TRUE	FALSE	NO	17	67	2	1	4	4	OK	280	383	89	3757	76
313	D244	6	D	PEC	TRUE	FALSE	NO	9	33	9	1	2	2	OK	390	793	124	7779	58
466	D245	6	D	PEC	TRUE	FALSE	NO	13	50	1	2	5	8	OK	400	572	127	5611	39
191	D246	6	D	PEC	TRUE	FALSE	NO	6	21	1	1	10	10	Reject	460	1112	146	10909	50
63	D248	6	D	PEC	TRUE	FALSE	NO	2	7	5	0	0	0	OK	277	404	88	3963	82
25	D249	6	D	PEC	TRUE	FALSE	NO	1	3	6	2	5	8	OK	405	560	129	5494	37
998	D250	6	D	PEC	TRUE	FALSE	NO	27	106	1	1	9	9	Reject	373	746	119	7318	62
603	D251	6	D	PEC	TRUE	FALSE	NO	16	64	5	2	2	4	OK	415	1181	132	11586	72
430	D252	6	D	PEC	TRUE	FALSE	NO	12	46	3	2	3	6	OK	380	493	121	4836	39
897	D253	6	D	PEC	TRUE	FALSE	NO	24	95	4	1	5	5	OK	313	498	100	4885	70
786	D254	6	D	PEC	TRUE	FALSE	NO	21	83	7	0	0	0	OK	540	1431	172	14038	39
167	D255	6	D	PEC	TRUE	FALSE	NO	5	18	6	2	4	8	OK	345	723	110	7093	76
548	D256	6	D	PEC	TRUE	FALSE	NO	15	58	6	0	0	0	OK	411	817	131	8015	51
868	D257	6	D	PEC	TRUE	FALSE	NO	23	92	3	2	5	7	OK	272	318	87	3120	69
987	D258	6	D	PEC	TRUE	FALSE	NO	26	104	8	2	5	9	OK	330	607	105	5955	73
1046	D259	6	D	PEC	TRUE	FALSE	NO	28	111	2	2	5	7	OK	350	493	111	4836	50
387	D260	6	D	PEC	TRUE	FALSE	NO	11	41	7	2	5	10	OK	400	809	127	7936	55
256	D261	6	D	PEC	TRUE	FALSE	NO	7	27	9	3	9	13	Reject	500	1023	159	10036	35
523	D262	6	D	PEC	TRUE	FALSE	NO	14	55	10	2	10	12	Reject	403	1032	128	10124	68

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. pilularis																			
671	D263	6	D	PEC	TRUE	FALSE	NO	18	71	6	3	12	34	Reject	438	1077	139	10565	56
279	D264	6	D	PEC	TRUE	FALSE	NO	8	30	3	1	6	6	OK	427	899	136	8819	50
937	D265	6	D	PEC	TRUE	FALSE	NO	25	99	6	0	0	0	OK	379	972	121	9535	77
1105	D266	6	D	PEC	TRUE	FALSE	NO	30	117	5	1	4	4	OK	320	510	102	5003	68
737	D267	6	D	PEC	TRUE	FALSE	NO	20	78	5	2	2	4	OK	394	836	125	8201	59
1093	D268	6	D	PEC	TRUE	FALSE	NO	29	116	1	1	5	5	OK	334	557	106	5464	65
345	D269	6	D	PEC	TRUE	FALSE	NO	10	37	3	0	0	0	OK	340	691	108	6779	76
120	D270	6	D	PEC	TRUE	FALSE	NO	4	13	6	1	5	5	OK	265	164	84	1609	38
91	D347	6	D	PEC	TRUE	FALSE	NO	3	10	5	0	0	0	OK	305	426	97	4179	65
E. dunnii																			
484	E051	24	E	ACQ	TRUE	FALSE	NO	13	51	10	2	15	25	Reject	510	1445	162	14175	47
941	E052	24	E	ACQ	TRUE	FALSE	NO	25	99	10	1	15	15	Reject	371	911	118	8937	77
757	E053	24	E	ACQ	TRUE	FALSE	NO	20	80	6	2	3	5	OK	382	672	122	6592	52
788	E054	24	E	ACQ	TRUE	FALSE	NO	21	83	9	2	20	25	Reject	458	1287	146	12625	58
626	E055	24	E	ACQ	TRUE	FALSE	NO	17	66	8	1	3	3	OK	392	717	125	7034	52
887	E056	24	E	ACQ	TRUE	FALSE	NO	24	94	3	1	22	22	Reject	442	1108	141	10869	56
400	E057	24	E	ACQ	TRUE	FALSE	NO	11	43	1	1	7	7	OK	420	783	134	7681	46
240	E058	24	E	ACQ	TRUE	FALSE	NO	7	26	3	1	20	20	Reject	500	1556	159	15264	54
686	E059	24	E	ACQ	TRUE	FALSE	NO	19	73	2	3	5	9	OK	415	1086	132	10654	66
525	E061	24	E	ACQ	TRUE	FALSE	NO	14	56	2	2	32	37	Reject	462	992	147	9732	44
1115	E062	24	E	ACQ	TRUE	FALSE	NO	30	118	6	1	15	15	Reject	392	639	125	6269	46
220	E063	24	E	ACQ	TRUE	FALSE	NO	6	24	2	1	16	16	Reject	456	1358	145	13322	62
655	E064	24	E	ACQ	TRUE	FALSE	NO	18	69	9	2	35	45	Reject	440	917	140	8996	47
809	E065	24	E	ACQ	TRUE	FALSE	NO	22	86	2	2	15	21	Reject	427	893	136	8760	50
597	E067	24	E	ACQ	TRUE	FALSE	NO	16	63	8	0	0	0	OK	272	207	87	2031	45
55	E069	24	E	ACQ	TRUE	FALSE	NO	2	6	7	1	8	8	Reject	372	430	118	4218	36

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. dunnii																			
858	E070	24	E	ACQ	TRUE	FALSE	NO	23	91	3	1	8	8	Reject	480	1870	153	18345	73
164	E074	24	E	ACQ	TRUE	FALSE	NO	5	18	3	0	0	0	OK	253	280	81	2747	75
134	E075	24	E	ACQ	TRUE	FALSE	NO	4	15	2	0	0	0	OK	275	348	88	3414	73
423	E076	24	E	ACQ	TRUE	FALSE	NO	12	45	5	0	0	0	OK	324	581	103	5700	74
1037	E077	24	E	ACQ	TRUE	FALSE	NO	28	110	1	1	11	11	Reject	330	455	105	4464	55
1019	E079	24	E	ACQ	TRUE	FALSE	NO	27	108	3	1	14	14	Reject	400	810	127	7946	55
371	E080	24	E	ACQ	TRUE	FALSE	NO	10	39	10	0	0	0	OK	240	186	76	1825	58
92	E081	24	E	ACQ	TRUE	FALSE	NO	3	10	6	1	6	6	OK	272	357	87	3502	77
1090	E082	24	E	ACQ	TRUE	FALSE	NO	29	115	8	1	4	4	OK	350	576	111	5651	58
988	E085	24	E	ACQ	TRUE	FALSE	NO	26	104	9	1	20	20	Reject	425	1395	135	13685	79
304	E087	24	E	ACQ	TRUE	FALSE	NO	8	32	9	1	12	12	Reject	366	983	117	9643	87
308	E090	24	E	ACQ	TRUE	FALSE	NO	9	33	4	1	15	15	Reject	375	857	119	8407	70
17	E094	24	E	ACQ	TRUE	FALSE	NO	1	2	8	1	9	9	Reject	310	446	99	4375	65
555	E099	24	E	ACQ	TRUE	FALSE	NO	15	59	3	1	7	7	OK	449	1232	143	12086	59
329	E283	7	E	PEC	TRUE	FALSE	NO	9	35	6	3	8	13	Reject	430	1085	137	10644	59
80	E284	7	E	PEC	TRUE	FALSE	NO	3	9	4	1	6	6	OK	395	648	126	6357	46
373	E288	7	E	PEC	TRUE	FALSE	NO	10	40	2	0	0	0	OK	335	567	107	5562	65
204	E289	7	E	PEC	TRUE	FALSE	NO	6	22	5	1	10	10	Reject	430	857	137	8407	47
447	E290	7	E	PEC	TRUE	FALSE	NO	12	48	1	3	5	11	OK	460	1254	146	12302	56
177	E291	7	E	PEC	TRUE	FALSE	NO	5	19	6	0	0	0	OK	290	598	92	5866	106
880	E292	7	E	PEC	TRUE	FALSE	NO	24	93	6	0	0	0	OK	382	551	122	5405	43
724	E293	7	E	PEC	TRUE	FALSE	NO	20	77	2	1	2	2	OK	389	716	124	7024	53
984	E297	7	E	PEC	TRUE	FALSE	NO	26	104	5	1	10	10	Reject	381	1129	121	11075	89
614	E299	7	E	PEC	TRUE	FALSE	NO	17	65	6	0	0	0	OK	370	607	118	5955	52
776	E300	7	E	PEC	TRUE	FALSE	NO	21	82	7	0	0	0	OK	335	451	107	4424	52
556	E301	7	E	PEC	TRUE	FALSE	NO	15	59	4	1	2	2	OK	388	930	124	9123	69

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. dunnii																			
282	E302	7	E	PEC	TRUE	FALSE	NO	8	30	6	2	3	6	OK	278	230	88	2256	46
576	E304	7	E	PEC	TRUE	FALSE	NO	16	61	6	0	0	0	OK	285	239	91	2345	45
132	E305	7	E	PEC	TRUE	FALSE	NO	4	14	9	1	7	7	OK	350	727	111	7132	74
239	E308	7	E	PEC	TRUE	FALSE	NO	7	26	2	0	0	0	OK	258	370	82	3630	93
485	E310	7	E	PEC	TRUE	FALSE	NO	13	52	1	1	10	10	Reject	426	1042	136	10222	58
931	E310	7	E	PEC	TRUE	FALSE	NO	25	98	9	1	5	5	OK	361	667	115	6543	61
1119	E311	7	E	PEC	TRUE	FALSE	NO	30	118	10	0	0	0	OK	375	787	119	7720	65
1075	E313	7	E	PEC	TRUE	FALSE	NO	29	114	2	1	5	5	OK	365	630	116	6180	56
1047	E315	7	E	PEC	TRUE	FALSE	NO	28	111	3	2	2	4	OK	327	309	104	3031	38
694	E317	7	E	PEC	TRUE	FALSE	NO	19	73	10	0	0	0	OK	264	326	84	3198	77
526	E321	7	E	PEC	TRUE	FALSE	NO	14	56	3	0	0	0	OK	424	990	135	9712	56
4	E322	7	E	PEC	TRUE	FALSE	NO	1	1	4	1	2	2	OK	380	765	121	7505	60
801	E323	7	E	PEC	TRUE	FALSE	NO	22	85	3	1	3	3	OK	368	1094	117	10732	95
395	E325	7	E	PEC	TRUE	FALSE	NO	11	42	6	1	2	2	OK	391	849	124	8329	62
844	E327	7	E	PEC	TRUE	FALSE	NO	23	89	8	1	5	5	OK	422	909	134	8917	52
1005	E330	7	E	PEC	TRUE	FALSE	NO	27	106	8	1	5	5	OK	424	606	135	5945	34
663	E332	7	E	PEC	TRUE	FALSE	NO	18	70	7	1	4	4	OK	365	1017	116	9977	91
66	E333	7	E	PEC	TRUE	FALSE	NO	2	7	8	0	0	0	OK	290	421	92	4130	75
E. cladocalyx																			
380	E419	32	F	ACQ	TRUE	TRUE	NO	10	40	9	0	0	0	OK	312	548	99	5376	78
86	F059	25	F	ACQ	TRUE	FALSE	NO	3	9	10	1	2	2	OK	255	413	81	4052	108
362	F060	25	F	ACQ	TRUE	FALSE	NO	10	39	1	0	0	0	OK	271	516	86	5062	112
154	F066	25	F	ACQ	TRUE	FALSE	NO	5	17	2	1	8	8	Reject	266	438	85	4297	101
840	F068	25	F	ACQ	TRUE	FALSE	NO	23	89	4	2	5	9	OK	287	740	91	7259	136
632	F072	25	F	ACQ	TRUE	FALSE	NO	17	67	5	0	0	0	OK	260	626	83	6141	154
56	F073	25	F	ACQ	TRUE	FALSE	NO	2	6	8	0	0	0	OK	274	560	87	5494	118

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
203	F076	25	F	ACQ	TRUE	FALSE	NO	6	22	4	1	3	3	OK	296	448	94	4395	75
249	F077	25	F	ACQ	TRUE	FALSE	NO	7	27	2	0	0	0	OK	235	290	75	2845	97
651	F079	25	F	ACQ	TRUE	FALSE	NO	18	69	5	0	0	0	OK	240	441	76	4326	138
710	F080	25	F	ACQ	TRUE	FALSE	NO	19	75	7	0	0	0	OK	251	449	80	4405	123
382	F085	25	F	ACQ	TRUE	FALSE	NO	11	41	2	0	0	0	OK	217	331	69	3247	141
1120	F086	25	F	ACQ	TRUE	FALSE	NO	30	119	1	0	0	0	OK	235	418	75	4101	140
479	F090	25	F	ACQ	TRUE	FALSE	NO	13	51	5	0	0	0	OK	270	771	86	7564	170
1041	F091	25	F	ACQ	TRUE	FALSE	NO	28	110	6	0	0	0	OK	265	654	84	6416	152
772	F093	25	F	ACQ	TRUE	FALSE	NO	21	82	3	3	4	8	OK	244	307	78	3012	92
143	F100	25	F	ACQ	TRUE	FALSE	NO	4	16	1	1	2	2	OK	290	785	92	7701	140
966	F101	25	F	ACQ	TRUE	FALSE	NO	26	102	7	4	3	10	OK	262	542	83	5317	131
564	F102	25	F	ACQ	TRUE	FALSE	NO	15	60	3	1	3	3	OK	250	467	80	4581	130
572	F103	25	F	ACQ	TRUE	FALSE	NO	16	61	2	1	5	5	OK	256	321	81	3149	83
726	F104	25	F	ACQ	TRUE	FALSE	NO	20	77	4	2	3	5	OK	250	289	80	2835	80
18	F105	25	F	ACQ	TRUE	FALSE	NO	1	2	9	1	5	5	OK	265	485	84	4758	113
1064	F108	25	F	ACQ	TRUE	FALSE	NO	29	113	1	0	0	0	OK	231	320	74	3139	113
310	F109	25	F	ACQ	TRUE	FALSE	NO	9	33	6	1	2	2	OK	270	464	86	4552	102
949	F110	25	F	ACQ	TRUE	FALSE	NO	25	100	8	1	2	2	OK	250	444	80	4356	123
833	F111	25	F	ACQ	TRUE	FALSE	NO	22	88	6	2	4	7	OK	285	612	91	6004	115
1006	F113	25	F	ACQ	TRUE	FALSE	NO	27	106	9	1	3	3	OK	290	466	92	4571	83
901	F114	25	F	ACQ	TRUE	FALSE	NO	24	95	8	0	0	0	OK	215	264	68	2590	115
288	F117	25	F	ACQ	TRUE	FALSE	NO	8	31	3	0	0	0	OK	221	348	70	3414	140
44	F240	32	F	ACQ	TRUE	TRUE	NO	2	5	6	1	5	5	OK	405	1181	129	11586	77
977	F241	8	F	PEC	TRUE	FALSE	NO	26	103	8	0	0	0	OK	302	834	96	8182	131
1069	F242	8	F	PEC	TRUE	FALSE	NO	29	113	6	1	3	3	OK	306	799	97	7838	121
742	F243	8	F	PEC	TRUE	FALSE	NO	20	79	1	2	2	4	OK	290	547	92	5366	97

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
778	F251	8	F	PEC	TRUE	FALSE	NO	21	82	9	1	6	6	OK	272	749	87	7348	161
393	F252	8	F	PEC	TRUE	FALSE	NO	11	42	4	1	4	4	OK	303	826	96	8103	129
893	F256	8	F	PEC	TRUE	FALSE	NO	24	94	9	0	0	0	OK	268	493	85	4836	111
640	F257	8	F	PEC	TRUE	FALSE	NO	17	68	3	0	0	0	OK	310	1003	99	9839	146
538	F258	8	F	PEC	TRUE	FALSE	NO	15	57	6	0	0	0	OK	285	710	91	6965	133
180	F259	8	F	PEC	TRUE	FALSE	NO	5	19	9	0	0	0	OK	300	727	95	7132	117
717	F265	8	F	PEC	TRUE	FALSE	NO	19	76	4	0	0	0	OK	301	737	96	7230	117
1117	F266	8	F	PEC	TRUE	FALSE	NO	30	118	8	0	0	0	OK	285	427	91	4189	80
867	F272	8	F	PEC	TRUE	FALSE	NO	23	92	2	0	0	0	OK	276	604	88	5925	125
365	F273	8	F	PEC	TRUE	FALSE	NO	10	39	4	0	0	0	OK	280	619	89	6072	122
950	F274	8	F	PEC	TRUE	FALSE	NO	25	100	9	0	0	0	OK	304	973	97	9545	150
498	F278	8	F	PEC	TRUE	FALSE	NO	14	53	4	1	3	3	OK	305	426	97	4179	65
453	F279	8	F	PEC	TRUE	FALSE	NO	12	48	7	0	0	0	OK	353	1156	112	11340	114
250	F280	8	F	PEC	TRUE	FALSE	NO	7	27	3	0	0	0	OK	270	528	86	5180	116
1060	F284	8	F	PEC	TRUE	FALSE	NO	28	112	6	0	0	0	OK	277	650	88	6377	133
486	F285	8	F	PEC	TRUE	FALSE	NO	13	52	2	0	0	0	OK	310	964	99	9457	140
73	F286	8	F	PEC	TRUE	FALSE	NO	2	8	6	1	2	2	OK	292	650	93	6377	113
602	F287	8	F	PEC	TRUE	FALSE	NO	16	64	4	0	0	0	OK	318	847	101	8309	114
670	F289	8	F	PEC	TRUE	FALSE	NO	18	71	5	1	2	2	OK	356	1498	113	14695	144
997	F290	8	F	PEC	TRUE	FALSE	NO	27	105	9	0	0	0	OK	260	438	83	4297	108
309	F291	8	F	PEC	TRUE	FALSE	NO	9	33	5	1	2	2	OK	276	604	88	5925	125
221	F292	8	F	PEC	TRUE	FALSE	NO	6	24	3	0	0	0	OK	300	625	95	6131	100
810	F293	8	F	PEC	TRUE	FALSE	NO	22	86	3	0	0	0	OK	300	646	95	6337	104
138	F297	8	F	PEC	TRUE	FALSE	NO	4	15	6	0	0	0	OK	285	493	91	4836	92
26	F298	8	F	PEC	TRUE	FALSE	NO	1	3	7	0	0	0	OK	305	717	97	7034	110
104	F299	8	F	PEC	TRUE	FALSE	NO	3	11	9	1	2	2	OK	305	751	97	7367	115

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
270	F300	8	F	PEC	TRUE	FALSE	NO	8	29	4	0	0	0	OK	273	727	87	7132	155
798	F301	36	F	ACQ	FALSE	FALSE	NO	21	84	10	0	0	0	OK	285	291	91	2855	55
925	F302	36	F	ACQ	FALSE	FALSE	NO	25	98	3	1	4	4	OK	296	683	94	6700	114
541	F303	36	F	ACQ	FALSE	FALSE	NO	15	57	9	2	5	9	OK	332	723	106	7093	86
857	F304	36	F	ACQ	FALSE	FALSE	NO	23	91	2	2	9	13	Reject	310	486	99	4768	71
811	F305	36	F	ACQ	FALSE	FALSE	NO	22	86	4	2	4	6	OK	316	338	101	3316	46
472	F306	36	F	ACQ	FALSE	FALSE	NO	13	50	7	1	7	7	OK	288	525	92	5150	95
1098	F307	36	F	ACQ	FALSE	FALSE	NO	29	116	7	3	6	10	OK	307	395	98	3875	59
705	F308	36	F	ACQ	FALSE	FALSE	NO	19	75	2	1	5	5	OK	350	755	111	7407	76
301	F309	36	F	ACQ	FALSE	FALSE	NO	8	32	6	1	4	4	OK	310	807	99	7917	117
381	F310	36	F	ACQ	FALSE	FALSE	NO	11	41	1	1	6	6	OK	282	527	90	5170	102
574	F311	36	F	ACQ	FALSE	FALSE	NO	16	61	4	1	6	6	OK	250	328	80	3218	91
426	F312	36	F	ACQ	FALSE	FALSE	NO	12	45	8	0	0	0	OK	280	432	89	4238	85
912	F312	36	F	ACQ	FALSE	FALSE	NO	24	96	10	2	7	12	OK	270	446	86	4375	98
195	F313	36	F	ACQ	FALSE	FALSE	NO	6	21	5	0	0	0	OK	275	638	88	6259	133
617	F315	36	F	ACQ	FALSE	FALSE	NO	17	65	9	1	3	3	OK	296	599	94	5876	100
1036	F316	36	F	ACQ	FALSE	FALSE	NO	28	109	10	3	4	8	OK	334	891	106	8741	104
328	F317	36	F	ACQ	FALSE	FALSE	NO	9	35	5	2	3	6	OK	287	385	91	3777	71
20	F319	36	F	ACQ	FALSE	FALSE	NO	1	3	1	1	5	5	OK	320	611	102	5994	81
368	F320	36	F	ACQ	FALSE	FALSE	NO	10	39	7	4	5	13	OK	331	633	105	6210	76
172	F321	36	F	ACQ	FALSE	FALSE	NO	5	19	1	1	5	5	OK	365	945	116	9270	84
503	F322	36	F	ACQ	FALSE	FALSE	NO	14	53	9	0	0	0	OK	263	500	84	4905	119
125	F323	36	F	ACQ	FALSE	FALSE	NO	4	14	2	2	10	20	Reject	276	487	88	4777	100
660	F324	36	F	ACQ	FALSE	FALSE	NO	18	70	4	1	2	2	OK	255	588	81	5768	154
93	F325	36	F	ACQ	FALSE	FALSE	NO	3	10	7	1	5	5	OK	365	988	116	9692	88
40	F326	36	F	ACQ	FALSE	FALSE	NO	2	5	2	2	3	5	OK	277	544	88	5337	111

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
242	F327	36	F	ACQ	FALSE	FALSE	NO	7	26	5	0	0	0	OK	284	574	90	5631	109
747	F328	36	F	ACQ	FALSE	FALSE	NO	20	79	6	1	3	3	OK	326	643	104	6308	81
951	F329	36	F	ACQ	FALSE	FALSE	NO	26	101	1	1	2	2	OK	299	463	95	4542	75
1021	F330	36	F	ACQ	FALSE	FALSE	NO	27	108	5	0	0	0	OK	295	707	94	6936	119
1121	No tag	36	F	ACQ	FALSE	FALSE	NO	30	119	2	0	0	0	OK	273	352	87	3453	75
706	F352	16	F	CREO	FALSE	FALSE	NO	19	75	3	0	0	0	OK	250	488	80	4787	135
296	F354	16	F	CREO	FALSE	FALSE	NO	8	32	1	0	0	0	OK	270	483	86	4738	106
635	F356	16	F	CREO	FALSE	FALSE	NO	17	67	8	0	0	0	OK	275	241	88	2364	50
158	F359	16	F	CREO	FALSE	FALSE	NO	5	17	6	0	0	0	OK	280	664	89	6514	131
102	F362	16	F	CREO	FALSE	FALSE	NO	3	11	7	0	0	0	OK	283	682	90	6690	131
11	F363	16	F	CREO	FALSE	FALSE	NO	1	2	2	2	3	6	OK	350	1259	111	12351	127
261	F367	16	F	CREO	FALSE	FALSE	NO	7	28	5	0	0	0	OK	327	814	104	7985	101
342	F369	16	F	CREO	FALSE	FALSE	NO	9	36	10	0	0	0	OK	395	1712	126	16795	120
74	F371	16	F	CREO	FALSE	FALSE	NO	2	8	7	2	4	6	OK	290	660	92	6475	117
350	F374	16	F	CREO	FALSE	FALSE	NO	10	37	8	0	0	0	OK	310	650	99	6377	95
208	F375	16	F	CREO	FALSE	FALSE	NO	6	22	9	0	0	0	OK	284	476	90	4670	90
765	F378	16	F	CREO	FALSE	FALSE	NO	21	81	5	0	0	0	OK	310	869	99	8525	127
819	F379	16	F	CREO	FALSE	FALSE	NO	22	87	2	0	0	0	OK	325	1048	103	10281	132
934	F380	16	F	CREO	FALSE	FALSE	NO	25	99	3	0	0	0	OK	258	312	82	3061	79
906	F547	16	F	CREO	FALSE	FALSE	NO	24	96	4	1	2	2	OK	313	735	100	7210	104
449	F382	16	F	CREO	FALSE	FALSE	NO	12	48	3	0	0	0	OK	332	947	106	9290	112
1052	F385	16	F	CREO	FALSE	FALSE	NO	28	111	8	0	0	0	OK	292	549	93	5386	96
676	F386	16	F	CREO	FALSE	FALSE	NO	18	72	2	0	0	0	OK	290	821	92	8054	146
1025	F387	16	F	CREO	FALSE	FALSE	NO	27	108	9	0	0	0	OK	271	588	86	5768	128
477	F388	16	F	CREO	FALSE	FALSE	NO	13	51	3	0	0	0	OK	325	1166	103	11438	147

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
533	F389	16	F	CREO	FALSE	FALSE	NO	15	57	1	2	3	5	OK	343	811	109	7956	87
397	F390	16	F	CREO	FALSE	FALSE	NO	11	42	8	0	0	0	OK	292	707	93	6936	123
739	F391	16	F	CREO	FALSE	FALSE	NO	20	78	7	0	0	0	OK	283	464	90	4552	89
601	F392	16	F	CREO	FALSE	FALSE	NO	16	64	3	0	0	0	OK	270	569	86	5582	125
513	F393	16	F	CREO	FALSE	FALSE	NO	14	54	9	0	0	0	OK	287	508	91	4983	93
1113	F395	16	F	CREO	FALSE	FALSE	NO	30	118	3	0	0	0	OK	300	696	95	6828	112
129	F397	16	F	CREO	FALSE	FALSE	NO	4	14	6	0	0	0	OK	285	463	91	4542	87
1084	F398	16	F	CREO	FALSE	FALSE	NO	29	115	2	1	2	2	OK	261	486	83	4768	119
982	F400	16	F	CREO	FALSE	FALSE	NO	26	104	3	0	0	0	OK	291	652	93	6396	115
842	No tag	16	F	CREO	FALSE	FALSE	NO	23	89	6	0	0	0	OK	271	593	86	5817	129
899	F404	32	F	ACQ	TRUE	TRUE	NO	24	95	6	1	5	5	OK	294	683	94	6700	117
448	F408	32	F	ACQ	TRUE	TRUE	NO	12	48	2	0	0	0	OK	369	1084	117	10634	94
799	F409	32	F	ACQ	TRUE	TRUE	NO	22	85	1	2	2	4	OK	344	1021	109	10016	109
386	F410	32	F	ACQ	TRUE	TRUE	NO	11	41	6	2	6	10	OK	325	623	103	6112	79
642	F413	32	F	ACQ	TRUE	TRUE	NO	17	68	5	0	0	0	OK	285	864	91	8476	162
502	F415	25	F	ACQ	TRUE	FALSE	NO	14	53	8	0	0	0	OK	278	584	88	5729	118
458	F417	32	F	ACQ	TRUE	TRUE	NO	13	49	2	0	0	0	OK	335	518	107	5082	60
275	F420	32	F	ACQ	TRUE	TRUE	NO	8	29	9	1	2	2	OK	320	569	102	5582	75
652	F421	32	F	ACQ	TRUE	TRUE	NO	18	69	6	0	0	0	OK	275	728	88	7142	152
260	F425	32	F	ACQ	TRUE	TRUE	NO	7	28	4	1	4	4	OK	275	581	88	5700	121
561	F428	32	F	ACQ	TRUE	TRUE	NO	15	59	9	1	5	5	OK	290	495	92	4856	88
864	F430	32	F	ACQ	TRUE	TRUE	NO	23	91	9	0	0	0	OK	394	1742	125	17089	124
1009	F431	32	F	ACQ	TRUE	TRUE	NO	27	107	3	1	4	4	OK	313	626	100	6141	89
16	F432	32	F	ACQ	TRUE	TRUE	NO	1	2	7	0	0	0	OK	325	598	103	5866	76
980	F433	32	F	ACQ	TRUE	TRUE	NO	26	104	1	1	6	6	OK	283	638	90	6259	122
774	F435	32	F	ACQ	TRUE	TRUE	NO	21	82	5	2	3	5	OK	316	749	101	7348	103

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
505	F436	32	F	ACQ	TRUE	TRUE	NO	14	54	1	0	0	0	OK	316	820	101	8044	113
212	F437	32	F	ACQ	TRUE	TRUE	NO	6	23	3	1	10	10	Reject	300	755	95	7407	121
716	F438	32	F	ACQ	TRUE	TRUE	NO	19	76	3	1	11	11	Reject	359	770	114	7554	72
99	F439	32	F	ACQ	TRUE	TRUE	NO	3	11	4	1	2	2	OK	310	763	99	7485	111
121	F441	32	F	ACQ	TRUE	TRUE	NO	4	13	7	0	0	0	OK	330	803	105	7877	97
450	F442	25	F	ACQ	TRUE	FALSE	NO	12	48	4	0	0	0	OK	290	605	92	5935	108
917	F443	32	F	ACQ	TRUE	TRUE	NO	25	97	5	0	0	0	OK	298	671	95	6583	110
589	F446	32	F	ACQ	TRUE	TRUE	NO	16	62	10	0	0	0	OK	312	1025	99	10055	146
175	F448	32	F	ACQ	TRUE	TRUE	NO	5	19	4	0	0	0	OK	326	1008	104	9888	126
341	F449	32	F	ACQ	TRUE	TRUE	NO	9	36	9	0	0	0	OK	365	1606	116	15755	143
744	F450	32	F	ACQ	TRUE	TRUE	NO	20	79	3	0	0	0	OK	300	880	95	8633	141
722	F453	12	F	PEC	TRUE	TRUE	NO	19	76	9	0	0	0	OK	289	550	92	5396	99
618	F462	12	F	PEC	TRUE	TRUE	NO	17	65	10	0	0	0	OK	310	654	99	6416	95
573	F463	12	F	PEC	TRUE	TRUE	NO	16	61	3	0	0	0	OK	310	632	99	6200	92
14	F464	12	F	PEC	TRUE	TRUE	NO	1	2	5	0	0	0	OK	250	374	80	3669	104
214	F468	12	F	PEC	TRUE	TRUE	NO	6	23	5	0	0	0	OK	265	517	84	5072	121
359	F469	12	F	PEC	TRUE	TRUE	NO	10	38	7	1	3	3	OK	305	514	97	5042	79
682	F470	12	F	PEC	TRUE	TRUE	NO	18	72	8	0	0	0	OK	335	1167	107	11448	135
961	F471	12	F	PEC	TRUE	TRUE	NO	26	102	2	0	0	0	OK	293	773	93	7583	133
291	F472	12	F	PEC	TRUE	TRUE	NO	8	31	6	0	0	0	OK	285	688	91	6749	129
87	F475	12	F	PEC	TRUE	TRUE	NO	3	10	1	0	0	0	OK	265	505	84	4954	118
552	F476	12	F	PEC	TRUE	TRUE	NO	15	58	10	1	3	3	OK	272	391	87	3836	84
940	F477	12	F	PEC	TRUE	TRUE	NO	25	99	9	0	0	0	OK	321	594	102	5827	78
1130	F478	12	F	PEC	TRUE	TRUE	NO	30	120	2	2	6	8	OK	370	890	118	8731	76
243	F481	12	F	PEC	TRUE	TRUE	NO	7	26	6	0	0	0	OK	260	594	83	5827	147
50	F482	12	F	PEC	TRUE	TRUE	NO	2	6	2	0	0	0	OK	360	576	115	5651	54

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
E. cladocalyx																			
777	F483	12	F	PEC	TRUE	TRUE	NO	21	82	8	0	0	0	OK	295	689	94	6759	116
881	F485	12	F	PEC	TRUE	TRUE	NO	24	93	7	0	0	0	OK	275	586	88	5749	122
1070	F486	12	F	PEC	TRUE	TRUE	NO	29	113	7	0	0	0	OK	309	807	98	7917	119
736	F487	12	F	PEC	TRUE	TRUE	NO	20	78	4	0	0	0	OK	296	691	94	6779	116
417	F488	12	F	PEC	TRUE	TRUE	NO	11	44	9	0	0	0	OK	301	494	96	4846	79
173	F489	12	F	PEC	TRUE	TRUE	NO	5	19	2	1	3	3	OK	335	825	107	8093	95
126	F490	12	F	PEC	TRUE	TRUE	NO	4	14	3	0	0	0	OK	270	535	86	5248	118
816	F492	12	F	PEC	TRUE	TRUE	NO	22	86	9	0	0	0	OK	314	697	100	6838	98
1032	F493	12	F	PEC	TRUE	TRUE	NO	28	109	6	0	0	0	OK	335	847	107	8309	98
317	F494	12	F	PEC	TRUE	TRUE	NO	9	34	4	1	2	2	OK	275	766	88	7514	160
994	F495	12	F	PEC	TRUE	TRUE	NO	27	105	6	0	0	0	OK	295	657	94	6445	111
481	F496	12	F	PEC	TRUE	TRUE	NO	13	51	7	0	0	0	OK	325	1266	103	12419	160
435	F497	12	F	PEC	TRUE	TRUE	NO	12	46	8	0	0	0	OK	274	448	87	4395	94
872	F498	12	F	PEC	TRUE	TRUE	NO	23	92	7	0	0	0	OK	310	771	99	7564	112
512	F499	12	F	PEC	TRUE	TRUE	NO	14	54	8	1	3	3	OK	357	737	114	7230	70
A. mearnsii																			
701	G062	26	G	ACQ	TRUE	FALSE	NO	19	74	7	1	20	20	Reject	324	979	103	9604	125
956	G071	26	G	ACQ	TRUE	FALSE	NO	26	101	6	2	6	11	OK	392	1152	125	11301	83
1108	G073	26	G	ACQ	TRUE	FALSE	NO	30	117	8	2	5	9	OK	271	475	86	4660	104
751	G076	26	G	ACQ	TRUE	FALSE	NO	20	79	10	1	8	8	Reject	298	380	95	3728	62
58	G077	26	G	ACQ	TRUE	FALSE	NO	2	6	10	1	10	10	Reject	393	1015	125	9957	73
332	G079	26	G	ACQ	TRUE	FALSE	NO	9	35	9	3	12	18	Reject	295	422	94	4140	71
560	G080	26	G	ACQ	TRUE	FALSE	NO	15	59	8	0	0	0	OK	288	540	92	5297	98
181	G082	26	G	ACQ	TRUE	FALSE	NO	5	20	1	1	10	10	Reject	410	1055	131	10350	66
870	G083	26	G	ACQ	TRUE	FALSE	NO	23	92	5	1	20	20	Reject	455	1496	145	14676	69
82	G086	26	G	ACQ	TRUE	FALSE	NO	3	9	6	1	7	7	OK	255	478	81	4689	125

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
820	G087	26	G	ACQ	TRUE	FALSE	NO	22	87	3	2	10	17	Reject	440	1882	140	18462	96
587	G094	26	G	ACQ	TRUE	FALSE	NO	16	62	8	1	11	11	Reject	350	859	111	8427	87
680	G095	26	G	ACQ	TRUE	FALSE	NO	18	72	6	1	13	13	Reject	250	408	80	4002	113
515	G098	26	G	ACQ	TRUE	FALSE	NO	14	55	2	2	15	23	Reject	315	586	100	5749	81
283	G100	26	G	ACQ	TRUE	FALSE	NO	8	30	7	1	15	15	Reject	350	922	111	9045	93
943	G101	26	G	ACQ	TRUE	FALSE	NO	25	100	2	1	9	9	Reject	288	432	92	4238	78
457	G103	26	G	ACQ	TRUE	FALSE	NO	13	49	1	2	10	12	Reject	376	1247	120	12233	102
1080	G104	26	G	ACQ	TRUE	FALSE	NO	29	114	7	1	8	8	Reject	270	278	86	2727	61
408	G105	26	G	ACQ	TRUE	FALSE	NO	11	43	9	0	0	0	OK	319	688	102	6749	92
451	G106	26	G	ACQ	TRUE	FALSE	NO	12	48	5	3	25	32	Reject	410	1251	131	12272	79
349	G107	26	G	ACQ	TRUE	FALSE	NO	10	37	7	1	12	12	Reject	394	1568	125	15382	111
1033	G108	26	G	ACQ	TRUE	FALSE	NO	28	109	7	1	10	10	Reject	270	354	86	3473	78
888	G109	26	G	ACQ	TRUE	FALSE	NO	24	94	4	1	10	10	Reject	382	1059	122	10389	82
1024	G111	26	G	ACQ	TRUE	FALSE	NO	27	108	8	2	5	9	OK	324	761	103	7465	97
251	G112	26	G	ACQ	TRUE	FALSE	NO	7	27	4	2	16	18	Reject	404	1317	129	12920	87
624	G113	26	G	ACQ	TRUE	FALSE	NO	17	66	6	2	5	8	OK	322	567	102	5562	74
761	G114	26	G	ACQ	TRUE	FALSE	NO	21	81	1	3	11	19	Reject	382	720	122	7063	56
130	G120	26	G	ACQ	TRUE	FALSE	NO	4	14	7	1	12	12	Reject	300	507	95	4974	81
837	G121	33	G	ACQ	TRUE	TRUE	NO	23	89	1	1	5	5	OK	365	801	116	7858	71
991	G122	33	G	ACQ	TRUE	TRUE	NO	27	105	3	2	8	11	Reject	369	909	117	8917	78
263	G123	33	G	ACQ	TRUE	TRUE	NO	7	28	7	1	5	5	OK	325	780	103	7652	99
1085	G124	33	G	ACQ	TRUE	TRUE	NO	29	115	3	4	5	12	OK	258	387	82	3796	98
436	G125	33	G	ACQ	TRUE	TRUE	NO	12	46	9	2	6	11	OK	388	971	124	9526	72
781	G126	33	G	ACQ	TRUE	TRUE	NO	21	83	2	1	10	10	Reject	384	1197	122	11743	92
1132	G127	33	G	ACQ	TRUE	TRUE	NO	30	120	4	3	5	17	Reject	314	484	100	4748	68
372	G128	33	G	ACQ	TRUE	TRUE	NO	10	40	1	0	0	0	OK	252	458	80	4493	124

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
176	G129	33	G	ACQ	TRUE	TRUE	NO	5	19	5	2	5	10	OK	285	514	91	5042	96
324	G131	33	G	ACQ	TRUE	TRUE	NO	9	35	1	1	10	10	Reject	343	765	109	7505	82
1044	G132	33	G	ACQ	TRUE	TRUE	NO	28	110	9	1	8	8	Reject	305	587	97	5758	90
665	G133	33	G	ACQ	TRUE	TRUE	NO	18	70	9	1	4	4	OK	294	609	94	5974	104
970	G134	33	G	ACQ	TRUE	TRUE	NO	26	103	1	1	7	7	OK	297	458	95	4493	76
529	G135	33	G	ACQ	TRUE	TRUE	NO	14	56	6	2	12	15	Reject	345	541	110	5307	57
401	G136	33	G	ACQ	TRUE	TRUE	NO	11	43	2	2	3	6	OK	320	713	102	6995	94
37	G138	33	G	ACQ	TRUE	TRUE	NO	1	4	8	1	7	7	OK	276	657	88	6445	136
292	G139	33	G	ACQ	TRUE	TRUE	NO	8	31	7	1	7	7	OK	287	400	91	3924	73
942	G140	33	G	ACQ	TRUE	TRUE	NO	25	100	1	2	8	10	Reject	300	678	95	6651	109
808	G141	33	G	ACQ	TRUE	TRUE	NO	22	86	1	1	8	8	Reject	377	934	120	9163	76
702	G142	33	G	ACQ	TRUE	TRUE	NO	19	74	8	1	8	8	Reject	334	891	106	8741	104
735	G143	33	G	ACQ	TRUE	TRUE	NO	20	78	3	1	10	10	Reject	387	954	123	9359	71
542	G144	33	G	ACQ	TRUE	TRUE	NO	15	57	10	1	10	10	Reject	318	537	101	5268	72
909	G145	33	G	ACQ	TRUE	TRUE	NO	24	96	7	1	15	15	Reject	320	603	102	5915	80
625	G146	33	G	ACQ	TRUE	TRUE	NO	17	66	7	1	4	4	OK	275	545	88	5346	114
467	G149	33	G	ACQ	TRUE	TRUE	NO	13	50	2	1	11	11	Reject	395	1252	126	12282	88
198	G150	33	G	ACQ	TRUE	TRUE	NO	6	21	8	1	10	10	Reject	287	434	91	4258	80
68	G151	33	G	ACQ	TRUE	TRUE	NO	2	8	1	1	6	6	OK	320	682	102	6690	90
586	G154	33	G	ACQ	TRUE	TRUE	NO	16	62	7	1	10	10	Reject	306	538	97	5278	81
79	G158	33	G	ACQ	TRUE	TRUE	NO	3	9	3	0	0	0	OK	255	344	81	3375	90
144	G160	33	G	ACQ	TRUE	TRUE	NO	4	16	2	1	15	15	Reject	340	453	108	4444	50
274	G171	37	G	ACQ	FALSE	FALSE	NO	8	29	8	1	9	9	Reject	340	865	108	8486	95
1091	G172	37	G	ACQ	FALSE	FALSE	NO	29	115	9	1	15	15	Reject	246	298	78	2923	87
1049	G173	37	G	ACQ	FALSE	FALSE	NO	28	111	5	1	14	14	Reject	255	349	81	3424	91
347	G174	37	G	ACQ	FALSE	FALSE	NO	10	37	5	1	16	16	Reject	340	753	108	7387	83

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
952	G175	37	G	ACQ	FALSE	FALSE	NO	26	101	2	1	20	20	Reject	323	402	103	3944	52
1018	G176	37	G	ACQ	FALSE	FALSE	NO	27	108	2	1	25	25	Reject	295	488	94	4787	82
853	G177	37	G	ACQ	FALSE	FALSE	NO	23	90	7	1	10	10	Reject	251	356	80	3492	98
139	G178	37	G	ACQ	FALSE	FALSE	NO	4	15	7	1	12	12	Reject	305	741	97	7269	113
163	G179	37	G	ACQ	FALSE	FALSE	NO	5	18	2	1	15	15	Reject	292	705	93	6916	123
19	G180	37	G	ACQ	FALSE	FALSE	NO	1	2	10	1	15	15	Reject	250	368	80	3610	102
244	G181	37	G	ACQ	FALSE	FALSE	NO	7	26	7	1	15	15	Reject	290	610	92	5984	108
793	G181	37	G	ACQ	FALSE	FALSE	NO	21	84	5	1	18	18	Reject	265	366	84	3590	85
947	G182	37	G	ACQ	FALSE	FALSE	NO	25	100	6	1	13	13	Reject	240	371	76	3640	116
575	G183	37	G	ACQ	FALSE	FALSE	NO	16	61	5	1	20	20	Reject	295	396	94	3885	67
658	G184	37	G	ACQ	FALSE	FALSE	NO	18	70	2	1	11	11	Reject	268	261	85	2560	59
697	G185	37	G	ACQ	FALSE	FALSE	NO	19	74	3	1	13	13	Reject	257	443	82	4346	113
563	G187	37	G	ACQ	FALSE	FALSE	NO	15	60	2	1	17	17	Reject	275	263	88	2580	55
530	G188	37	G	ACQ	FALSE	FALSE	NO	14	56	7	1	12	12	Reject	277	408	88	4002	83
45	G189	37	G	ACQ	FALSE	FALSE	NO	2	5	7	1	6	6	OK	230	272	73	2668	97
731	G190	37	G	ACQ	FALSE	FALSE	NO	20	77	9	1	16	16	Reject	292	461	93	4522	80
383	G191	37	G	ACQ	FALSE	FALSE	NO	11	41	3	2	10	17	Reject	255	312	81	3061	82
225	G192	37	G	ACQ	FALSE	FALSE	NO	6	24	7	1	10	10	Reject	263	284	84	2786	68
827	G193	37	G	ACQ	FALSE	FALSE	NO	22	87	10	1	18	18	Reject	255	299	81	2933	78
97	G194	37	G	ACQ	FALSE	FALSE	NO	3	11	2	1	17	17	Reject	295	487	94	4777	82
875	G195	37	G	ACQ	FALSE	FALSE	NO	24	93	1	1	50	50	Reject	265	394	84	3865	92
1129	G196	37	G	ACQ	FALSE	FALSE	NO	30	120	1	1	10	10	Reject	252	217	80	2129	59
634	G197	37	G	ACQ	FALSE	FALSE	NO	17	67	7	1	13	13	Reject	287	320	91	3139	59
433	G198	37	G	ACQ	FALSE	FALSE	NO	12	46	6	1	10	10	Reject	275	513	88	5033	107
314	G199	37	G	ACQ	FALSE	FALSE	NO	9	34	1	1	7	7	OK	255	415	81	4071	109

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
									A. mearnsii										
488	G200	37	G	ACQ	FALSE	FALSE	NO	13	52	4	1	10	10	Reject	260	343	83	3365	85
229	G229	13	G	PEC	TRUE	TRUE	NO	7	25	1	1	3	3	OK	285	561	91	5503	105
470	G283	9	G	PEC	TRUE	FALSE	NO	13	50	5	0	0	0	OK	233	351	74	3443	120
955	G288	9	G	PEC	TRUE	FALSE	NO	26	101	5	1	6	6	OK	344	886	109	8692	94
210	G299	26	G	ACQ	TRUE	FALSE	NO	6	23	1	2	5	9	OK	261	446	83	4375	109
1092	G302	9	G	PEC	TRUE	FALSE	NO	29	115	10	0	0	0	OK	262	456	83	4473	110
851	G310	9	G	PEC	TRUE	FALSE	NO	23	90	5	1	10	10	Reject	424	1914	135	18776	109
704	G311	9	G	PEC	TRUE	FALSE	NO	19	75	1	1	6	6	OK	320	693	102	6798	92
932	G312	9	G	PEC	TRUE	FALSE	NO	25	99	1	1	7	7	OK	422	1219	134	11958	70
879	G314	9	G	PEC	TRUE	FALSE	NO	24	93	5	2	6	11	OK	328	620	104	6082	76
750	G315	9	G	PEC	TRUE	FALSE	NO	20	79	9	1	14	14	Reject	300	692	95	6789	111
1012	G316	9	G	PEC	TRUE	FALSE	NO	27	107	6	0	0	0	OK	365	919	116	9015	82
411	G317	9	G	PEC	TRUE	FALSE	NO	11	44	3	1	11	11	Reject	420	1819	134	17844	106
637	G318	9	G	PEC	TRUE	FALSE	NO	17	67	10	1	5	5	OK	362	1099	115	10781	100
554	G319	9	G	PEC	TRUE	FALSE	NO	15	59	2	2	4	7	OK	305	710	97	6965	109
675	G320	9	G	PEC	TRUE	FALSE	NO	18	72	1	2	4	6	OK	338	794	108	7789	89
604	G321	9	G	PEC	TRUE	FALSE	NO	16	64	6	1	5	5	OK	408	1023	130	10036	65
150	G322	9	G	PEC	TRUE	FALSE	NO	4	16	8	1	3	3	OK	320	722	102	7083	96
524	G323	9	G	PEC	TRUE	FALSE	NO	14	56	1	2	6	11	OK	439	1964	140	19267	101
325	G324	9	G	PEC	TRUE	FALSE	NO	9	35	2	2	4	7	OK	410	1215	131	11919	76
166	G325	9	G	PEC	TRUE	FALSE	NO	5	18	5	1	5	5	OK	265	467	84	4581	109
252	G326	9	G	PEC	TRUE	FALSE	NO	7	27	5	1	9	9	Reject	438	1303	139	12782	67
1057	G328	9	G	PEC	TRUE	FALSE	NO	28	112	3	1	4	4	OK	282	710	90	6965	137
441	G329	9	G	PEC	TRUE	FALSE	NO	12	47	5	2	3	5	OK	255	423	81	4150	111
88	G331	9	G	PEC	TRUE	FALSE	NO	3	10	2	1	7	7	OK	313	771	100	7564	109
773	G332	9	G	PEC	TRUE	FALSE	NO	21	82	4	2	10	15	Reject	268	456	85	4473	103

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
216	G334	9	G	PEC	TRUE	FALSE	NO	6	23	7	2	15	18	Reject	350	875	111	8584	89
9	G335	9	G	PEC	TRUE	FALSE	NO	1	1	9	1	5	5	OK	350	1004	111	9849	102
1124	G336	9	G	PEC	TRUE	FALSE	NO	30	119	5	2	10	18	Reject	336	540	107	5297	62
829	G338	9	G	PEC	TRUE	FALSE	NO	22	88	2	1	3	3	OK	283	702	90	6887	134
374	G339	9	G	PEC	TRUE	FALSE	NO	10	40	3	0	0	0	OK	340	1187	108	11644	131
70	G340	9	G	PEC	TRUE	FALSE	NO	2	8	3	1	5	5	OK	270	528	86	5180	116
267	No tag	9	G	PEC	TRUE	FALSE	NO	8	29	1	2	5	7	OK	270	540	86	5297	119
1004	G341	13	G	PEC	TRUE	TRUE	NO	27	106	7	0	0	0	OK	280	514	89	5042	102
719	G344	13	G	PEC	TRUE	TRUE	NO	19	76	6	0	0	0	OK	255	256	81	2511	67
771	G345	13	G	PEC	TRUE	TRUE	NO	21	82	2	0	0	0	OK	327	722	104	7083	90
986	G347	13	G	PEC	TRUE	TRUE	NO	26	104	7	0	0	0	OK	273	504	87	4944	107
462	G350	13	G	PEC	TRUE	TRUE	NO	13	49	6	0	0	0	OK	354	904	113	8868	88
124	G351	13	G	PEC	TRUE	TRUE	NO	4	14	1	1	5	5	OK	310	831	99	8152	121
514	G352	13	G	PEC	TRUE	TRUE	NO	14	55	1	0	0	0	OK	315	922	100	9045	128
812	G353	13	G	PEC	TRUE	TRUE	NO	22	86	5	1	2	2	OK	264	427	84	4189	101
109	G357	13	G	PEC	TRUE	TRUE	NO	3	12	4	1	5	5	OK	315	786	100	7711	109
743	G359	13	G	PEC	TRUE	TRUE	NO	20	79	2	1	5	5	OK	305	684	97	6710	105
196	G361	13	G	PEC	TRUE	TRUE	NO	6	21	6	0	0	0	OK	263	375	84	3679	89
34	G364	13	G	PEC	TRUE	TRUE	NO	1	4	5	0	0	0	OK	370	953	118	9349	82
598	G366	13	G	PEC	TRUE	TRUE	NO	16	63	9	0	0	0	OK	267	437	85	4287	100
944	G367	13	G	PEC	TRUE	TRUE	NO	25	100	3	0	0	0	OK	300	563	95	5523	90
666	G369	13	G	PEC	TRUE	TRUE	NO	18	71	1	1	4	4	OK	382	1425	122	13979	111
621	G386	13	G	PEC	TRUE	TRUE	NO	17	66	3	0	0	0	OK	274	448	87	4395	94
273	G370	13	G	PEC	TRUE	TRUE	NO	8	29	7	1	5	5	OK	269	414	86	4061	92
1058	G371	13	G	PEC	TRUE	TRUE	NO	28	112	4	2	3	5	OK	280	481	89	4719	95
1088	G373	13	G	PEC	TRUE	TRUE	NO	29	115	6	1	4	4	OK	306	483	97	4738	73

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
156	G374	13	G	PEC	TRUE	TRUE	NO	5	17	4	1	5	5	OK	265	417	84	4091	97
361	G375	13	G	PEC	TRUE	TRUE	NO	10	38	9	1	3	3	OK	342	841	109	8250	91
1128	G376	13	G	PEC	TRUE	TRUE	NO	30	119	9	0	0	0	OK	284	665	90	6524	126
320	G377	13	G	PEC	TRUE	TRUE	NO	9	34	7	2	3	5	OK	297	682	95	6690	113
421	G379	13	G	PEC	TRUE	TRUE	NO	12	45	3	0	0	0	OK	275	495	88	4856	103
413	G380	13	G	PEC	TRUE	TRUE	NO	11	44	5	0	0	0	OK	366	938	117	9202	83
67	G384	13	G	PEC	TRUE	TRUE	NO	2	7	9	0	0	0	OK	297	749	95	7348	124
562	G385	13	G	PEC	TRUE	TRUE	NO	15	60	1	1	4	4	OK	292	643	93	6308	112
882	G388	13	G	PEC	TRUE	TRUE	NO	24	93	8	0	0	0	OK	296	618	94	6063	103
839	G389	13	G	PEC	TRUE	TRUE	NO	23	89	3	0	0	0	OK	270	450	86	4415	99
83	G391	17	G	CREO	FALSE	FALSE	NO	3	9	7	1	11	11	Reject	303	438	96	4297	68
856	G392	17	G	CREO	FALSE	FALSE	NO	23	91	1	1	12	12	Reject	392	795	125	7799	57
551	G393	17	G	CREO	FALSE	FALSE	NO	15	58	9	2	12	16	Reject	272	484	87	4748	104
752	G394	17	G	CREO	FALSE	FALSE	NO	20	80	1	1	11	11	Reject	306	432	97	4238	65
1059	G395	17	G	CREO	FALSE	FALSE	NO	28	112	5	1	8	8	Reject	286	477	91	4679	88
1010	G396	17	G	CREO	FALSE	FALSE	NO	27	107	4	1	14	14	Reject	324	818	103	8025	104
429	G397	17	G	CREO	FALSE	FALSE	NO	12	46	2	1	10	10	Reject	260	481	83	4719	119
582	G398	17	G	CREO	FALSE	FALSE	NO	16	62	3	1	15	15	Reject	247	371	79	3640	107
509	G399	17	G	CREO	FALSE	FALSE	NO	14	54	5	1	10	10	Reject	251	485	80	4758	133
892	G400	17	G	CREO	FALSE	FALSE	NO	24	94	8	2	7	10	OK	420	1599	134	15686	94
803	G401	17	G	CREO	FALSE	FALSE	NO	22	85	5	1	14	14	Reject	375	1076	119	10556	89
338	G402	17	G	CREO	FALSE	FALSE	NO	9	36	6	1	10	10	Reject	304	531	97	5209	82
1126	G403	17	G	CREO	FALSE	FALSE	NO	30	119	7	1	9	9	Reject	290	566	92	5552	101
699	G404	17	G	CREO	FALSE	FALSE	NO	19	74	5	1	9	9	Reject	258	427	82	4189	108
246	G405	17	G	CREO	FALSE	FALSE	NO	7	26	9	1	10	10	Reject	320	866	102	8495	115
785	G406	17	G	CREO	FALSE	FALSE	NO	21	83	6	1	6	6	OK	363	677	116	6641	61

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. mearnsii																			
1077	G407	17	G	CREO	FALSE	FALSE	NO	29	114	4	1	16	16	Reject	374	960	119	9418	80
957	G408	17	G	CREO	FALSE	FALSE	NO	26	101	7	1	10	10	Reject	265	599	84	5876	140
75	G409	17	G	CREO	FALSE	FALSE	NO	2	8	8	1	4	4	OK	256	426	81	4179	110
633	G410	17	G	CREO	FALSE	FALSE	NO	17	67	6	2	5	8	OK	299	738	95	7240	120
201	G411	17	G	CREO	FALSE	FALSE	NO	6	22	2	1	9	9	Reject	358	787	114	7720	74
268	G412	17	G	CREO	FALSE	FALSE	NO	8	29	2	1	13	13	Reject	391	1097	124	10762	80
15	G413	17	G	CREO	FALSE	FALSE	NO	1	2	6	1	10	10	Reject	300	602	95	5906	97
930	G414	17	G	CREO	FALSE	FALSE	NO	25	98	8	1	14	14	Reject	248	407	79	3993	116
392	G415	17	G	CREO	FALSE	FALSE	NO	11	42	3	1	8	8	Reject	308	742	98	7279	110
140	G416	17	G	CREO	FALSE	FALSE	NO	4	15	8	1	12	12	Reject	355	1109	113	10879	108
471	G417	17	G	CREO	FALSE	FALSE	NO	13	50	6	1	12	12	Reject	275	426	88	4179	89
667	G418	17	G	CREO	FALSE	FALSE	NO	18	71	2	1	10	10	Reject	445	1537	142	15078	76
356	G419	17	G	CREO	FALSE	FALSE	NO	10	38	4	1	12	12	Reject	367	877	117	8603	77
153	G420	17	G	CREO	FALSE	FALSE	NO	5	17	1	2	6	9	OK	370	1494	118	14656	128
P. elliottii																			
247	H121	27	H	ACQ	TRUE	FALSE	NO	7	26	10	0	0	0	OK	330	493	105	4836	60
438	H122	27	H	ACQ	TRUE	FALSE	NO	12	47	2	0	0	0	OK	305	559	97	5484	85
141	H123	27	H	ACQ	TRUE	FALSE	NO	4	15	9	1	7	7	OK	320	605	102	5935	80
959	H124	27	H	ACQ	TRUE	FALSE	NO	26	101	9	0	0	0	OK	360	542	115	5317	50
53	H125	27	H	ACQ	TRUE	FALSE	NO	2	6	5	0	0	0	OK	330	620	105	6082	75
38	H126	27	H	ACQ	TRUE	FALSE	NO	1	4	9	0	0	0	OK	313	554	100	5435	78
339	H127	27	H	ACQ	TRUE	FALSE	NO	9	36	7	0	0	0	OK	325	568	103	5572	72
540	H128	27	H	ACQ	TRUE	FALSE	NO	15	57	8	0	0	0	OK	340	455	108	4464	50
84	H129	27	H	ACQ	TRUE	FALSE	NO	3	9	8	0	0	0	OK	325	482	103	4728	61
355	H130	27	H	ACQ	TRUE	FALSE	NO	10	38	3	0	0	0	OK	370	761	118	7465	65
775	H131	27	H	ACQ	TRUE	FALSE	NO	21	82	6	1	4	4	OK	319	474	102	4650	63

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
P. elliottii																			
402	H132	27	H	ACQ	TRUE	FALSE	NO	11	43	3	1	5	5	OK	325	555	103	5445	70
500	H133	27	H	ACQ	TRUE	FALSE	NO	14	53	6	0	0	0	OK	354	634	113	6220	62
725	H134	27	H	ACQ	TRUE	FALSE	NO	20	77	3	0	0	0	OK	382	547	122	5366	43
896	H135	27	H	ACQ	TRUE	FALSE	NO	24	95	3	0	0	0	OK	285	709	91	6955	133
616	H136	27	H	ACQ	TRUE	FALSE	NO	17	65	8	0	0	0	OK	332	407	106	3993	48
673	H137	27	H	ACQ	TRUE	FALSE	NO	18	71	8	0	0	0	OK	330	506	105	4964	61
995	H138	27	H	ACQ	TRUE	FALSE	NO	27	105	7	1	4	4	OK	333	450	106	4415	53
200	H139	27	H	ACQ	TRUE	FALSE	NO	6	22	1	1	3	3	OK	325	367	103	3600	46
1053	H140	27	H	ACQ	TRUE	FALSE	NO	28	111	9	0	0	0	OK	307	579	98	5680	87
1101	H141	27	H	ACQ	TRUE	FALSE	NO	30	117	1	0	0	0	OK	247	698	79	6847	201
1089	H142	27	H	ACQ	TRUE	FALSE	NO	29	115	7	1	6	6	OK	304	432	97	4238	67
915	H143	27	H	ACQ	TRUE	FALSE	NO	25	97	3	0	0	0	OK	325	386	103	3787	49
608	H144	27	H	ACQ	TRUE	FALSE	NO	16	64	10	0	0	0	OK	345	546	110	5356	58
168	H145	27	H	ACQ	TRUE	FALSE	NO	5	18	7	1	4	4	OK	380	527	121	5170	42
850	H146	27	H	ACQ	TRUE	FALSE	NO	23	90	4	0	0	0	OK	350	436	111	4277	44
830	H147	27	H	ACQ	TRUE	FALSE	NO	22	88	3	1	3	3	OK	315	426	100	4179	59
460	H148	27	H	ACQ	TRUE	FALSE	NO	13	49	4	1	5	5	OK	332	627	106	6151	74
297	H149	27	H	ACQ	TRUE	FALSE	NO	8	32	2	0	0	0	OK	303	268	96	2629	42
720	H150	27	H	ACQ	TRUE	FALSE	NO	19	76	7	0	0	0	OK	330	621	105	6092	75
A. cunninghamii																			
1028	J121	28	J	ACQ	TRUE	FALSE	NO	28	109	2	0	0	0	OK	328	331	104	3247	41
756	J122	28	J	ACQ	TRUE	FALSE	NO	20	80	5	0	0	0	OK	374	530	119	5199	44
1106	J123	28	J	ACQ	TRUE	FALSE	NO	30	117	6	0	0	0	OK	347	624	110	6121	65
782	J124	28	J	ACQ	TRUE	FALSE	NO	21	83	3	0	0	0	OK	316	431	101	4228	59
611	J125	28	J	ACQ	TRUE	FALSE	NO	17	65	3	0	0	0	OK	350	301	111	2953	30
569	J126	28	J	ACQ	TRUE	FALSE	NO	15	60	8	0	0	0	OK	410	598	131	5866	38

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
A. cunninghamii																			
340	J127	28	J	ACQ	TRUE	FALSE	NO	9	36	8	0	0	0	OK	390	511	124	5013	37
28	J128	28	J	ACQ	TRUE	FALSE	NO	1	3	9	0	0	0	OK	355	801	113	7858	78
939	J129	28	J	ACQ	TRUE	FALSE	NO	25	99	8	0	0	0	OK	319	228	102	2237	30
182	J130	28	J	ACQ	TRUE	FALSE	NO	5	20	2	0	0	0	OK	397	758	126	7436	53
152	J131	28	J	ACQ	TRUE	FALSE	NO	4	16	10	0	0	0	OK	323	307	103	3012	40
272	J132	28	J	ACQ	TRUE	FALSE	NO	8	29	6	0	0	0	OK	364	661	116	6484	59
439	J133	28	J	ACQ	TRUE	FALSE	NO	12	47	3	0	0	0	OK	313	224	100	2197	32
72	J134	28	J	ACQ	TRUE	FALSE	NO	2	8	5	1	2	2	OK	340	604	108	5925	67
497	J135	28	J	ACQ	TRUE	FALSE	NO	14	53	3	0	0	0	OK	333	428	106	4199	50
353	J136	28	J	ACQ	TRUE	FALSE	NO	10	38	1	0	0	0	OK	375	474	119	4650	39
231	J137	28	J	ACQ	TRUE	FALSE	NO	7	25	3	0	0	0	OK	375	800	119	7848	66
218	J138	28	J	ACQ	TRUE	FALSE	NO	6	23	9	0	0	0	OK	395	739	126	7250	52
588	J139	28	J	ACQ	TRUE	FALSE	NO	16	62	9	0	0	0	OK	380	692	121	6789	55
388	J140	28	J	ACQ	TRUE	FALSE	NO	11	41	8	0	0	0	OK	345	511	110	5013	54
981	J141	28	J	ACQ	TRUE	FALSE	NO	26	104	2	0	0	0	OK	386	740	123	7259	56
98	J142	28	J	ACQ	TRUE	FALSE	NO	3	11	3	0	0	0	OK	400	741	127	7269	50
678	J143	28	J	ACQ	TRUE	FALSE	NO	18	72	4	0	0	0	OK	365	774	116	7593	69
689	J144	28	J	ACQ	TRUE	FALSE	NO	19	73	5	0	0	0	OK	335	475	107	4660	55
817	J145	28	J	ACQ	TRUE	FALSE	NO	22	86	10	0	0	0	OK	340	453	108	4444	50
902	J146	28	J	ACQ	TRUE	FALSE	NO	24	95	9	0	0	0	OK	364	642	116	6298	58
1017	J147	28	J	ACQ	TRUE	FALSE	NO	27	108	1	0	0	0	OK	356	435	113	4267	42
1081	J148	28	J	ACQ	TRUE	FALSE	NO	29	114	8	1	4	4	OK	370	512	118	5023	44
493	J149	28	J	ACQ	TRUE	FALSE	NO	13	52	9	0	0	0	OK	355	797	113	7819	77
838	J150	28	J	ACQ	TRUE	FALSE	NO	23	89	2	0	0	0	OK	370	608	118	5964	52

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
P. radiata																			
119	K065	29	K	ACQ	TRUE	FALSE	NO	4	13	5	0	0	0	OK	345	317	110	3110	33
822	K067	29	K	ACQ	TRUE	FALSE	NO	22	87	5	0	0	0	OK	375	240	119	2354	20
390	K070	29	K	ACQ	TRUE	FALSE	NO	11	42	1	1	2	2	OK	362	519	115	5091	47
258	K071	29	K	ACQ	TRUE	FALSE	NO	7	28	2	1	4	4	OK	304	268	97	2629	41
559	K071	29	K	ACQ	TRUE	FALSE	NO	15	59	7	1	2	2	OK	345	337	110	3306	36
753	K074	29	K	ACQ	TRUE	FALSE	NO	20	80	2	0	0	0	OK	378	488	120	4787	39
636	K081	29	K	ACQ	TRUE	FALSE	NO	17	67	9	0	0	0	OK	350	283	111	2776	29
420	K083	29	K	ACQ	TRUE	FALSE	NO	12	45	2	0	0	0	OK	307	284	98	2786	43
594	K086	29	K	ACQ	TRUE	FALSE	NO	16	63	5	0	0	0	OK	457	281	145	2757	13
215	K087	29	K	ACQ	TRUE	FALSE	NO	6	23	6	0	0	0	OK	335	318	107	3120	37
29	K088	29	K	ACQ	TRUE	FALSE	NO	1	3	10	0	0	0	OK	320	274	102	2688	36
1068	K089	29	K	ACQ	TRUE	FALSE	NO	29	113	5	0	0	0	OK	276	161	88	1579	33
318	K090	29	K	ACQ	TRUE	FALSE	NO	9	34	5	0	0	0	OK	328	283	104	2776	35
89	K093	29	K	ACQ	TRUE	FALSE	NO	3	10	3	0	0	0	OK	290	185	92	1815	33
354	K095	29	K	ACQ	TRUE	FALSE	NO	10	38	2	0	0	0	OK	370	418	118	4101	36
179	K096	29	K	ACQ	TRUE	FALSE	NO	5	19	8	0	0	0	OK	304	268	97	2629	41
1043	K097	29	K	ACQ	TRUE	FALSE	NO	28	110	8	0	0	0	OK	324	223	103	2188	28
911	K098	29	K	ACQ	TRUE	FALSE	NO	24	96	9	0	0	0	OK	435	282	138	2766	15
695	K099	29	K	ACQ	TRUE	FALSE	NO	19	74	1	0	0	0	OK	295	236	94	2315	40
852	K101	29	K	ACQ	TRUE	FALSE	NO	23	90	6	0	0	0	OK	355	454	113	4454	44
954	K106	29	K	ACQ	TRUE	FALSE	NO	26	101	4	0	0	0	OK	356	270	113	2649	26
495	K108	29	K	ACQ	TRUE	FALSE	NO	14	53	1	0	0	0	OK	365	345	116	3384	31
294	K110	29	K	ACQ	TRUE	FALSE	NO	8	31	9	0	0	0	OK	320	372	102	3649	49
794	K111	29	K	ACQ	TRUE	FALSE	NO	21	84	6	0	0	0	OK	357	464	114	4552	44
669	K112	29	K	ACQ	TRUE	FALSE	NO	18	71	4	0	0	0	OK	351	294	112	2884	29

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	Post Label	Bundle Type	Species	Preser-vative used	De-barked?	Gang-nailed?	Mwv-dried?	Rep	BlK	Run	No of Splits	Largest Split [mm]	Total Splits [mm]	Status?	Circum. [mm]	Load [Kg]	Diam	Load [N]	Bending Strength [MPa]
P. radiata																			
65	K114	29	K	ACQ	TRUE	FALSE	NO	2	7	7	0	0	0	OK	350	257	111	2521	26
483	K116	29	K	ACQ	TRUE	FALSE	NO	13	51	9	0	0	0	OK	370	497	118	4876	43
916	K119	29	K	ACQ	TRUE	FALSE	NO	25	97	4	0	0	0	OK	390	252	124	2472	18
1107	K122	29	K	ACQ	TRUE	FALSE	NO	30	117	7	0	0	0	OK	340	353	108	3463	39
1001	K127	29	K	ACQ	TRUE	FALSE	NO	27	106	4	0	0	0	OK	359	384	114	3767	36
662	K181	38	K	CCA	TRUE	FALSE	NO	18	70	6	1	5	5	OK	285	275	91	2698	52
1097	K182	38	K	CCA	TRUE	FALSE	NO	29	116	6	0	0	0	OK	320	397	102	3895	53
116	K183	38	K	CCA	TRUE	FALSE	NO	4	13	2	0	0	0	OK	310	289	99	2835	42
113	K184	38	K	CCA	TRUE	FALSE	NO	3	12	8	0	0	0	OK	290	265	92	2600	47
974	K185	38	K	CCA	TRUE	FALSE	NO	26	103	5	1	6	6	OK	309	307	98	3012	45
814	K186	38	K	CCA	TRUE	FALSE	NO	22	86	7	0	0	0	OK	340	495	108	4856	55
1008	K187	38	K	CCA	TRUE	FALSE	NO	27	107	2	0	0	0	OK	326	323	104	3169	40
213	K188	38	K	CCA	TRUE	FALSE	NO	6	23	4	0	0	0	OK	317	347	101	3404	47
577	K189	38	K	CCA	TRUE	FALSE	NO	16	61	7	0	0	0	OK	359	414	114	4061	39
57	K190	38	K	CCA	TRUE	FALSE	NO	2	6	9	1	3	3	OK	286	258	91	2531	48
769	K191	38	K	CCA	TRUE	FALSE	NO	21	81	9	0	0	0	OK	355	593	113	5817	57
394	K192	38	K	CCA	TRUE	FALSE	NO	11	42	5	1	5	5	OK	322	382	102	3747	50
698	K193	38	K	CCA	TRUE	FALSE	NO	19	74	4	0	0	0	OK	285	324	91	3178	61
628	K194	38	K	CCA	TRUE	FALSE	NO	17	67	1	0	0	0	OK	324	314	103	3080	40
534	K195	38	K	CCA	TRUE	FALSE	NO	15	57	2	1	4	4	OK	305	519	97	5091	79
894	K196	38	K	CCA	TRUE	FALSE	NO	24	95	1	0	0	0	OK	294	219	94	2148	37
7	K197	38	K	CCA	TRUE	FALSE	NO	1	1	7	1	3	3	OK	325	420	103	4120	53
302	K198	38	K	CCA	TRUE	FALSE	NO	8	32	7	0	0	0	OK	308	222	98	2178	33
528	K199	38	K	CCA	TRUE	FALSE	NO	14	56	5	0	0	0	OK	318	213	101	2090	29
1109	K200	38	K	CCA	TRUE	FALSE	NO	30	117	9	0	0	0	OK	335	375	107	3679	43
232	K201	38	K	CCA	TRUE	FALSE	NO	7	25	4	0	0	0	OK	354	477	113	4679	47

Details of post treatment								Random test			Some of the measured data						Manipulated data		
Post ID	**Post Label**	**Bundle Type**	**Species**	**Preser-vative used**	**De-barked?**	**Gang-nailed?**	**Mwv-dried?**	**Rep**	**BlK**	**Run**	**No of Splits**	**Largest Split [mm]**	**Total Splits [mm]**	**Status?**	**Circum. [mm]**	**Load [Kg]**	**Diam**	**Load [N]**	**Bending Strength [MPa]**
P. radiata																			
475	K202	38	K	CCA	TRUE	FALSE	NO	13	51	1	1	4	4	OK	340	421	108	4130	46
336	K203	38	K	CCA	TRUE	FALSE	NO	9	36	4	0	0	0	OK	328	265	104	2600	33
873	K204	38	K	CCA	TRUE	FALSE	NO	23	92	8	0	0	0	OK	350	332	111	3257	34
1055	K205	38	K	CCA	TRUE	FALSE	NO	28	112	1	0	0	0	OK	345	429	110	4208	45
157	K206	38	K	CCA	TRUE	FALSE	NO	5	17	5	1	4	4	OK	345	473	110	4640	50
938	K207	38	K	CCA	TRUE	FALSE	NO	25	99	7	1	3	3	OK	326	303	104	2972	38
419	K208	38	K	CCA	TRUE	FALSE	NO	12	45	1	0	0	0	OK	294	230	94	2256	39
377	K209	38	K	CCA	TRUE	FALSE	NO	10	40	6	0	0	0	OK	370	463	118	4542	40
732	K210	38	K	CCA	TRUE	FALSE	NO	20	77	10	0	0	0	OK	298	205	95	2011	34

APPENDIX E Bending strength evaluation using the four point bending test at Queensland DPI&F

PEC-treated *A. mearnsii* debarked only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4302-1	G221	10/11/2003	89.0	105.0	8.68	58.74
4302-2	G243	10/11/2003	80.0	94.0	10.93	92.66
4302-3	G262	10/11/2003	77.0	99.0	8.93	64.57
4302-4	G238	10/11/2003	73.0	103.0	8.47	57.15
4302-5	G252	10/11/2003	73.0	105.0	9.52	63.88
4302-6	G273	10/11/2003	71.0	99.0	8.96	60.55
4302-7	G242	10/11/2003	74.0	102.0	12.06	77.27
4302-8	G231	10/11/2003	86.0	108.0	13.52	85.34
4302-9	G245	10/11/2003	67.0	98.0	12.36	67.26
4302-10	G256	10/11/2003	92.0	125.0	8.19	46.34
4302-11	G241	10/11/2003	80.0	111.0	11.32	74.18
4302-12	G226	10/11/2003	83.0	98.0	7.43	65.20
4302-13	G249	10/11/2003	106.0	130.0	8.12	56.02
4302-14	G260	10/11/2003	76.0	96.0	9.54	67.45
4302-15	G259	10/11/2003	85.0	117.0	10.64	66.84
4302-16	G248	10/11/2003	74.0	97.0	11.93	80.61
4302-17	G105	10/11/2003	80.0	105.0	8.82	65.14
4302-18	G228	10/11/2003	76.0	102.0	9.81	74.38
4302-19	G224	10/11/2003	89.0	96.0	10.02	77.19
4302-20	G222	11/11/2003	76.0	102.0	7.85	63.56
4302-21	G246	11/11/2003	77.0	87.0	13.16	86.99
4302-22	G233	11/11/2003	71.0	86.0	9.98	79.90
4302-23	G227	11/11/2003	86.0	121.0	10.32	71.44
4302-24	G266	11/11/2003	76.0	99.0	9.37	111.77
4302-25	G223	11/11/2003	84.0	103.0	10.47	78.24
4302-26	G255	11/11/2003	80.0	108.0	8.40	59.34
4302-27	G253	11/11/2003	80.0	103.0	11.55	82.91
4302-28	G274	11/11/2003	115.0	159.0	7.86	59.61
4302-29	G244	10/11/2003	105.0	130.0	7.28	51.76
4302-30	G247	10/11/2003	102.0	131.0	9.40	75.74
					Average	**70.73**

Creosote + oil-treated *C. maculata* bark-on

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4032-31	C415	17/11/2003	76.0	95.0	13.49	111.70
4032-32	C412	17/11/2003	92.0	102.0	11.66	82.77
4032-33	C403	17/11/2003	80.0	92.0	14.64	91.90
4032-34	C397	17/11/2003	92.0	99.0	15.08	106.52
4032-35	C413	17/11/2003	83.0	105.0	9.12	94.21
4032-36	C391	17/11/2003	95.0	105.0	7.64	60.80
4032-37	C417	17/11/2003	86.0	111.0	9.18	62.54
4032-38	C407	17/11/2003	89.0	112.0	8.14	52.24
4032-39	C404	17/11/2003	99.0	118.0	13.41	87.22
4032-40	C401	17/11/2003	86.0	93.0	13.43	84.70
4032-41	C408	17/11/2003	108.0	115.0	11.25	70.79
4032-42	C406	17/11/2003	99.0	127.0	8.26	72.94
4032-43	C410	17/11/2003	102.0	127.0	8.66	62.24
4032-44	C405	17/11/2003	109.0	124.0	10.91	72.68
4032-45	C420	17/11/2003	99.0	118.0	9.52	66.32
4032-46	C398	17/11/2003	95.0	118.0	10.12	69.40
4032-47	C419	17/11/2003	111.0	127.0	10.33	72.20
4032-48	C414	17/11/2003	80.0	99.0	10.46	167.26
4032-49	C394	17/11/2003	83.0	92.0	19.73	109.36
4032-50	C416	17/11/2003	76.0	105.0	11.83	95.08
4032-51	C399	17/11/2003	83.0	92.0	12.17	87.80
4032-52	C396	18/11/2003	76.0	86.0	11.86	97.08
4032-53	C400	18/11/2003	99.0	111.0	12.95	86.67
4032-54	C409	18/11/2003	83.0	108.0	9.25	72.16
4032-55	C418	18/11/2003	75.0	83.0	11.46	91.93
4032-56	C402	18/11/2003	73.0	108.0	8.56	68.27
4032-57	C392	18/11/2003	67.0	73.0	16.67	111.40
4032-58	C393	18/11/2003	76.0	83.0	10.34	86.26
4032-59	C411	18/11/2003	64.0	83.0	12.60	89.03
4032-60	C395	18/11/2003	83.0	95.0	3.26	65.17
					Average	**84.95**

PEC-treated *E. cladocalyx* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303-61	F185	18/11/2003	102.0	111.0	15.72	106.73
4303-62	F187	18/11/2003	92.0	102.0	15.82	127.20
4303-63	F203	18/11/2003	95.0	102.0	13.79	95.16
4303-64	F232	20/11/2003	102.0	121.0	8.67	70.89
4303-65	F210	20/11/2003	99.0	108.0	14.49	120.26
4303-66	F216	20/11/2003	86.0	93.0	13.17	103.22
4303-67	F226	20/11/2003	102.0	121.0	10.43	79.78
4303-68	F209	20/11/2003	99.0	121.0	10.11	85.57
4303-69	F201	20/11/2003	111.0	127.0	11.52	93.18
4303-70	F199	25/11/2003	99.0	108.0	11.45	92.87
4303-71	F221	25/11/2003	73.0	111.0	21.89	165.01
4303-72	F198	25/11/2003	102.0	115.0	10.07	81.70
4303-73	F202	25/11/2003	102.0	111.0	11.39	99.27
4303-74	F231	25/11/2003	121.0	130.0	10.58	79.96
4303-75	F233	25/11/2003	95.0	105.0	31.49	118.44
4303-76	F217	25/11/2003	115.0	137.0	20.31	80.40
4303-77	F215	25/11/2003	105.0	111.0	11.91	89.66
4303-78	F208	25/11/2003	85.0	93.0	11.11	86.55
4303-79	F230	25/11/2003	84.0	95.0	13.54	108.54
4303-80	F124	25/11/2003	70.0	90.0	9.49	85.94
4303-81	F195	25/11/2003	83.0	90.0	16.13	129.06
4303-82	F228	25/11/2003	102.0	115.0	10.39	93.30
4303-83	F227	25/11/2003	95.0	115.0	10.33	82.58
4303-84	F222	25/11/2003	83.0	115.0	6.15	58.80
4303-85	F207	25/11/2003	81.0	92.0	10.73	89.18
4303-86	F212	25/11/2003	87.0	99.0	14.63	112.79
4303-87	F206	25/11/2003	71.0	89.0	9.13	80.50
4303-88	F193	25/11/2003	76.0	102.0	10.54	88.43
4303-89	F299	25/11/2003	73.0	95.0	7.98	68.18
4303-90	F218	25/11/2003	74.0	90.0	9.71	91.91
					Average	**95.50**

Creosote + oil-treated *E. pilularis* bark-on

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303b-1	D414	25/11/2003	117.0	150.0	6.70	33.60
4303b-2	D407	25/11/2003	85.0	110.0	7.05	50.24
4303b-3	D393	25/11/2003	81.0	118.0	4.76	45.56
4303b-4	D403	25/11/2003	102.0	119.0	6.78	50.39
4303b-5	D405	25/11/2003	114.0	142.0	5.78	41.68
4303b-6	D399	25/11/2003	73.0	99.0	9.54	63.65
4303b-7	D395	25/11/2003	108.0	134.0	6.62	47.52
4303b-8	D394	25/11/2003	140.0	158.0	5.57	38.31
4303b-9	D411	25/11/2003	87.0	111.0	8.15	62.96
4303b-10	D397	25/11/2003	133.0	150.0	6.29	39.27
4303b-11	D415	25/11/2003	108.0	129.0	4.90	31.91
4303b-12	D419	25/11/2003	112.0	120.0	10.82	77.06
4303b-13	D416	25/11/2003	100.0	115.0	7.24	57.38
4303b-14	D406	25/11/2003	100.0	121.0	7.25	56.15
4303b-15	D398	25/11/2003	118.0	153.0	7.82	56.60
4303b-16	D413	25/11/2003	105.0	129.0	7.22	50.55
4303b-17	D401	25/11/2003	111.0	148.0	5.38	48.53
4303b-18	D392	25/11/2003	98.0	116.0	7.92	63.76
4303b-19	D404	25/11/2003	92.0	112.0	7.24	39.81
4303b-20	D408	25/11/2003	94.0	110.0	6.31	46.23
4303b-21	D400	25/11/2003	87.0	109.0	7.69	62.34
4303b-22	D396	25/11/2003	100.0	118.0	5.02	45.30
4303b-23	D418	26/11/2003	78.0	109.0	5.27	35.26
4303b-24	D402	26/11/2003	98.0	119.0	7.94	53.91
4303b-25	D409	26/11/2003	85.0	111.0	8.48	59.14
4303b-26	D410	26/11/2003	106.0	136.0	8.35	62.34
4303b-27	D391	26/11/2003	87.0	108.0	7.43	55.39
4303b-28	D420	26/11/2003	81.0	108.0	6.62	56.40
4303b-29	D412	26/11/2003	74.0	106.0	7.91	49.19
4303b-30	D417	26/11/2003	67.0	98.0	7.84	60.34
					Average	**51.36**

PEC-treated *E. globulus* debarked only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303b-1	B334	27/11/2003	83.0	116.0	7.29	55.39
4303b-2	B275	27/11/2003	80.0	104.0	8.92	58.68
4303b-3	B265	27/11/2003	86.0	130.0	4.64	44.60
4303b-4	B323	27/11/2003	73.0	104.0	9.91	80.31
4303b-5	B271	27/11/2003	84.0	111.0	6.94	51.87
4303b-6	B318	27/11/2003	88.0	109.0	6.28	54.41
4303b-7	B321	27/11/2003	87.0	117.0	8.73	58.60
4303b-8	B326	27/11/2003	81.0	102.0	9.77	65.67
4303b-9	B315	27/11/2003	97.0	147.0	5.34	45.88
4303b-10	B272	27/11/2003	95.0	130.0	5.46	38.48
4303b-11	B314	27/11/2003	80.0	130.0	5.30	29.52
4303b-12	B319	27/11/2003	82.0	111.0	7.13	56.72
4303b-13	B268	27/11/2003	77.0	100.0	8.08	75.12
4303b-14	B276	27/11/2003	83.0	122.0	5.09	46.17
4303b-15	B264	27/11/2003	78.0	98.0	8.44	64.57
4303b-16	B330	27/11/2003	80.0	103.0	7.50	49.30
4303b-17	B226	27/11/2003	78.0	124.0	5.44	51.32
4303b-18	B313	27/11/2003	87.0	112.0	7.60	69.68
4303b-19	B263	27/11/2003	87.0	119.0	8.54	64.50
4303b-20	B274	27/11/2003	80.0	105.0	5.62	42.25
4303b-21	B336	27/11/2003	72.0	103.0	6.37	44.01
4303b-22	B270	27/11/2003	78.0	105.0	7.09	53.80
4303b-23	B340	27/11/2003	80.0	120.0	5.44	46.94
4303b-24	B333	27/11/2003	72.0	105.0	6.63	48.88
4303b-25	B262	27/11/2003	88.0	112.0	5.89	53.83
4303b-26	B338	27/11/2003	72.0	130.0	11.26	70.61
4303b-27	B329	27/11/2003	80.0	104.0	5.62	43.70
4303b-28	B339	27/11/2003	78.0	103.0	6.30	51.65
4303b-29	B337	27/11/2003	77.0	102.0	7.75	64.75
4303b-30	B332	27/11/2003	87.0	124.0	7.68	57.90
					Average	**54.64**

ACQ-treated *E. cladocalyx* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303b-1	F176	28/11/2003	101.0	124.0	13.04	86.38
4303b-2	F128	28/11/2003	95.0	117.0	9.53	89.84
4303b-3	F145	28/11/2003	90.0	98.0	15.35	128.74
4303b-4	F173	28/11/2003	111.0	119.0	13.17	94.08
4303b-5	F178	28/11/2003	86.0	94.0	15.30	131.69
4303b-6	F179	28/11/2003	121.0	141.0	13.64	92.06
4303b-7	F120	28/11/2003	83.0	97.0	13.87	91.35
4303b-8	F165	28/11/2003	83.0	91.0	17.60	122.73
4303b-9	F170	28/11/2003	81.0	105.0	7.80	68.11
4303b-10	F172	28/11/2003	82.0	109.0	9.41	85.72
4303b-11	F161	28/11/2003	71.0	85.0	18.95	149.44
4303b-12	F171	28/11/2003	84.0	94.0	15.88	130.77
4303b-13	F155	28/11/2003	85.0	97.0	15.77	121.75
4303b-14	F152	28/11/2003	70.0	82.0	12.21	90.72
4303b-15	F127	28/11/2003	76.0	85.0	9.95	85.48
4303b-16	F153	28/11/2003	65.0	86.0	10.53	81.46
4303b-17	F132	28/11/2003	70.0	81.0	15.88	134.11
4303b-18	F167	28/11/2003	69.0	85.0	12.17	91.41
4303b-19	F159	28/11/2003	76.0	86.0	16.55	127.10
4303b-20	F163	28/11/2003	74.0	94.0	10.51	75.11
4303b-21	F146	28/11/2003	77.0	86.0	12.23	94.43
4303b-22	F139	28/11/2003	75.0	95.0	8.31	75.35
4303b-23	F129	28/11/2003	66.0	73.0	17.43	116.88
4303b-24	F137	28/11/2003	62.0	73.0	12.84	100.39
4303b-25	F164	28/11/2003	77.0	86.0	18.04	108.92
4303b-26	F157	28/11/2003	102.0	127.0	9.43	80.32
4303b-27	F160	28/11/2003	94.0	104.0	14.17	98.49
4303b-28	F166	28/11/2003	87.0	95.0	15.95	116.49
4303b-29	F158	28/11/2003	112.0	116.0	9.02	58.02
4303b-30	F177	28/11/2003	119.0	142.0	10.00	62.27
					Average	**99.65**

ACQ-treated *E. dunnii* debark + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303c-1	E155	28/11/2003	127.0	144.0	7.29	67.15
4303c-2	E180	28/11/2003	115.0	122.0	8.88	95.95
4303c-3	E135	28/11/2003	112.0	134.0	7.93	50.45
4303c-4	E142	1/12/2003	123.0	120.0	13.22	65.75
4303c-5	E158	1/12/2003	80.0	103.0	7.92	36.57
4303c-6	E141	1/12/2003	92.0	103.0	10.46	57.76
4303c-7	E136	1/12/2003	74.0	92.0	8.06	41.30
4303c-8	E138	1/12/2003	122.0	146.0	7.44	57.79
4303c-9	E148	1/12/2003	108.0	123.0	10.50	70.73
4303c-10	E137	1/12/2003	99.0	117.0	11.94	82.15
4303c-11	E154	1/12/2003	102.0	111.0	10.41	48.69
4303c-12	E152	1/12/2003	87.0	101.0	14.27	101.37
4303c-13	E173	1/12/2003	125.0	144.0	8.67	45.88
4303c-14	E153	1/12/2003	111.0	123.0	9.10	57.38
4303c-15	E167	1/12/2003	106.0	121.0	10.35	74.39
4303c-16	E169	1/12/2003	95.0	90.0	8.71	58.10
4303c-17	E157	1/12/2003	73.0	78.0	14.02	92.70
4303c-18	E164	1/12/2003	72.0	105.0	6.56	60.73
4303c-19	E151	1/12/2003	73.0	100.0	7.91	38.75
4303c-20	E134	1/12/2003	130.0	140.0	16.34	68.59
4303c-21	E156	1/12/2003	103.0	119.0	10.20	63.17
4303c-22	E162	1/12/2003	96.0	115.0	7.75	48.62
4303c-23	E175	1/12/2003	110.0	126.0	12.72	73.56
4303c-24	E170	1/12/2003	130.0	135.0	7.95	45.30
4303c-25	E177	1/12/2003	124.0	134.0	14.34	63.44
4303c-26	E161	1/12/2003	65.0	78.0	8.20	57.38
4303c-27	E165	1/12/2003	95.0	111.0	11.36	54.43
4303c-28	E178	1/12/2003	123.0	137.0	9.26	49.14
4303c-29	E145	1/12/2003	121.0	131.0	12.31	59.61
4303c-30	E160	1/12/2003	130.0	143.0	10.44	52.31
					Average	**61.30**

ACQ-treated *E. pilularis* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303c-1	D052	1/12/2003	143.0	159.0	14.57	82.44
4303c-2	D069	1/12/2003	124.0	127.0	11.60	65.78
4303c-3	D067	1/12/2003	107.0	124.0	8.13	58.69
4303c-4	D076	1/12/2003	112.0	139.0	9.42	63.48
4303c-5	D079	2/12/2003	107.0	123.0	14.05	91.14
4303c-6	D074	2/12/2003	81.0	104.0	4.35	26.04
4303c-7	D068	2/12/2003	115.0	124.0	16.12	91.37
4303c-8	D062	2/12/2003	77.0	87.0	14.01	93.37
4303c-9	D078	2/12/2003	100.0	116.0	6.65	43.43
4303c-10	D058	2/12/2003	93.0	100.0	18.15	116.87
4303c-11	D051	2/12/2003	90.0	111.0	8.93	60.69
4303c-12	D065	2/12/2003	125.0	153.0	8.08	50.79
4303c-13	D064	2/12/2003	128.0	140.0	18.48	119.03
4303c-14	D080	2/12/2003	95.0	115.0	5.77	49.10
4303c-15	D075	2/12/2003	93.0	112.0	8.83	75.39
4303c-16	D054	2/12/2003	77.0	109.0	8.55	55.80
4303c-17	D066	2/12/2003	98.0	108.0	14.20	89.73
4303c-18	D060	2/12/2003	98.0	116.0	7.03	35.02
4303c-19	D070	2/12/2003	98.0	117.0	15.59	80.88
4303c-20	D056	2/12/2003	107.0	130.0	5.75	38.70
4303c-21	D057	2/12/2003	98.0	130.0	11.09	72.17
4303c-22	D055	2/12/2003	116.0	142.0	8.16	46.02
4303c-23	D071	2/12/2003	126.0	132.0	15.19	77.04
4303c-24	D073	2/12/2003	122.0	131.0	8.24	84.78
4303c-25	D061	2/12/2003	132.0	165.0	5.78	53.52
4303c-26	D063	2/12/2003	145.0	156.0	13.34	71.75
4303c-27	D059	2/12/2003	125.0	160.0	12.17	77.30
4303c-28	D072	2/12/2003	141.0	153.0	20.50	99.16
4303c-29	D053	2/12/2003	153.0	174.0	15.41	69.80
4303c-30	D077	2/12/2003	165.0	205.0	6.52	36.20
					Average	**69.18**

4303c-27	H082	3/12/2003	94.0	113.0
4303c-28	H071	3/12/2003	98.0	112.0
4303c-29	H073	3/12/2003	83.0	111.0
4303c-30	H077	3/12/2003	97.0	116.0

ACQ-treated *A. cunninghamii* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303d-1	J170	4/12/2003	117.0	140.0	5.91	30.93
4303d-2	J154	4/12/2003	95.0	131.0	9.58	56.11
4303d-3	J156	4/12/2003	95.0	126.0	5.88	35.01
4303d-4	J161	4/12/2003	100.0	129.0	4.93	23.40
4303d-5	J163	4/12/2003	99.0	125.0	7.67	30.69
4303d-6	J180	4/12/2003	102.0	123.0	8.39	36.36
4303d-7	J177	4/12/2003	109.0	131.0	8.53	36.97
4303d-8	J164	4/12/2003	102.0	122.0	8.25	35.71
4303d-9	J174	4/12/2003	107.0	118.0	7.07	41.46
4303d-10	J172	4/12/2003	95.0	121.0	7.06	41.34
4303d-11	J155	4/12/2003	101.0	124.0	10.09	48.06
4303d-12	J178	4/12/2003	106.0	128.0	7.06	28.89
4303d-13	J179	4/12/2003	114.0	138.0	11.48	55.69
4303d-14	J167	4/12/2003	99.0	112.0	6.86	28.98
4303d-15	J162	4/12/2003	90.0	109.0	7.54	39.91
4303d-16	J153	4/12/2003	92.0	121.0	6.60	33.33
4303d-17	J158	4/12/2003	102.0	128.0	9.38	47.45
4303d-18	J151	4/12/2003	92.0	117.0	9.44	55.98
4303d-19	J166	4/12/2003	85.0	106.0	6.01	22.23
4303d-20	J175	4/12/2003	92.0	113.0	7.53	35.62
4303d-21	J171	4/12/2003	111.0	127.0	6.59	44.00
4303d-22	J152	4/12/2003	99.0	143.0	19.69	37.18
4303d-23	J173	4/12/2003	106.0	122.0	10.38	33.19
4303d-24	J176	4/12/2003	100.0	136.0	7.02	32.20
4303d-25	J165	4/12/2003	92.0	115.0	8.57	32.64
4303d-26	J169	4/12/2003	95.0	123.0	10.25	55.30
4303d-27	J160	4/12/2003	111.0	136.0	7.51	40.41
4303d-28	J168	4/12/2003	100.0	126.0	7.75	38.58
4303d-29	J157	4/12/2003	99.0	131.0	6.76	39.49
4303d-30	J159	4/12/2003	99.0	119.0	7.50	36.95
					Average	**38.47**

PEC-treated *C. maculata* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303d-1	C307	5/12/2003	85.0	99.0	18.67	124.18
4303d-2	C338	5/12/2003	99.0	102.0	14.90	96.89
4303d-3	C315	5/12/2003	95.0	99.0	9.97	66.66
4303d-4	C301	5/12/2003	89.0	101.0	20.87	115.61
4303d-5	C302	5/12/2003	100.0	113.0	7.82	102.42
4303d-6	C303	5/12/2003	84.0	89.0	12.62	74.62
4303d-7	C317	5/12/2003	86.0	95.0	22.51	126.45
4303d-8	C328	5/12/2003	76.0	95.0	13.08	103.67
4303d-9	C337	5/12/2003	85.0	95.0	11.74	94.46
4303d-10	C322	5/12/2003	94.0	111.0	16.01	128.92
4303d-11	C313	5/12/2003	100.0	104.0	10.64	80.65
4303d-12	C333	5/12/2003	81.0	85.9	16.46	119.26
4303d-13	C325	5/12/2003	82.0	86.0	17.61	116.00
4303d-14	C318	5/12/2003	82.0	92.0	16.43	112.26
4303d-15	C306	5/12/2003	80.0	92.0	12.44	79.21
4303d-16	C305	5/12/2003	102.0	102.0	14.11	88.01
4303d-17	C331	5/12/2003	86.0	76.0	22.16	133.10
4303d-18	C339	5/12/2003	99.0	92.0	13.82	94.60
4303d-19	C327	5/12/2003	73.0	83.0	18.19	105.48
4303d-20	C320	5/12/2003	95.0	102.0	19.95	121.79
4303d-21	C336	5/12/2003	92.0	105.0	15.00	98.88
4303d-22	C326	5/12/2003	80.0	86.0	15.40	101.39
4303d-23	C304	5/12/2003	70.0	76.0	17.93	115.09
4303d-24	C323	5/12/2003	89.0	89.0	14.34	101.43
4303d-25	C330	5/12/2003	86.0	89.0	16.62	116.10
4303d-26	C329	5/12/2003	89.0	99.0	14.49	82.51
4303d-27	C340	5/12/2003	95.0	115.0	10.59	65.47
4303d-28	C321	5/12/2003	89.0	105.0	13.23	96.91
4303d-29	C314	5/12/2003	83.0	95.0	19.20	127.18
4303d-30	C308	5/12/2003	83.0	76.0	18.10	107.94
					Average	**103.24**

ACQ-treated *A. cunninghamii* dried in shade

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303d-1	J047	11/12/2003	111.0	137.0	7.37	31.68
4303d-2	J032	11/12/2003	112.0	130.0	8.58	34.96
4303d-3	J031	11/12/2003	94.0	122.0	8.65	57.46
4303d-4	J030	11/12/2003	107.0	130.0	6.74	23.54
4303d-5	J041	11/12/2003	103.0	127.0	7.70	45.35
4303d-6	J033	11/12/2003	102.0	124.0	9.93	62.21
4303d-7	J044	11/12/2003	91.0	124.0	no data	3.81
4303d-8	J036	11/12/2003	110.0	128.0	7.67	46.61
4303d-9	J048	11/12/2003	105.0	126.0	7.64	42.12
4303d-10	J049	11/12/2003	108.0	123.0	6.93	32.91
4303d-11	J046	11/12/2003	98.0	128.0	6.83	35.38
4303d-12	J038	11/12/2003	87.0	115.0	11.28	19.97
4303d-13	J042	11/12/2003	93.0	122.0	14.92	40.73
4303d-14	J026	11/12/2003	86.0	118.0	9.96	36.80
4303d-15	J037	11/12/2003	102.0	131.0	9.20	37.36
4303d-16	J050	11/12/2003	113.0	135.0	8.26	37.50
4303d-17	J029	11/12/2003	96.0	121.0	11.08	37.55
4303d-18	J021	11/12/2003	95.0	124.0	12.43	25.97
4303d-19	J035	11/12/2003	100.0	122.0	12.33	32.01
4303d-20	J0228	11/12/2003	101.0	131.0	10.41	17.55
4303d-21	J034	11/12/2003	92.0	106.0	16.04	33.33
4303d-22	J040	11/12/2003	90.0	117.0	11.59	35.32
4303d-23	J025	11/12/2003	94.0	122.0	11.70	37.03
4303d-24	J039	11/12/2003	93.0	116.0	11.37	29.21
4303d-25	J024	11/12/2003	111.0	134.0	7.60	25.25
4303d-26	J043	11/12/2003	99.0	121.0	11.00	45.95
4303d-27	J045	11/12/2003	100.0	120.0	7.90	53.47
4303d-28	J028	11/12/2003	99.0	137.0	6.24	30.06
4303d-29	J027	11/12/2003	97.0	131.0	8.17	33.78
4303d-30	J023	11/12/2003	99.0	115.0	11.00	60.17
					Average	**36.17**

ACQ-treated *E. grandis* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303e-1	A099	12/12/2003	70.0	97.0	27.66	31.74
4303e-2	A057	12/12/2003	95.0	119.0	7.54	52.71
4303e-3	A094	12/12/2003	91.0	126.0	3.88	33.76
4303e-4	A093	12/12/2003	68.0	100.0	22.54	37.68
4303e-5	A087	12/12/2003	72.0	98.0	20.98	43.53
4303e-6	A069	12/12/2003	88.0	116.0	6.77	46.03
4303e-7	A066	12/12/2003	75.0	100.0	14.81	35.80
4303e-8	A077	12/12/2003	81.0	82.0	20.14	56.90
4303e-9	A083	12/12/2003	73.0	102.0	8.82	42.04
4303e-10	A103	12/12/2003	71.0	89.0	12.40	50.49
4303e-11	A086	12/12/2003	73.0	99.0	9.15	41.22
4303e-12	A078	12/12/2003	83.0	89.0	8.56	54.83
4303e-13	A088	12/12/2003	77.0	97.0	10.26	41.99
4303e-14	A058	12/12/2003	69.0	84.0	13.58	58.81
4303e-15	A102	12/12/2003	67.0	89.0	14.41	46.83
4303e-16	A073	12/12/2003	89.0	106.0	6.79	36.32
4303e-17	A091	12/12/2003	66.0	89.0	13.46	49.47
4303e-18	A084	12/12/2003	65.0	104.0	9.19	39.14
4303e-19	A089	12/12/2003	70.0	96.0	11.18	46.94
4303e-20	A098	12/12/2003	77.0	102.0	9.35	45.11
4303e-21	A081	12/12/2003	75.0	97.0	16.77	44.28
4303e-22	A082	12/12/2003	73.0	103.0	14.83	38.26
4303e-23	A095	12/12/2003	72.0	91.0	26.55	42.88
4303e-24	A100	12/12/2003	80.0	102.0	16.64	39.56
4303e-25	A056	12/12/2003	85.0	114.0	9.18	33.69
4303e-26	A090	12/12/2003	70.0	92.0	27.33	45.75
4303e-27	A080	12/12/2003	97.0	119.0	8.31	44.54
4303e-28	A096	12/12/2003	71.0	94.0	26.85	41.34
4303e-29	A092	12/12/2003	72.0	100.0	16.45	34.24
4303e-30	A067	12/12/2003	95.0	99.0	19.63	49.90
					Average	**43.53**

ACQ-treated *C. maculata* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303e-1	C057	15/12/2003	83.0	99.0	13.94	80.29
4303e-2	C078	15/12/2003	99.0	107.0	15.86	128.76
4303e-3	C073	15/12/2003	83.0	96.0	13.94	92.68
4303e-4	C076	15/12/2003	101.0	116.0	15.02	105.85
4303e-5	C072	15/12/2003	77.0	89.0	15.69	107.93
4303e-6	C074	15/12/2003	75.0	82.0	19.42	108.48
4303e-7	C059	15/12/2003	73.0	89.0	20.25	94.81
4303e-8	C068	15/12/2003	90.0	104.0	13.97	55.20
4303e-9	C079	15/12/2003	69.0	90.0	20.34	85.02
4303e-10	C071	15/12/2003	100.0	107.0	7.37	97.93
4303e-11	C066	15/12/2003	94.0	102.0	9.54	95.76
4303e-12	C062	15/12/2003	90.0	105.0	10.06	61.01
4303e-13	C080	15/12/2003	79.0	83.0	21.74	90.46
4303e-14	C077	15/12/2003	94.0	102.0	13.63	97.48
4303e-15	C069	15/12/2003	82.0	94.0	27.86	93.95
4303e-16	C067	15/12/2003	78.0	88.0	25.86	102.93
4303e-17	C061	15/12/2003	94.0	99.0	13.21	67.57
4303e-18	C063	15/12/2003	84.0	95.0	22.51	85.78
4303e-19	C075	15/12/2003	76.0	83.0	22.18	98.96
4303e-20	C070	15/12/2003	99.0	112.0	13.35	121.32
4303e-21	C054	15/12/2003	78.0	88.0	18.23	98.70
4303e-22	C055	15/12/2003	82.0	89.0	16.12	111.41
4303e-23	C056	15/12/2003	85.0	101.0	16.72	68.66
4303e-24	C052	15/12/2003	73.0	88.0	17.16	85.41
4303e-25	C064	15/12/2003	84.0	97.0	13.65	117.84
4303e-26	C051	15/12/2003	88.0	95.0	16.45	127.81
4303e-27	C065	15/12/2003	109.0	127.0	10.14	103.11
4303e-28	C053	15/12/2003	102.0	111.0	13.00	58.65
4303e-29	C058	15/12/2003	84.0	108.0	13.10	82.31
4303e-30	C060	15/12/2003	108.0	122.0	10.21	51.93
					Average	**92.60**

ACQ-treated *A. cunninghamii* end-sealed

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303e-1	J073	16/12/2003	100.0	126.0	6.73	37.05
4303e-2	J097	16/12/2003	108.0	130.0	7.70	40.73
4303e-3	J098	16/12/2003	98.0	140.0	4.41	28.29
4303e-4	J077	16/12/2003	95.0	122.0	8.10	34.79
4303e-5	J082	16/12/2003	107.0	122.0	8.66	31.95
4303e-6	J080	16/12/2003	86.0	105.0	18.54	39.41
4303e-7	J072	16/12/2003	110.0	130.0	7.87	30.11
4303e-8	J081	16/12/2003	104.0	126.0	6.82	45.71
4303e-9	J094	16/12/2003	101.0	130.0	6.35	45.12
4303e-10	J087	16/12/2003	99.0	131.0	6.44	30.81
4303e-11	J083	16/12/2003	108.0	134.0	9.07	45.33
4303e-12	J096	16/12/2003	108.0	128.0	9.98	36.42
4303e-13	J074	16/12/2003	87.0	127.0	5.38	31.88
4303e-14	J075	16/12/2003	106.0	128.0	7.72	49.04
4303e-15	J079	16/12/2003	103.0	122.0	10.76	45.82
4303e-16	J093	16/12/2003	110.0	136.0	7.35	32.16
4303e-17	J078	16/12/2003	89.0	108.0	12.34	38.45
4303e-18	J076	16/12/2003	92.0	119.0	13.01	31.38
4303e-19	J071	16/12/2003	110.0	126.0	9.69	37.90
4303e-20	J092	16/12/2003	92.0	121.0	9.02	35.79
4303e-21	J091	16/12/2003	99.0	127.0	10.27	19.75
4303e-22	J100	16/12/2003	102.0	126.0	12.29	46.85
4303e-23	J084	16/12/2003	111.0	138.0	8.49	23.37
4303e-24	J090	16/12/2003	95.0	123.0	14.00	35.76
4303e-25	J095	16/12/2003	103.0	132.0	5.86	45.30
4303e-26	J089	16/12/2003	90.0	124.0	7.15	13.23
4303e-27	J086	16/12/2003	93.0	119.0	9.40	22.17
4303e-28	J085	16/12/2003	88.0	117.0	11.19	18.18
4303e-29	J099	16/12/2003	95.0	125.0	12.98	23.80
4303e-30	J088	16/12/2003	92.0	115.0	14.33	28.58
					Average	**34.17**

ACQ-treated *C. maculata* bark-on

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303f-1	C176	22/12/2003	91.0	106.0	7.29	59.74
4303f-2	C185	22/12/2003	76.0	92.0	12.07	83.52
4303f-3	C183	22/12/2003	104.0	113.0	11.00	70.19
4303f-4	C190	22/12/2003	99.0	100.0	26.49	79.07
4303f-5	C196	22/12/2003	84.0	95.0	13.51	90.69
4303f-6	C195	22/12/2003	93.0	122.0	9.83	77.93
4303f-7	C199	22/12/2003	87.0	95.0	9.78	75.33
4303f-8	C175	22/12/2003	76.0	96.0	9.73	77.94
4303f-9	C188	22/12/2003	101.0	113.0	9.45	59.45
4303f-10	C191	22/12/2003	68.0	79.0	13.93	72.03
4303f-11	C177	22/12/2003	80.0	85.0	12.38	80.72
4303f-12	C186	22/12/2003	88.0	93.0	12.57	62.48
4303f-13	C189	22/12/2003	88.0	100.0	10.99	74.17
4303f-14	C192	22/12/2003	72.0	93.0	7.90	56.62
4303f-15	C193	22/12/2003	86.0	97.0	10.40	64.33
4303f-16	C179	22/12/2003	94.0	109.0	12.47	81.53
4303f-17	C174	22/12/2003	88.0	97.0	10.66	42.39
4303f-18	C182	22/12/2003	83.0	90.0	11.35	56.60
4303f-19	C172	22/12/2003	97.0	104.0	12.46	57.66
4303f-20	C171	22/12/2003	70.0	83.0	17.08	84.28
4303f-21	C173	22/12/2003	80.0	95.0	13.52	87.03
4303f-22	C181	22/12/2003	87.0	101.0	9.06	69.14
4303f-23	C184	22/12/2003	78.0	96.0	9.97	66.32
4303f-24	C180	22/12/2003	77.0	88.0	14.47	82.48
4303f-25	C197	22/12/2003	74.0	85.0	10.28	67.00
4303f-26	C187	22/12/2003	80.0	88.0	9.87	65.70
4303f-27	C194	22/12/2003	94.0	102.0	13.38	85.67
4303f-28	C178	22/12/2003	64.0	73.0	18.37	90.70
4303f-29	C200	22/12/2003	70.0	88.0	13.01	72.29
4303f-30	C198	22/12/2003	83.0	82.0	12.03	81.30
					Average	**72.48**

ACQ-treated *E. dunnii* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303f-1	E131	17/12/2003	125.0	151.0	8.78	57.64
4303f-2	E133	17/12/2003	117.0	129.0	9.96	56.34
4303f-3	E122	17/12/2003	125.0	141.0	9.17	50.08
4303f-4	E130	17/12/2003	128.0	136.0	8.53	45.10
4303f-6	E112	17/12/2003	128.0	145.0	8.07	52.03
4303f-7	E121	17/12/2003	114.0	130.0	8.26	46.95
4303f-8	E104	17/12/2003	101.0	121.0	8.85	43.76
4303f-9	E107	17/12/2003	96.0	105.0	11.49	58.74
4303f-10	E129	17/12/2003	116.0	130.0	8.64	43.10
4303f-11	E113	17/12/2003	135.0	153.0	7.25	49.40
4303f-12	E118	17/12/2003	136.0	140.0	9.80	52.20
4303f-13	E120	17/12/2003	110.0	133.0	5.30	35.27
4303f-14	E110	17/12/2003	130.0	142.0	8.97	32.80
4303f-15	E117	17/12/2003	138.0	152.0	6.88	52.03
4303f-16	E106	17/12/2003	91.0	102.0	19.44	41.25
4303f-17	E125	17/12/2003	95.0	115.0	14.25	48.84
4303f-18	E128	17/12/2003	131.0	142.0	8.78	54.72
4303f-19	E127	17/12/2003	115.0	141.0	9.42	55.34
4303f-20	E115	17/12/2003	124.0	138.0	13.18	31.76
4303f-21	E114	17/12/2003	138.0	151.0	6.72	33.94
4303f-22	E123	17/12/2003	144.0	132.0	4.67	40.02
4303f-23	E108	17/12/2003	126.0	143.0	8.74	29.61
4303f-24	E119	17/12/2003	115.0	133.0	7.17	57.87
4303f-25	E105	17/12/2003	94.0	114.0	14.21	44.14
4303f-26	E102	17/12/2003	127.0	149.0	8.58	36.88
4303f-27	E103	17/12/2003	108.0	121.0	9.28	61.56
4303f-28	E124	17/12/2003	129.0	147.0	6.28	41.78
4303f-29	E126	17/12/2003	132.0	151.0	6.45	41.43
4303f-30	E111	17/12/2003	88.0	100.0	9.42	52.58
4303F-31	E109	17/12/2003	105.0	127.0	7.29	42.92
4303F-32	E101	17/12/2003	123.0	143.0	7.66	42.64
4303F-33	E116	17/12/2003	123.0	138.0	8.45	44.55
					Average	**45.28**

ACQ-treated *E. pilularis* bark-on

Sample No.	Client No.	Date Tested	Breadth (mm)	Depth (mm)	MOE (Gpa)	MOR (Mpa)
4303f-1	D192	18/12/2003	86.0	100.0	6.80	28.58
4303f-2	D193	18/12/2003	82.0	98.0	7.80	69.72
4303f-3	D176	18/12/2003	116.0	130.0	7.53	47.06
4303f-4	D196	18/12/2003	96.0	100.0	5.02	34.13
4303f-5	D171	18/12/2003	114.0	132.0	6.38	57.76
4303f-6	D185	18/12/2003	120.0	142.0	5.08	36.41
4303f-7	D189	18/12/2003	121.0	154.0	3.28	21.16
4303f-8	D194	18/12/2003	111.0	142.0	6.10	47.61
4303f-9	D200	18/12/2003	129.0	167.0	3.35	20.06
4303f-10	D195	18/12/2003	92.0	129.0	6.17	46.80
4303f-11	D190	18/12/2003	89.0	113.0	8.08	60.43
4303f-12	D197	18/12/2003	130.0	141.0	4.90	38.34
4303f-13	D191	18/12/2003	95.0	123.0	8.19	46.89
4303f-14	D199	18/12/2003	98.0	125.0	7.12	49.20
4303f-15	D181	18/12/2003	131.0	171.0	7.38	42.53
4303f-16	D183	18/12/2003	137.0	163.0	6.73	49.09
4303f-17	D182	18/12/2003	96.0	120.0	13.59	54.32
4303f-18	D179	18/12/2003	132.0	168.0	4.91	39.90
4303f-19	D186	18/12/2003	88.0	105.0	7.94	79.73
4303f-20	D175	18/12/2003	118.0	141.0	5.01	38.09
4303f-21	D173	18/12/2003	115.0	154.0	6.80	51.36
4303f-22	D180	18/12/2003	123.0	161.0	6.37	43.80
4303f-23	D177	18/12/2003	81.0	101.0	13.69	52.12
4303f-24	D187	18/12/2003	77.0	113.0	9.25	62.36
4303f-25	D178	18/12/2003	93.0	111.0	6.49	43.23
4303f-26	D174	18/12/2003	150.0	172.0	3.85	33.53
4303f-27	D172	18/12/2003	88.0	114.0	5.00	29.90
4303f-28	D184	18/12/2003	95.0	116.0	6.14	42.25
4303f-29	D188	18/12/2003	80.0	99.0	7.68	52.79
4303f-30	D198	18/12/2003	68.0	90.0	13.91	51.76
					Average	**45.70**

PEC-treated *C. maculata* debark + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303g-1	c127	22/12/2003	80.7	85.9	13.95	57.10
4303g-2	c148	22/12/2003	85.9	95.5	16.31	68.70
4303g-3	c133	22/12/2003	85.9	98.6	15.85	91.92
4303g-4	c126	22/12/2003	101.9	111.4	19.26	109.8210
4303g-5	c149	22/12/2003	73.2	82.7	16.33	112.18
4303g-6	c131	22/12/2003	73.2	79.5	17.11	105.79
4303g-7	c130	22/12/2003	82.8	85.9	13.62	90.73
4303g-9	c128	22/12/2003	105.0	111.4	19.26	71.21
4303g-10	c147	22/12/2003	101.9	108.2	20.08	103.91
4303g-11	c132	22/12/2003	105.0	114.6	15.62	107.54
4303g-12	c146	22/12/2003	101.9	105.0	16.61	115.66
4303g-13	c123	22/12/2003	82.8	89.1	22.52	117.29
4303g-14	c145	22/12/2003	76.4	85.9	17.23	103.96
4303g-15	c129	22/12/2003	76.4	95.5	17.64	113.14
4303g-16	c141	22/12/2003	73.2	79.6	22.66	111.50
4303g-17	c122	22/12/2003	85.9	92.3	19.80	120.53
4303g-18	c134	22/12/2003	89.1	95.5	16.85	114.58
4303g-19	c121	22/12/2003	108.2	114.6	12.93	112.20
4303g-20	c125	22/12/2003	85.9	98.7	14.99	83.38
4303g-21	c150	22/12/2003	92.3	101.9	14.38	80.87
4303g-22	c143	22/12/2003	95.5	105.0	19.98	104.06
4303g-23	c124	22/12/2003	89.1	89.1	10.39	101.09
4303g-24	c135	22/12/2003	79.6	98.7	30.85	159.30
4303g-25	c138	22/12/2003	98.7	101.9	19.20	102.37
4303g-26	c136	22/12/2003	92.3	98.7	18.48	111.90
4303g-27	c142	22/12/2003	85.9	92.3	20.95	106.53
4303g-28	c139	22/12/2003	79.6	89.1	16.49	99.72
4303g-29	c137	22/12/2003	89.1	98.7	17.14	112.94
4303g-30	c144	22/12/2003	73.2	82.8	53.64	92.03
4303g31	c140	22/12/2003	73.2	85.9	11.53	86.32
					Average	**102.28**

PEC-treated *E. grandis* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303g2-32	A232	16/01/2004	67.0	95.0	7.59	46.37
4303g2-33	A244	16/01/2004	86.0	118.0	4.16	32.03
4303g2-34	A228	16/01/2004	73.0	83.0	4.29	35.70
4303g2-35	A255	16/01/2004	76.0	92.0	7.26	58.28
4303g2-36	A238	16/01/2004	76.0	99.0	6.52	46.14
4303g2-37	A230	16/01/2004	80.0	80.0	8.27	58.01
4303g2-38	A275	16/01/2004	80.0	95.0	4.97	39.74
4303g2-39	A233	16/01/2004	80.0	99.0	4.87	40.82
4303g2-40	A226	16/01/2004	70.0	95.0	6.69	42.32
4303g2-41	A235	16/01/2004	80.0	95.0	5.02	47.95
4303g2-42	A261	16/01/2004	73.0	86.0	7.49	45.76
4303g2-43	A273	16/01/2004	76.0	92.0	7.07	45.10
4303g2-44	A236	16/01/2004	73.0	83.0	7.92	54.71
4303g2-45	A239	16/01/2004	76.0	86.0	7.28	43.06
4303g2-46	A264	16/01/2004	80.0	102.0	4.81	34.16
4303g2-47	A243	16/01/2004	73.0	92.0	6.99	54.46
4303g2-48	A248	16/01/2004	76.0	92.0	5.91	45.66
4303g2-49	A225	16/01/2004	76.0	108.0	4.80	43.94
4303g2-50	A234	16/01/2004	73.0	102.0	6.12	24.80
4303g2-51	A241	16/01/2004	80.0	95.0	4.95	49.92
4303g2-52	A262	16/01/2004	80.0	95.0	5.97	41.55
4303g2-53	A242	16/01/2004	83.0	105.0	5.06	39.87
4303g2-54	A259	16/01/2004	108.0	108.0	4.94	31.18
4303g2-55	A253	16/01/2004	76.0	92.0	6.63	53.82
4303g2-56	A227	16/01/2004	70.0	86.0	9.32	51.93
4303g2-57	A247	16/01/2004	76.0	92.0	6.24	40.83
4303g2-58	A237	16/01/2004	83.0	95.0	6.56	71.00
4303g2-59	A274	16/01/2004	86.0	86.0	8.89	67.45
4303g2-60	A249	16/01/2004	70.0	83.0	8.86	49.39
4303g2-61	A246	16/01/2004	80.0	89.0	8.47	59.44
					Average	**46.51**

PEC-treated *E. dunnii* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303h-1	E250	23/12/2003	105.0	121.0	14.20	74.79
4303h-2	E242	23/12/2003	115.0	130.0	5.19	27.47
4303h-3	E247	23/12/2003	121.0	140.0	9.31	55.39
4303h-4	E221	23/12/2003	102.0	111.0	10.84	71.95
4303h-5	E240	23/12/2003	121.0	134.0	9.64	61.04
4303h-6	E251	23/12/2003	99.0	111.0	7.97	65.09
4303h-7	E248	23/12/2003	121.0	137.0	11.47	58.27
4303h-8	E236	23/12/2003	140.0	162.0	6.72	39.20
4303h-9	E241	23/12/2003	89.0	98.0	9.84	44.01
4303h-10	E249	23/12/2003	95.0	115.0	8.17	57.11
4303h-11	E243	23/12/2003	118.0	127.0	9.16	52.24
4303h-12	E239	23/12/2003	127.0	143.0	9.54	52.00
4303h-13	E234	23/12/2003	137.0	150.0	9.95	43.48
4303h-14	E233	23/12/2003	80.0	99.0	6.07	38.67
4303h-15	E224	23/12/2003	76.0	89.0	12.21	58.58
4303h-16	E225	23/12/2003	140.0	161.0	8.45	46.92
4303h-17	E246	23/12/2003	76.0	83.0	9.98	58.68
4303h-18	E230	23/12/2003	80.0	118.0	16.86	55.67
4303h-19	E238	23/12/2003	134.0	146.0	8.67	42.13
4303h-20	E231	23/12/2003	76.0	89.0	7.24	38.40
4303h-21	E223	23/12/2003	127.0	137.0	8.98	35.97
4303h-22	E229	23/12/2003	111.0	127.0	6.59	35.19
4303h-23	E228	23/12/2003	118.0	130.0	6.87	41.83
4303h-24	E237	23/12/2003	124.0	150.0	7.46	37.82
4303h-25	E244	23/12/2003	95.0	115.0	6.97	29.84
4303h-26	E226	23/12/2003	99.0	111.0	7.50	40.10
4303h-27	E222	23/12/2003	130.0	146.0	9.08	30.14
4303h-28	E245	23/12/2003	130.0	140.0	9.65	44.89
4303h-29	E235	23/12/2003	143.0	144.0	9.04	49.81
4303h-30	E232	23/12/2003	134.0	140.0	7.64	45.35
					Average	**47.73**

PEC-treated *E. dunnii* debark + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303h-31	E357	23/12/2003	111.0	137.0	7.13	45.35
4303h-32	E363	23/12/2003	105.0	124.0	6.93	39.94
4303h-33	E352	23/12/2003	121.0	140.0	7.80	49.94
4303h-34	E334	23/12/2003	83.0	108.0	10.25	69.09
4303h-35	E340	23/12/2003	111.0	127.0	10.28	55.16
4303h-36	E361	23/12/2003	86.0	102.0	13.55	68.87
4303h-37	E355	23/12/2003	89.0	99.0	9.81	47.95
4303h-38	e355	23/12/2003	89.1	98.7	6.04	42.92
4303h-39	e339	23/12/2003	92.3	105.0	11.23	56.49
4303h-40	e384	23/12/2003	105.0	112.8	11.14	55.03
4303h-41	e335	23/12/2003	108.2	121.0	10.95	71.05
4303h-42	e350	23/12/2003	111.4	124.2	11.94	62.72
4303h-43	e364	23/12/2003	105.0	124.2	8.88	52.19
4303h-44	e358	23/12/2003	130.5	146.4	7.46	36.89
4303h-45	e351	23/12/2003	85.9	101.9	7.78	45.44
4303h-46	e356	23/12/2003	82.8	105.0	8.41	48.76
4303h-47	e336	23/12/2003	82.8	98.7	9.10	52.69
4303h-48	e359	23/12/2003	76.4	85.9	9.97	65.46
4303h-49	e362	23/12/2003	79.6	89.1	8.14	45.46
4303h-50		23/12/2003	73.2	92.3	7.14	46.79
4303h-51	e379	23/12/2003	85.9	105.0	9.18	54.02
4303h-52	e353	23/12/2003	85.9	108.2	10.50	56.68
4303h-53	e344	23/12/2003	101.9	112.8	9.36	52.29
4303h-54	e345	23/12/2003	112.8	133.7	10.67	64.81
4303h-55	e360	23/12/2003	124.2	136.9	8.31	46.43
4303h-56	e341	23/12/2003	121.0	140.1	10.77	57.55
4303h-57	e338	23/12/2003	114.6	124.2	7.64	39.94
4303h-58	e342	23/12/2003	95.5	121.0	9.49	51.60
4303h-59	e337	23/12/2003	85.9	92.3	10.23	54.90
4303h-60	e354	23/12/2003	89.1	89.1	6.82	45.88
4303h-61	e347	23/12/2003	73.2	82.8	9.54	49.38
					Average	**52.63**

PEC-treated *E. pilularis* debarked + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303h-1	D362	24/12/2003	80.0	95.0	15.37	75.87
4303h-2	D343	24/12/2003	121.0	130.0	15.96	70.23
4303h-3	D368	24/12/2003	95.0	121.0	11.10	55.10
4303h-4	D351	24/12/2003	118.0	115.0	8.20	55.66
4303h-5	D365	24/12/2003	124.0	137.0	13.70	67.76
4303h-6	D341	24/12/2003	95.0	118.0	8.75	60.20
4303h-7	D361	24/12/2003	89.0	111.0	16.95	88.23
4303h-8	D363	24/12/2003	118.0	127.0	10.53	67.98
4303h-9	D367	24/12/2003	80.0	92.0	11.31	78.69
4303h-10	D348	24/12/2003	127.0	137.0	11.58	79.73
4303h-11	D370	24/12/2003	102.0	115.0	12.36	70.37
4303h-12	D356	24/12/2003	111.0	124.0	10.86	60.96
4303h-13	D360	24/12/2003	76.0	76.0	17.87	100.99
4303h-14	D345	24/12/2003	137.0	156.0	11.98	66.34
4303h-15	D355	24/12/2003	124.0	150.0	6.19	42.57
4303h-16	D344	24/12/2003	162.0	178.0	8.72	44.54
4303h-17	D357	24/12/2003	118.0	166.0	6.53	48.56
4303h-18	D359	24/12/2003	89.0	95.0	17.01	75.44
4303h-19	D364	24/12/2003	102.0	111.0	11.87	52.73
4303h-20	D354	24/12/2003	115.0	127.0	11.38	58.74
4303h-21	D347	24/12/2003	137.0	146.0	14.35	73.77
4303h-22	D363	24/12/2003	108.0	134.0	9.41	63.59
4303h-23	D369	24/12/2003	85.0	95.0	12.87	67.91
4303h-24	D350	24/12/2003	102.0	127.0	7.53	60.46
4303h-25	D366	24/12/2003	80.0	86.0	14.35	69.07
4303h-26	D349	24/12/2003	86.0	105.0	12.35	79.95
4303h-27	D352	24/12/2003	111.0	130.0	12.74	67.90
4303h-28	D358	24/12/2003	159.0	191.0	5.83	48.03
4303h-29	D346	24/12/2003	159.0	175.0	10.73	75.98
					Average	**66.46**

ACQ-treated *E. globulus* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303i-1	B079	2/01/2004	76.0	111.0	5.95	52.49
4303i-2	B072	2/01/2004	76.0	99.0	8.52	65.36
4303i-3	B076	2/01/2004	83.0	111.0	7.00	47.25
4303i-4	B025	2/01/2004	73.0	108.0	10.13	65.30
4303i-5	B058	2/01/2004	108.0	140.0	5.75	46.97
4303i-6	BO71	2/01/2004	102.0	134.0	7.13	45.93
4303i-7	B083	2/01/2004	108.0	127.0	6.51	51.06
4303i-8	B048	2/01/2004	102.0	121.0	8.55	41.43
4303i-9	B067	2/01/2004	73.0	95.0	7.87	48.81
4303i-10	B070	2/01/2004	73.0	102.0	6.73	48.28
4303i-11	BO94	2/01/2004	73.0	102.0	6.96	64.21
4303i-12	B075	2/01/2004	76.0	105.0	8.55	62.48
4303i-13	B056	2/01/2004	76.0	95.0	7.01	61.25
4303i-14	B089	2/01/2004	73.0	99.0	6.89	45.14
4303i-15	B082	2/01/2004	92.0	130.0	5.37	48.99
4303i-16	B046	2/01/2004	102.0	137.0	7.18	47.19
4303i-17	B078	2/01/2004	95.0	124.0	8.30	49.85
4303i-18	B059	5/01/2004	80.0	102.0	8.28	52.26
4303i-19	B084	5/01/2004	73.0	92.0	6.96	54.07
4303i-20	B069	5/01/2004	83.0	102.0	6.67	42.53
4303i-21	B050	5/01/2004	105.0	121.0	7.12	50.70
4303i-22	B077	5/01/2004	80.0	99.0	7.00	69.66
4303i-23	B057	5/01/2004	76.0	115.0	4.87	42.82
4303i-24	B074	5/01/2004	102.0	137.0	4.94	44.93
4303i-25	B063	5/01/2004	80.0	95.0	6.58	52.88
4303i-26	B024	5/01/2004	80.0	105.0	8.30	60.60
4303i-27	B065	5/01/2004	99.0	130.0	6.86	51.08
4303i-28	B047	5/01/2004	95.0	137.0	4.37	55.40
4303i-29	B090	5/01/2004	76.0	99.0	6.87	47.62
4303i-30	B081	5/01/2004	102.0	134.0	3.24	37.65
					Average	**51.81**

PEC-treated *E. pilularis* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303i-31	D292	5/01/2004	115.0	146.0	5.98	55.04
4303i-32	D282	5/01/2004	89.0	102.0	7.12	51.91
4303i-33	D275	5/01/2004	127.0	162.0	7.60	43.06
4303i-34	D299	5/01/2004	95.0	102.0	11.25	71.14
4303i-35	D278	5/01/2004	133.0	146.0	4.75	28.73
4303i-36	D293	5/01/2004	169.0	191.0	14.87	66.08
4303i-37	D294	5/01/2004	115.0	146.0	11.93	68.41
4303i-38	D295	5/01/2004	108.0	124.0	16.32	102.97
4303i-39	D281	5/01/2004	80.0	111.0	11.45	83.61
4303i-40	D291	5/01/2004	99.0	118.0	7.78	56.07
4303i-41	D287	5/01/2004	76.0	92.0	7.67	54.01
4303i-42	D300	5/01/2004	127.0	136.0	18.01	92.45
4303i-43	D276	5/01/2004	115.0	153.0	6.73	57.06
4303i-44	D284	5/01/2004	99.0	108.0	21.95	105.77
4303i-45	D279	5/01/2004	159.0	188.0	7.78	44.51
4303i-46	D297	5/01/2004	102.0	111.0	23.21	79.05
4303i-47	D289	5/01/2004	127.0	140.0	14.22	88.13
4303i-48	D296	5/01/2004	102.0	115.0	26.03	137.11
4303i-49	D283	5/01/2004	108.0	115.0	18.37	95.95
4303i-50	D286	5/01/2004	111.0	146.0	5.89	49.36
4303i-51	D288	5/01/2004	80.0	108.0	7.30	56.95
4303i-52	D298	5/01/2004	102.0	115.0	16.26	109.81
4303i-53	D274	5/01/2004	105.0	127.0	8.38	65.05
4303i-54	D272	5/01/2004	133.0	166.0	6.06	47.44
4303i-55	D277	5/01/2004	140.0	181.0	6.24	46.22
4303i-56	D290	5/01/2004	111.0	140.0	8.25	62.89
4303i-57	D285	5/01/2004	162.0	188.0	7.15	51.93
4303i-58	D271	5/01/2004	162.0	194.0	5.82	57.15
4303i-59	D280	5/01/2004	140.0	178.0	5.78	49.51
4303i-60	D273	5/01/2004	111.0	140.0	7.27	34.12
					Average	**67.05**

ACQ-treated *P. elliottii* dried in shade

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303i-61	H040	6/01/2004	95.0	115.0	12.12	42.67
4303i-62	H035	6/01/2004	92.0	108.0	8.59	42.79
4303i-63	H042	6/01/2004	95.0	111.0	8.99	40.77
4303i-64	H026	6/01/2004	89.0	108.0	10.87	58.48
4303i-65	H031	6/01/2004	86.0	108.0	9.22	53.40
4303i-66	H025	6/01/2004	92.0	115.0	10.30	47.43
4303i-67	H037	6/01/2004	89.0	108.0	7.23	36.72
4303i-68	H045	6/01/2004	86.0	127.0	7.94	36.88
4303i-69	H027	6/01/2004	82.0	118.0	9.16	50.82
4303i-70	H023	6/01/2004	92.0	111.0	9.93	58.70
4303i-71	H028	6/01/2004	86.0	108.0	10.34	66.90
4303i-72	H038	6/01/2004	95.0	118.0	7.85	46.17
4303i-73	H036	6/01/2004	83.0	105.0	7.87	44.50
4303i-74	H032	6/01/2004	92.0	108.0	10.51	56.21
4303i-75	H044	6/01/2004	95.0	118.0	10.31	44.90
4303i-76	H024	6/01/2004	89.0	127.0	5.25	32.40
4303i-77	H039	6/01/2004	95.0	124.0	6.21	44.24
4303i-78	H021	6/01/2004	89.0	108.0	11.20	61.01
4303i-79	H029	6/01/2004	83.0	105.0	10.58	56.82
4303i-80	H034	6/01/2004	92.0	108.0	7.89	44.55
4303i-81	H049	6/01/2004	95.0	111.0	11.37	58.59
4303i-82	H030	6/01/2004	95.0	115.0	9.91	63.86
4303i-83	H033	6/01/2004	95.0	121.0	9.96	56.24
4303i-84	H043	6/01/2004	95.0	108.0	15.33	66.59
4303i-85	H022	6/01/2004	83.0	102.0	11.86	56.71
4303i-86	H048	6/01/2004	89.0	99.0	14.61	71.65
4303i-87	H050	6/01/2004	95.0	111.0	11.99	60.20
4303i-88	H041	6/01/2004	86.0	105.0	12.00	63.15
4303i-89	H046	6/01/2004	102.0	121.0	11.42	62.54
4303i-90	H047	6/01/2004	95.0	115.0	10.62	53.88
					Average	**52.66**

ACQ-treated *P. radiata* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303j-1	K056	7/01/2004	86.0	115.0	6.86	33.92
4303j-2	K016	7/01/2004	95.0	115.0	4.68	21.29
4303j-3	K029	7/01/2004	105.0	111.0	5.50	33.10
4303j-4	K037	7/01/2004	92.0	127.0	4.19	20.61
4303j-5	K023	7/01/2004	102.0	111.0	8.70	44.90
4303j-6	K014	7/01/2004	102.0	115.0	6.61	33.85
4303j-7	K024	7/01/2004	99.0	118.0	6.11	32.13
4303j-8	K013	7/01/2004	108.0	118.0	4.29	26.46
4303j-9	K044	7/01/2004	108.0	115.0	4.54	23.97
4303j-10	K007	7/01/2004	89.0	111.0	6.31	28.60
4303j-11	K003	7/01/2004	105.0	111.0	6.67	43.40
4303j-12	K020	7/01/2004	95.0	111.0	7.68	34.93
4303j-13	K055	7/01/2004	86.0	121.0	4.66	28.38
4303j-14	K015	7/01/2004	92.0	108.0	5.97	39.49
4303j-15	K002	7/01/2004	86.0	108.0	6.97	31.34
4303j-16	K004	7/01/2004	92.0	121.0	5.47	21.04
4303j-17	K021	7/01/2004	102.0	118.0	5.96	24.88
4303j-18	K035	7/01/2004	111.0	124.0	4.59	27.33
4303j-19	K033	7/01/2004	95.0	118.0	5.71	35.15
4303j-20	K019	7/01/2004	108.0	111.0	4.31	29.33
4303j-21	K018	7/01/2004	89.0	121.0	5.26	32.02
4303j-22	K022	7/01/2004	86.0	102.0	8.80	41.19
4303j-23	K040	7/01/2004	83.0	89.0	6.23	27.50
4303j-24	K017	7/01/2004	92.0	127.0	5.34	23.13
4303j-25	K031	7/01/2004	99.0	130.0	5.44	26.90
4303j-26	K051	7/01/2004	102.0	127.0	4.04	24.26
4303j-27	K034	7/01/2004	95.0	118.0	6.61	32.06
4303j-28	K027	7/01/2004	86.0	108.0	5.59	22.30
4303j-29	K012	7/01/2004	95.0	137.0	4.50	20.51
4303j-30	K005	7/01/2004	80.0	102.0	6.71	19.56
					Average	**29.45**

ACQ-treated *E. pilularis* debarked + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303j-31	D124	8/01/2004	134.0	146.0	13.81	63.50
4303j-32	D140	8/01/2004	95.0	111.0	8.72	66.44
4303j-33	D128	8/01/2004	137.0	172.0	8.41	40.30
4303j-34	D123	8/01/2004	118.0	127.0	12.98	75.82
4303j-35	D145	8/01/2004	108.0	121.0	12.25	62.22
4303j-36	D136	8/01/2004	95.0	105.0	8.87	65.01
4303j-37	D148	8/01/2004	127.0	137.0	10.56	77.34
4303j-38	D142	8/01/2004	124.0	134.0	12.98	74.25
4303j-39	D147	8/01/2004	127.0	133.0	9.27	55.98
4303j-40	D146	8/01/2004	124.0	153.0	7.35	55.07
4303j-41	D125	8/01/2004	133.0	124.0	11.07	76.47
4303j-42	D126	8/01/2004	118.0	130.0	14.05	71.37
4303j-43	D141	8/01/2004	130.0	140.0	12.47	83.83
4303j-44	D134	8/01/2004	140.0	172.0	8.62	60.95
4303j-45	D138	8/01/2004	115.0	127.0	17.29	97.93
4303j-46	D139	8/01/2004	121.0	127.0	12.53	57.58
4303j-47	D149	8/01/2004	111.0	121.0	12.76	85.35
4303j-48	D122	8/01/2004	115.0	118.0	12.57	62.89
4303j-49	D150	8/01/2004	121.0	130.0	10.57	52.93
4303j-50	D127	8/01/2004	108.0	118.0	11.04	74.94
4303j-51	D132	8/01/2004	121.0	127.0	12.26	70.05
4303j-52	D121	8/01/2004	108.0	140.0	6.12	44.66
4303j-53	D131	8/01/2004	92.0	105.0	12.51	74.59
4303j-54	D129	8/01/2004	162.0	188.0	12.14	59.59
4303j-55	D133	8/01/2004	156.0	169.0	12.25	88.11
4303j-56	D143	8/01/2004	150.0	143.0	11.19	60.88
4303j-57	D144	8/01/2004	133.0	166.0	8.20	57.12
4303j-58	D137	8/01/2004	166.0	194.0	14.46	54.51
4303j-59	D130	8/01/2004	137.0	175.0	6.84	48.00
4303j-60	D135	8/01/2004	172.0	204.0	15.09	72.18
					Average	**66.33**

CCA-treated *P. radiata* debarked

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303j-61	K158	12/01/2004	95.0	111.0	8.13	41.68
4303j-62	K157	12/01/2004	99.0	105.0	7.97	45.61
4303j-63	K175	12/01/2004	99.0	124.0	7.15	36.74
4303j-64	K152	12/01/2004	99.0	108.0	6.73	46.83
4303j-65	K151	12/01/2004	108.0	121.0	6.34	31.73
4303j-66	K167	12/01/2004	89.0	108.0	5.87	36.61
4303j-67	K180	12/01/2004	105.0	118.0	5.49	34.68
4303j-68	K164	12/01/2004	99.0	115.0	8.14	54.06
4303j-69	K156	12/01/2004	99.0	124.0	5.61	31.59
4303j-70	K155	12/01/2004	83.0	115.0	5.73	31.75
4303j-71	K166	12/01/2004	102.0	127.0	6.22	31.22
4303j-72	K153	12/01/2004	105.0	121.0	6.56	36.37
4303j-73	K174	12/01/2004	99.0	111.0	8.63	52.55
4303j-74	K169	12/01/2004	111.0	127.0	7.20	42.24
4303j-75	K163	12/01/2004	92.0	102.0	7.05	38.69
4303j-76	K159	12/01/2004	95.0	111.0	6.02	53.66
4303j-77	K161	12/01/2004	83.0	95.0	5.21	27.78
4303j-78	H156	12/01/2004	64.0	102.0	4.77	23.86
4303j-79	K160	12/01/2004	86.0	108.0	7.30	39.29
4303j-80	K177	12/01/2004	89.0	95.0	8.97	46.06
4303j-81	K172	12/01/2004	89.0	95.0	6.82	39.56
4303j-82	K171	12/01/2004	95.0	105.0	7.98	44.99
4303j-83	K175	12/01/2004	92.0	102.0	6.93	46.77
4303j-84	K173	12/01/2004	102.0	111.0	9.61	40.89
4303j-85	K168	12/01/2004	92.0	102.0	11.85	36.28
4303j-86	K170	12/01/2004	108.0	124.0	4.92	30.80
4303j-87	K162	12/01/2004	86.0	108.0	6.50	43.39
4303j-88	K178	12/01/2004	102.0	115.0	5.44	24.12
4303j-89	K176	12/01/2004	105.0	111.0	6.67	39.47
					Average	**38.94**

ACQ-treated *A. mearnsii* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303k-1	G065	13/01/2004	95.0	133.0	7.07	63.26
4303k-2	G064	13/01/2004	83.0	115.0	9.95	91.38
4303k-3	G117	13/01/2004	80.0	95.0	12.08	78.16
4303k-4	G061	13/01/2004	118.0	153.0	7.06	65.44
4303k-5	G096	13/01/2004	92.0	111.0	10.34	82.79
4303k-6	G074	13/01/2004	89.0	108.0	9.22	62.39
4303k-7	G090	13/01/2004	105.0	137.0	4.34	63.65
4303k-8	G118	13/01/2004	102.0	115.0	6.97	75.10
4303k-9	G084	13/01/2004	105.0	127.0	10.72	49.69
4303k-10	G070	13/01/2004	70.0	99.0	6.40	70.01
4303k-11	G067	13/01/2004	83.0	102.0	8.55	85.62
4303k-12	G063	13/01/2004	89.0	92.0	8.00	70.35
4303k-13	G110	13/01/2004	115.0	133.0	8.36	72.70
4303k-14	G068	13/01/2004	75.0	92.0	12.78	111.17
4303k-16	G093	13/01/2004	105.0	133.0	18.99	118.68
4303k-17	G091	13/01/2004	73.0	92.0	12.05	77.58
4303k-18	G115	13/01/2004	111.0	153.0	7.42	28.84
4303k-19	G116	13/01/2004	133.0	153.0	7.87	62.49
4303k-20	G102	13/01/2004	105.0	133.0	12.22	80.43
4303k-21	G072	13/01/2004	86.0	102.0	5.58	58.94
4303k-22	G066	13/01/2004	83.0	95.0	9.99	87.54
4303k-23	G097	13/01/2004	99.0	115.0	9.04	80.82
4303k-24	G078	13/01/2004	83.0	95.0	9.92	86.29
4303k-25	G085	13/01/2004	130.0	169.0	7.55	65.19
4303k-26	G092	13/01/2004	76.0	102.0	7.66	69.91
					Average	**74.34**

ACQ-treated *P. elliottii* debark only

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303k-27	H153	14/01/2004	95.0	115.0	8.89	43.62
4303k-28	H156	14/01/2004	99.0	137.0	6.01	31.94
4303k-29	H154	14/01/2004	86.0	111.0	7.15	49.96
4303k-30	H160	14/01/2004	86.0	111.0	5.78	39.14
4303k-31	H155	14/01/2004	86.0	115.0	6.11	36.74
4303k-32	H167	14/01/2004	86.0	111.0	6.00	34.88
4303k-33	H159	14/01/2004	89.0	108.0	5.76	35.22
4303k-34	H178	14/01/2004	105.0	124.0	6.24	34.74
4303k-35	H166	14/01/2004	95.0	115.0	6.28	40.01
4303k-36	H158	14/01/2004	83.0	105.0	6.01	36.56
4303k-37	H163	14/01/2004	99.0	115.0	7.64	45.53
4303k-38	H151	14/01/2004	86.0	108.0	7.24	45.92
4303k-39	H179	14/01/2004	86.0	108.0	6.94	40.98
4303k-40	H164	14/01/2004	92.0	115.0	7.53	46.04
4303k-41	H169	14/01/2004	99.0	121.0	7.34	47.61
4303k-42	H180	14/01/2004	86.0	115.0	6.79	44.22
4303k-43	H176	14/01/2004	95.0	115.0	5.10	28.98
4303k-45	H157	14/01/2004	83.0	111.0	6.15	41.95
4303k-46	H171	14/01/2004	89.0	108.0	8.64	38.79
4303k-47	H173	14/01/2004	95.0	108.0	8.32	43.66
4303k-48	H152	14/01/2004	99.0	111.0	4.37	31.93
4303k-49	H170	14/01/2004	83.0	102.0	8.15	49.48
4303k-50	H175	14/01/2004	95.0	111.0	5.03	38.76
4303k-51	H168	14/01/2004	92.0	115.0	6.45	37.51
4303k-52	H161	14/01/2004	86.0	118.0	7.77	49.45
4303k-53	H172	14/01/2004	67.0	111.0	6.36	40.88
4303k-54	H177	14/01/2004	92.0	115.0	4.62	24.01
4303k-55	H162	14/01/2004	92.0	111.0	7.53	54.28
4303k-56	H174	14/01/2004	86.0	118.0	8.36	44.99
					Average	**40.61**

PEC-treated *C. maculata* debark + gang-nail

Sample No.	Client No.	Date Tested	SED (mm)	LED (mm)	MOE (Gpa)	MOR (Mpa)
4303k-57	C355	15/01/2004	92.0	102.0	11.73	67.02
4303k-58	C341	15/01/2004	102.0	111.0	16.40	118.48
4303k-59	C361	15/01/2004	89.0	108.0	9.06	37.53
4303k-60	C350	15/01/2004	99.0	102.0	15.37	113.79
4303k-61	C367	15/01/2004	86.0	99.0	10.20	64.77
4303k-62	C356	15/01/2004	77.0	92.0	11.51	81.87
4303k-63	C366	15/01/2004	80.0	83.0	14.41	90.84
4303k-64	C359	15/01/2004	92.0	111.0	11.84	95.21
4303k-65	C360	15/01/2004	73.0	83.0	11.90	85.08
4303k-66	C348	15/01/2004	83.0	92.0	15.66	118.23
4303k-67	C352	15/01/2004	86.0	102.0	12.94	93.11
4303k-68	C344	15/01/2004	83.0	95.0	14.00	73.94
4303k-69	C345	15/01/2004	73.0	82.0	16.84	102.33
4303k-70	C368	15/01/2004	102.0	111.0	11.34	90.80
4303k-71	C365	15/01/2004	95.0	108.0	14.67	128.38
4303k-72	C347	15/01/2004	92.0	102.0	18.59	145.85
4303k-73	C358	15/01/2004	86.0	108.0	11.46	82.81
4303k-74	C353	15/01/2004	108.0	121.0	14.29	128.25
4303k-75	C354	15/01/2004	92.0	80.0	17.68	91.49
4303k-76	C351	15/01/2004	92.0	105.0	15.18	120.06
4303k-77	C370	15/01/2004	99.0	108.0	12.43	95.95
4303k-78	C362	15/01/2004	76.0	86.0	28.92	124.41
4303k-79	C363	15/01/2004	76.0	92.0	12.61	110.25
4303k-80	C369	15/01/2004	102.0	105.0	13.47	102.10
4303k-81	C357	15/01/2004	89.0	99.0	14.34	110.86
4303k-82	C364	15/01/2004	99.0	111.0	7.09	68.14
4303k-83	C346	15/01/2004	102.0	108.0	14.84	101.21
4303k-84	C342	15/01/2004	73.0	95.0	9.86	73.88
4303k-85	C343	15/01/2004	89.0	95.0	15.52	114.43
4303k-86	C349	15/01/2004	105.0	111.0	14.58	126.45
					Average	**98.58**

APPENDIX F PAH levels in soil samples taken at distaces from treated posts

PEC-treated posts

E. grandis

Post No.	PAH levels (mg/kg)								
	50 mm from post			100 mm from post			500 mm from post		
	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr
105	6.0	13	29	20	<1.6	4.0	<1.6	<1.6	<1.6
110	30	<1.6	27	2.1	<1.6	11	<1.6	<1.6	<1.6
122	59	18	8.8	1.9	2.2	<1.6	<1.6	<1.6	<1.6
132	20	2.4	9.2	<1.6	3.4	3.4	<1.6	<1.6	<1.6
141	19	15	6.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
151	40	31	55	5.0	<1.6	<1.6	<1.6	<1.6	<1.6
165	29	3.9	28	6.1	<1.6	4.8	<1.6	<1.6	<1.6
174	6.1	47	12	<1.6	5.5	<1.6	<1.6	<1.6	<1.6
183	28	11	53	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
188	24	11	12	2.1	<1.6	<1.6	<1.6	<1.6	<1.6
Mean	**26.1**	**15.4**	**24.1**	**2.5**	**2.1**	**3.3**	**<1.6**	**<1.6**	**<1.6**

E. globulus

Post No.	PAH levels (mg/kg)								
	50 mm from post			100 mm from post			500 mm from post		
	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr
5	4.9	8.0	6.6	<1.6	3.1	<1.6	<1.6	<1.6	<1.6
14	31	7.2	2.5	2.2	3.5	3.4	<1.6	<1.6	<1.6
21	10	3.2	<1.6	<1.6	2.6	<1.6	<1.6	<1.6	<1.6
31	65	22	17	5.2	6.6	<1.6	<1.6	<1.6	<1.6
41	7.2	5.2	3.2	2.3	<1.6	<1.6	<1.6	<1.6	<1.6
51	9.7	3.8	42	<1.6	2.0	<1.6	<1.6	<1.6	<1.6
63	8.0	3.2	11	17	8.4	<1.6	<1.6	<1.6	<1.6
72	20	5.2	2.7	11	<1.6	<1.6	<1.6	<1.6	<1.6
82	20	6.5	24	2.7	9.7	4.1	<1.6	<1.6	<1.6
88	<1.6	11	19	<1.6	<1.6	3.4	<1.6	<1.6	<1.6
Mean	**16.8**	**7.5**	**13.0**	**3.8**	**4.1**	**2.2**	**<1.6**	**<1.6**	**<1.6**

E. camaldulensis

Post No.	PAH levels (mg/kg)								
	50 mm from post			100 mm from post			500 mm from post		
	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr
200	24	11	4.9	3.1	4.6	<1.6	<1.6	<1.6	<1.6
208	<1.6	21	3.9	<1.6	3.9	<1.6	<1.6	<1.6	<1.6
221	4.4	18	7.2	<1.6	<1.6	2.4	<1.6	<1.6	<1.6
229	19	<1.6	21	12	<1.6	7.0	<1.6	<1.6	<1.6
237	15	12	29	<1.6	<1.6	8.1	<1.6	<1.6	<1.6
244	20	15	52	<1.6	<1.6	5.7	<1.6	<1.6	<1.6
255	67	40	28	4.4	3.2	24	<1.6	<1.6	<1.6
259	19	29	12	4.6	2.8	4.0	<1.6	<1.6	<1.6
265	29	30	61	<1.6	<1.6	7.6	<1.6	<1.6	<1.6
272	9.9	27	39	<1.6	<1.6	16	<1.6	<1.6	<1.6
Mean	**20.8**	**20.5**	**25.8**	**3.4**	**2.4**	**7.8**	**<1.6**	**<1.6**	**<1.6**

HTC-treated posts

P. radiata

Post No.	PAH levels (mg/kg)								
	50 mm from post			100 mm from post			500 mm from post		
	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr	1 yr	2 yr	3 yr
1	30	15	56	1.7	1.9	2.6	<1.6	<1.6	<1.6
2	21	9.0	4.0	<1.6	4.3	<1.6	<1.6	<1.6	<1.6
Mean	**25.5**	**12.0**	**30.0**	**1.7**	**3.1**	**2.1**	**<1.6**	**<1.6**	**<1.6**

Disclaimer

The opinions provided in the Report have been prepared for the Client and its specified purposes. Accordingly, any person other than the Client, uses the information in this report entirely at its own risk. The Report has been provided in good faith and on the basis that every endeavour has been made to be accurate and not misleading and to exercise reasonable care, skill and judgment in providing such opinions.

Neither ensis nor its parent organisations, CSIRO and Scion, or any of its employees, contractors, agents or other persons acting on its behalf or under its control accept any responsibility or liability in respect of any opinion provided in this Report by ensis.