

## **Public consultation on DZ 3640 *Preservation of timber and wood-based products***

This brief provides an overview of the key changes that are included in this draft standard DZ 3640 *Preservation of timber and wood based products*. It outlines the rationale for changes in this standard and is intended to inform readers' feedback on the draft standard.

NZS 3640:2003 *Chemical preservation of round and sawn timber* was published in 2003 and sets out the requirements for chemical preservative treatment to provide protection from decay and insects, including marine borers. The standard describes the hazard classification for service and applicable biological hazards and also provides timber identification requirements. NZS 3640 has been amended five times since it was first published.

The intent of this revision is to align the language of the standard with the New Zealand Building Code, and with NZS 3602 *Timber and wood-based products for use in buildings*, which is also being revised. This revision to the standard also reflects changes in industry practice, new treatments, the inclusion of additional wood products, and non-biocidal treatments. Consequently, the title of the standard has been amended to reflect these changes.

In July 2016, as part of the revision of the standard, Standards New Zealand sought proposals from industry on additional treatments or amendments to be included in the standard. The committee reviewed these applications and some have been included in the draft standard

### **The key changes to the standard are summarised as follows**

#### **1. Proposal to change the title of the standard to reflect the inclusion of other wood-based products and new treatment systems**

##### **Proposed title – Preservation of wood and timber based products**

The draft standard now includes sawn timber, roundwood, part rounds, and some engineered wood products (such as plywood and LVL). Glulam is now included too. The treatment requirements for glulam are the same as for sawn timber. The word 'chemical' has been removed from the title as the draft proposed standard includes some modified wood treatments that do not fit the accepted terminology for a chemical wood preservative.

#### **2. Format of standard**

The clause numbering and layout have been aligned with other recent New Zealand standard publications. Some appendices have been removed where the information can be referenced to other standards, for example AS/NZS1605 *Methods for sampling and analyzing timber preservatives and preservative-treated timber*. A significant change is the previous section 4 on Preservatives, which is now included as a normative appendix (appendix B).

#### **3. Timber species**

The draft standard applies to *Pinus radiata*. Other species may be treated to hazard class H1.1 and H1.2 provided the preservative penetration and retention requirements can be achieved, and the timber species is listed in NZS 3602 for that particular hazard class. For plywood, LVL, and glulam the treatments are for radiata pine only. This reflects the current requirements in NZS 3640 for sawn timber.

#### **4. Definitions**

There have been significant changes to the definitions for preservative penetration and retention.

- The definition for 'Complete penetration' is amended and a new definition for 'Evidence of penetration' has been included;
- The definitions of Characteristic value (Penetration) and Characteristic value (retention) have been revised.

Photographs and diagrams have been included in appendix A as informative guidance to help interpret the definitions and requirements.

The new definitions avoid the ambiguity of the existing wording that permitted a set of 10 samples to include an 'untreated' sample, and have the set of samples pass. The draft standard proposes the following:

- In a set of 10 samples, a single sample may fail the penetration requirements but the new definition will require that sample to be analysed and achieve 66% of the minimum retention in the analytical zone for the set to pass;
- In a set of 10 samples, if all pass the penetration requirement, and a single sample fails on the retention requirements, the new definition will require that sample to achieve 66% of the minimum retention in the analytical zone.

## **5. Heartwood**

There have been no changes to the existing penetration requirements for heartwood. There is no heartwood penetration requirement for H1.2. There is also no defined heartwood penetration requirement for H3.1 and H3.2 provided the timber or wood product is treated in 'final shape and form'. If there is machining after treatment to H3.1 and H3.2 resulting in a change to cross-section dimensions then there is a heartwood penetration requirement.

The current requirements in the standard are unchanged as there is no evidence of failure with the current specification of heartwood in treated timber exposed under in-service conditions.

## **6. Inclusion of some plywood and laminated veneer lumbar (LVL) chemical preservation treatments**

New Plywood and LVL treatments are included based on applications that were submitted. These wood products are to be manufactured from radiata pine. No data was submitted on other species.

## **7. The removal of a mandatory requirement for inclusion of waxes/resins in light organic solvent preservative (LOSP) azole (propiconazole plus tebuconazole) treating solutions**

Under some circumstances waxes and resins may have an adverse effect on the properties of the treated timber. The preservative without wax/resin has been demonstrated to meet a 15 year minimum performance.

An application was received to remove the mandatory requirements for the inclusion of waxes and resins. The addition of wax/resin is therefore removed as a mandatory requirement as its inclusion or not should be the decision of the preservative supplier/treater as appropriate to the type of wood product and end use.

## **8. The removal of tributyl tin oxide (TBTO) and tributyl tin naphthenate (TBTN) as approved preservatives.**

Tributyl tin oxide (TBTO) and Tributyl tin naphthenate (TBTN) have been removed without prejudice as they are no longer used commercially. IPBC was previously from the standard as a single active ingredient fungicide treatment.

## 9. Inclusion of chemical treatments

As part of the revision Standards New Zealand sought proposals from industry on additional treatments or amendments to be included in the revision of NZS 3640. Some of these are being proposed for inclusion in the standard.

- (a) A boron polyol treatment as an envelope treatment for sawn timber in H1.2;
- (b) A boron ethanolamine treatment as an envelope treatment for LVL in H1.2;
- (c) The existing glueline and surface triadimefon plus cyproconazole treatment for H1.2 to be extended to include plywood;
- (d) A glueline and surface triadimefon plus cyproconazole treatment for H3.1 for both LVL and plywood;
- (e) A LOSP Copper tebuconazole treatment for H3.1 and H3.2.

The key aspects of the proposed treatments are as follows:

- The H1.2 treatment is to provide in-service protection to framing but is not designed for extended or prolonged exposure to an elevated moisture contact;
- The H3.1 and H3.2 treatments are required for timber to be durable for a minimum of 15 and 50 years respectively;
- The boron polyol treatment applied as an envelope on sawn timber was supported by 8 years' exposure data from a biological test of framing exposed in a high hazard environment.
- The boron ethanolamine applied as an envelope on LVL was supported by 2 years' exposure data in a high hazard environment.
- Both these envelope treatment options for sawn timber and LV have defined penetration patterns and with a boron retention that is 50% higher than the conventional boron H1.2 treatment;
- The envelope treatments would be identified with an 'E' as part of the branding;
- The glueline and surface triadimefon and cyproconazole treatments were supported by exposure studies. The current H1.2 approval has been extended to include plywood. There is no penetration requirement as the preservative is distributed throughout the cross-section in the glue lines. The maximum veneer thickness is specified. The H3.1 application was supported by field test data from many sites (NZ, Australia, USA). The H3.1 retention is double that of the H1.2 retention;
- The LOSP copper tebuconazole application was supported by bioequivalence testing with a water-based copper azole treatment. There was no data for the biological hazard for H1.2, so this treatment is specifically excluded from timber framing (H1.2) applications.

## 10. Inclusion of new non-biocidal chemical modification systems

The following non-biocidal chemical modification systems are proposed for inclusion:

- (a) Dimethyloldihydroxyethelenurea (DMDHEU) treatment of radiata pine only for H3.1 and some H3.2 end uses, and H4 round posts, for example, for use in vineyards;
- (b) Acetylation of radiata pine only for H3.1 and some specific H3.2 end uses;

The key aspects of the proposed treatments are as follows:

- These treatments are restricted to radiata pine and selected sapwood. The treatments modify the timber. These are not traditional chemical preservative systems;
  - Neither of these treatment systems can be used for H1.2.
- There is no other standard for this type of chemical modification treatment system. These have been included in the draft DZ 3640 standard as there are properties that can be analysed for compliance with the proposed specification.

## **11. Separate tables for hazard classes H3.1 to H3.2**

Separate tables are included for H3.1 and H3.2

- (a) Water-borne copper chemical treatments that had identical retentions for H3.1 and H3.2 have been removed from H3.1;
- (b) The H3.2 treatments can be used for H3.1 end use situations;
- (c) The only H3.2 treatments that can be used for framing (H1.2) are the water-based treatments; copper chrome arsenate (CCA), copper quaternary and copper azole;
- (d) These changes to the hazard class 3 tables are intended to simplify the current table and distinguish more clearly between the in-service durability requirements.
- (e) All treatments of a higher hazard class do not by default meet the requirements of a lower hazard class. Hazard class H1.2 has specific biological hazard and fitness-for-purpose requirements.

## **12. Identification of treated timber or wood products**

The following requirements for branding or identification of treated timber are proposed for inclusion in the draft

- (a) New preservative numbers – The wood modification treatments have been assigned new numbers; 82 for DMDHEU and 83 for Acetylated wood;
- (b) Colour coding of H1.2 – The pink or red colour for boron treatment, or green for the azole treatment for framing would not be required if there was continuous ink branding along a face or edge of the board;
- (c) Two new envelope treatments are proposed for H1.2 for sawn timber and LVL and are proposed to be identified with an 'E' in the brand.

## **13. Hazard class H4 and H5**

The analytical zones for hazard classes H4 and H5 have been simplified.

## **14. Hazard class H6**

The only preservative approved is CCA and only a minimum copper retention was specified previously. This has been retained but a CCA total elements retention requirement has been proposed.

## **15. Supplementary treatments**

A new section on supplementary treatments has been proposed as a new appendix C.

## **16. Fixation of CCA**

Fixation of CCA is a proposed as a mandatory requirement for treated timber before dispatch from the treatment facility.

# DRAFT

New Zealand Standard

---

**Draft**

**Number:**

**DZ 3640:2018**

---

**Public consultation  
draft**

**Preservation of timber  
and wood-based  
products**

Draft	Date
	13/12/17

**Committee: P3640**

---

DO NOT USE THIS DRAFT AS A STANDARD –  
IT MAY BE ALTERED BEFORE FINAL PUBLICATION

---

Standards New Zealand

---

Private Bag 1473, Wellington 6140

---

## Public comment information

### Status

This document is a proposed New Zealand standard under the Standards and Accreditation Act 2015. Issued as a draft in this form, it provides the required statutory opportunity for consideration and comment by the bodies and persons having an interest in the standard.

### How to comment

Closing date for comments is **March 9, 2018**.

There are two preferred methods for submitting comments.

- (a) You can submit comments via the Standards New Zealand website at <https://www.standards.govt.nz/developing-standards/comment-on-draft-standards/> in the 'New Zealand draft standards' tab, using the 'submit comments' button below this standard's entry. The electronic system is limited to text only and does not recognise engineering notation, equations or symbols.
- (b) You can submit comments using the downloadable public comment form, available at <https://www.standards.govt.nz/assets/Drafts/DZ3640-Public-comment-form.docx>. **Please** email the completed form to [SNZPublicComments@mbie.govt.nz](mailto:SNZPublicComments@mbie.govt.nz).

### Please read before commenting

To help you send in your comments, please read the following.

- (1) Comments are invited, preferably in electronic format, on the technical content, wording, and general arrangement of this draft.
- (c) Editorial matters (that is spelling, punctuation, grammar, numbering, references, and so on) will be corrected before final publication.
- (d) Please do not return marked-up drafts as comments.
- (e) When completing the public comment form, ensure that the number of this draft, your name and organisation (if applicable) is recorded. Please place relevant clause numbers beside each comment.
- (f) Please provide supporting reasons and suggested wording, for each comment. Where you consider that specific content is too simplistic, too complex or too detailed, provide an alternative.
- (g) If the draft is acceptable without change, an acknowledgement to this effect would be appreciated.
- (h) Normally no acknowledgement of comment is sent. All comments received by the due date will be put before the relevant development committee. Where appropriate, changes will be incorporated before the standard is formally approved.

#### Postal address

Standards New Zealand  
Private Bag 1473  
WELLINGTON 6140

#### Physical address

15 Stout Street  
WELLINGTON 6011

**Telephone:** +64 3 943 4259

**Enquiries:** [enquiries@standards.govt.nz](mailto:enquiries@standards.govt.nz)

**Email:** [SNZPublicComments@mbie.govt.nz](mailto:SNZPublicComments@mbie.govt.nz)

**Website:** [www.standards.govt.nz](http://www.standards.govt.nz)

New Zealand Standard

**Preservation of timber and  
wood-based products**

---

Superseding NZS 3640:2003

## **Committee representation**

This draft was prepared under the supervision of the Committee for the NZ Standards Executive established under the Standards and Accreditation Act 2015.

The committee consisted of representatives of the following organisations:

Australia and New Zealand Timber Preservatives Manufacturers Association

BRANZ

Building Officials Institute of New Zealand

Frame Truss Manufacturers' Association of New Zealand

Independent Chair – Co-opted by Standards New Zealand

MBIE, BSP

New Zealand Building Industry Federation

New Zealand Farm Forestry Association

New Zealand Timber Industry Federation Inc.

Scion

Timber Design Society

Timber Treatment Audit Organisations

Wood Processors and Manufacturers Association

WorkSafe New Zealand

## **Acknowledgement**

Standards New Zealand gratefully acknowledges the contribution of time and expertise from all those involved in developing this draft standard.

## **Copyright**

This document is Crown copyright administered by the New Zealand Standards Executive. You may not reproduce any part of it without prior written permission of the New Zealand Standards Executive, unless your actions are permitted by Part 3 of the Copyright Act 1994.

We will vigorously defend the copyright in this standard. Your unauthorised use may result in penalties being imposed under the Copyright Act 1994 including fines of up to \$10,000 for every infringing copy (up to a maximum of \$150,000 for the same transaction and for other specified offences) or imprisonment of up to 5 years. If the breach is serious, we may also seek additional damages from you as well as injunctive relief and/or an account of profits.

Published by Standards New Zealand, PO Box 1473, Wellington 6140. Telephone: (03) 943 4259, Website: [www.standards.govt.nz](http://www.standards.govt.nz).



## Contents

1	General .....	10
1.1	Scope.....	10
1.2	Interpretation.....	10
1.3	Definitions .....	11
1.4	Abbreviations .....	13
2	Hazard classes and treatment requirements .....	15
2.1	Hazard classification .....	15
2.2	Selection of timber treatment.....	16
2.3	Preservative penetration and retention.....	16
2.4	Penetration and retention sampling requirements.....	17
3	Identification of treated timber and wood products .....	18
3.1	Branding.....	18
3.2	Colouring.....	20
4	Hazard class specifications.....	21
4.1	Hazard classes H1.1 and H1.2 .....	21
4.2	Hazard class H3.1 and H3.2.....	25
4.3	Hazard class H4 .....	30
4.4	Hazard class H5 .....	31

## Appendix

Appendix A - Guidance for penetration patterns .....	33
Appendix B - Chemical preservation.....	40
Appendix C - Supplementary treatments .....	44
Appendix D - Analytical methods .....	45
Appendix E - Central ninth analytical zone .....	46
Appendix F - Specification advisory notes .....	47
Appendix G - Applying for new or variations to preservation treatments .....	49

## Table

Table 1: Hazard classification .....	15
Table 2: Requirements for branding or identification of treated timber .....	18
Table 3: Colour coding for timber and wood-based products in H1.2.....	20
Table 4: Minimum preservative retention in the H1.1 analysis zone .....	22
Table 5: Minimum preservative retention in the H1.2 analysis zone .....	24
Table 6: Minimum preservative retention in the H3.1 analysis zone .....	26
Table 7: Minimum preservative retention in the H3.2 analysis zone .....	29
Table 8: Minimum preservative retention in the H4 analysis zone .....	30
Table 9: Minimum preservative retention in the H5 analysis zone .....	31
Table 10: Minimum preservative retention in the H6 analysis zone (rounds, part rounds and sawn timber) .....	32
Table 11: Relative proportions of CCA components.....	40
Table 12: Relative proportions of alkaline copper quaternary components.....	41
Table 13: Relative proportions of CuAz components.....	41
Table 14: Relative proportions of propiconazole and tebuconazole .....	41
Table 15: LOSP fungicides .....	42
Table 16: Relative proportions of propiconazole and tebuconazole .....	43
Table 17: Relative proportions of CuAz components.....	43
Table 18: Relative proportions of triadimefon and cyproconazole components .....	44

## Figure

Figure 1: Examples for branding.....	20
Figure 2: Examples for penetration patterns for copper based treatments – Sawn timber treated with water-borne copper preservative .....	33
Figure 3: Examples for penetration patterns for sawn timber treated with water borne copper preservative and planed after treatment.....	35
Figure 4: Examples for penetration patterns for sawn timber treated with LOSP azole preservative and fabricated as glulam after treatment.....	36
Figure 5: Examples for penetration patterns for sawn timber treated with LOSP azole preservative .....	37

Figure 6: Examples for penetration patterns for penetrations patterns for boron treatment..... 38

Figure 7: Sawn timber treated with boron preservative to envelope penetration pattern  
(identified with 'E'brand).....39

Figure 8: Examples for determining central ninth zone.....46

## Referenced documents

Reference is made in this document to the following:

New Zealand standards

NZS 3602:2003 <sup>1</sup>	Timber and wood-based products for use in building (In preparation)
NZS 3603:1993 <sup>2</sup>	Timber structures (Under review)
NZS 3604:2011	Timber-framed buildings
NZS 3605:2001	Timber piles and poles for use in building

### Joint Australian/New Zealand standards

AS/NZS 1605:- - - <sup>3</sup>	Methods for sampling and analysing timber preservatives and preservative-treated timber
Part 1:2006	General requirements, sampling, and determination of sapwood and heartwood presence
Part 2:2006	Determination of preservative penetration by spot tests
Part 3:2006	Analysis methods for determination of preservative retention
Part 4:2006	Analysis methods for determination of preservative solution concentration
AS/NZS 4491:1997	Timber – Glossary of terms in timber related standards

### Australian standards or of other national standards bodies – listed in alphabetical order

AS 3530:2009	Solvents – Mineral turpentine and white spirit
ISO 16634-1 and ISO 16634-2	

### Other publications

American Wood Protection Association AWPAC Standard P36-16 July 2016 – Standard for Oil-Borne Preservatives

Protocols for assessment of wood preservatives, Australasian Wood Preservation Committee (AWPC), September 2015 revision

### New Zealand legislation

Hazardous Substances and New Organisms (HSNO) Act 1996

Building Act 2004, New Zealand Building Code (NZBC) and Compliance Documents Websites

## Latest revisions

The users of this standard should ensure that their copies of the above-mentioned New Zealand standards are the latest revisions. Amendments to referenced New Zealand and joint Australian/New Zealand standards can be found on [www.standards.govt.nz](http://www.standards.govt.nz).

## Review of standards

Suggestions for improvement of this standard will be welcomed. They should be sent to the Manager, Standards New Zealand, Private Bag 1473, Wellington 6140.

---

<sup>1</sup> NZS 3602:2003 is being revised and the draft standard is currently out for public consultation.

<sup>2</sup> NZS 3603 is under review and is expected to be superseded by NZS AS 1720.1

<sup>3</sup> AS/NZS 1605 suite of standard are currently under review

## Foreword

NZS 3640:2003 *Chemical preservation of round and sawn timber* was published in 2003 and set out the requirements for chemical preservative treatment to provide protection from decay and insects, including marine borers. The standard describes the hazard classification for service and biological hazard and also provides timber identification requirements.

NZS 3640 has been amended five times since it was first published. This latest revision to the standard reflects changes in industry practice, new treatments, additional wood products, and non-biocidal treatments. Consequently, the title of the standard has been amended to 'Preservation of timber and wood based products'.

The key changes are summarised below:

- a. The standard applies to *Pinus radiata*. Other species may be treated to hazard class H1.2 provided the preservative penetration and retention requirements can be achieved, and the timber species is listed in NZS 3602<sup>4</sup> for the particular hazard class. This only applies to sawn timber.
- b. The standard now includes glulam products for some hazard classes. The penetration and retention requirements are the same as for sawn timber.
- c. Plywood, LVL, and glulam treatments are for radiata pine only. This reflects the current requirements in NZS 3640 for sawn timber and roundwood.
- d. Definitions in the standard have been reviewed and updated, specifically changes to the definitions for preservative penetration and retention. Photographs and diagrams have been included in new appendices A and E as guidance to help interpret the definitions and requirements.
- e. Tributyl tin oxide (TBTO) and Tributyl tin naphthenate (TBTN) have been removed from H3.1 without prejudice as they are no longer used commercially. TBTO, TBTN and Iodo propyl butyl carbamate (IPBC) were previously removed from H1.2 during the last amendment to this standard.
- f. As part of the revision of the standard, Standards New Zealand sought proposals from industry on additional treatments or amendments to be included in the standard. The following are the list of treatments proposed for inclusion in the draft standard:
  - (i) A boron polyol treatment as an envelope treatment for sawn timber in H1.2;
  - (ii) A boron ethanolamine treatment as an envelope treatment for LVL in H1.2;
  - (iii) The glueline and surface triadimefon plus cyproconazole treatment for H1.2 to be extended to include plywood;
  - (iv) A glueline and surface triadimefon plus cyproconazole treatment for H3.1 for both LVL and plywood;
  - (v) A LOSP Copper tebuconazole treatment for H3.1 and H3.2.
- g. The following non-biocidal chemical modification systems are proposed for inclusion:
  - (i) Dimethyloldihydroxyethelenurea (DMDHEU) treatment of radiata pine only for H3.1 and some H3.2 end uses, and H4 posts, for example, for use in vineyards;
  - (ii) Acetylation of radiata pine only for H3.1 and some specific H3.2 end uses;
  - (iii) Neither of these treatment systems can be used for H1.2.

---

<sup>4</sup> NZS 3602:2003 is being revised and the draft standard is currently out for public consultation.

- h. The following requirements for branding or identification of treated timber are proposed for inclusion in the draft
  - (i) New preservative numbers – The wood modification treatments have been assigned new numbers; 82 for DMDHEU and 83 for Acetylated wood;
  - (ii) Colour coding of H1.2 – The pink or red colour for boron treatment, or green for the azole treatment for framing would not be required if there was continuous ink branding along a face or edge of the board;
  - (iii) Two new envelope treatments are proposed for H1.2 for sawn timber and LVL, and are proposed to be identified with an 'E' in the brand.
- i. A new appendix has been added on supplementary treatments (appendix C) and an appendix with specification advisory notes (appendix F).
- j. NZS 3640 is intended to be used in conjunction with NZS 3602, NZS 3603, NZS3604 and NZS 3605. It is also intended to be suitable for reference as a means of compliance with New Zealand Building Code clause B2 Durability.

NOTE – Throughout this standard, New Zealand Building Code (New Zealand Building Code) Acceptable Solutions are referred to by their number/letter assignment only (such as B2/AS1).

## 1 General

### 1.1 Scope

#### 1.1.1 Objectives

This standard sets out requirements for the preservation and identification of timber and wood-based products to provide protection from decay and insect attack. This includes marine borers in all likely exposure conditions throughout New Zealand. The requirements are based on hazard classes that are described in this standard.

The assessment of treatments in this standard is on an evidential basis for resisting fungal, insect or marine wood borer attack within the prescribed hazard class.

This Standard is intended for use by treatment plants. Assessment of compliance is to apply at the plant gate.

#### 1.1.2 Inclusions

The requirements for hazard class H1.1 and H1.2 apply to all timber species for which hazard class H1.1 and H1.2 is specified in NZS 3602. Hazard classes H3.1, H3.2, H4, H5 and H6 apply only to Pinus species.

The treatment requirements for laminated veneer lumber (LVL), plywood and glued laminated timber (Glulam) apply only to radiata pine and where that wood product type is listed in specific hazard classes.

This standard also includes wood modification treatments for radiata pine in hazard classes H3.1, H3.2 and H4.

#### **C1.1.2**

*While it may be possible to treat other species using the provisions of this standard, such treatments are outside the scope of this standard and the adequacy of the resulting treatments will need to be demonstrated.*

#### 1.1.3 Exclusions

The effectiveness of preservative treatment can be adversely affected by subsequent handling, storage and utilisation. These issues are outside the scope of this Standard, but some advisory information is given in Appendix B

### 1.2 Interpretation

For the purposes of this standard, the word 'shall' refers to requirements that are essential for compliance with the standard, while the word 'should' refers to practices that are advised or recommended.

Clauses prefixed 'C' and printed in italic type are intended as comments on the corresponding clauses. They are not to be taken as the only or complete interpretation. The standard can be complied with if the comment is ignored.

The terms 'normative' and 'informative' have been used in this standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a standard while an 'informative' appendix is only for information and guidance.

However, where an informative appendix specifies a prescribed test procedure, the word 'shall' used in it means that if users elect to conduct this test, it shall be undertaken exactly as set out in the appendix.

### 1.3 Definitions

For the purposes of this standard the following definitions shall apply:

<b>Active ingredient</b>	Fungicide or insecticide approved in the preservative formulation.
<b>Analysis zone</b>	The zone of treated wood that will contain a specified retention of preservative. This zone varies and its precise dimension and location is set out in the appropriate hazard class specification
<b>Borings</b>	Borings are cylindrical samples extracted from treated wood for the purpose of determining preservative penetration or retention
<b>Brand</b>	The identification mark applied to pieces or packets of timber in accordance with this Standard
<b>Central ninth</b>	Applicable to solid timber only. For pieces that contain 100% sapwood, when the cross section is divided into nine equal portions the central ninth is the zone in the centre of the piece. For pieces where the central ninth (as defined above) contains heartwood, a single zone, equivalent in area and orientation to the central ninth, will be taken immediately adjacent to the heartwood in the most difficult to treat remaining portion Refer to Appendix A.
<b>Characteristic value (penetration)</b>	The tenth percentile of the required ten samples. For example, when 10 samples are taken from a population of treated product, the population is deemed to have passed if nine of the samples meet or exceed the specified preservative penetration.
<b>Characteristic value (retention)</b>	The tenth percentile of the required 10 samples. For example, when 10 samples are taken from a population of treated product, the population is deemed to have passed if nine of the samples meet or exceed the specified preservative retention and the tenth sample shall be no less than 66% of the retention value.
<b>Charge</b>	The quantity of timber processed as a batch, in a timber preservation treatment plant or one complete treatment process cycle
<b>Chemical</b>	A single identifiable compound
<b>Complete penetration</b>	95% of the penetration zone shows a continuous and contiguous distribution of the spot test reagents across the cross section. Refer to Appendix A NOTE – Continuous means unbroken, contiguous means connected.
<b>Engineered wood products</b>	Plywood, LVL, glulam fabricated from gluing ply or lamina to form the final wood product.
<b>Evidence of penetration</b>	Distribution of the spot test reagent, visible as streaks or spots, throughout the specified penetration zone,
<b>Fixed preservative</b>	A preservative in which the active ingredients are fixed or deposited in the wood so that leaching will be minimised
<b>Fixation</b>	The process by which preservative active ingredients become leach resistant or fixed to the wood fibre

<b>Glued laminated timber (Glulam)</b>	A structural element formed by gluing together finger-jointed timber laminations that all have the grain parallel to the longitudinal axis
<b>Glueline treatment</b>	Where the preservative is added to the glue and applied at the time of manufacture of the LVL or plywood.
<b>Hazard class</b>	An exposure and service condition where timber and wood-based products are at particular risk to one or more biological agents (such as fungi, insects, bacteria, or marine organisms)
<b>Heartwood</b>	The non-living central part of a tree trunk containing tannins, resins and other extractives, which can usually be differentiated from sapwood, by means of chemical reagents. Heartwood is generally darker in colour than sapwood.
<b><i>In situ</i> preparations</b>	Fungicidal solutions applied after machining or cutting treated timber and wood-based products to provide additional protection to the exposed cut surfaces
<b>Laminated veneer lumber (LVL)</b>	A structural product assembled from veneers laminated with adhesive, in which the grain direction of the outer veneers and most of the other veneers is parallel to the longitudinal axis. Manufactured in conformance with the requirements of AS/NZS 4357 and intended for structural applications.
<b>Edge or face branding</b>	Identification of the treatment plant, preservative and hazard class on the edge or face along the length of timber, at 1.5 m centres, repeated at no greater than 1.8 m centres
<b>Machined timber</b>	Sawn timber which has been planed or moulded to its final cross-sectional dimension
<b>Micronised copper</b>	A copper compound ground into particles that are 0.005 to 10 microns in size and suspended in the carrier solvent with the aid of a dispersant
<b>Packet branded</b>	Weatherproof legible identification placed on each side of a packet of treated timber and wood-based products (intended to be handled as a single unit) or a minimum of 10% of individual pieces branded
<b>Part round</b>	A round post sawn in halves or quarters
<b>Penetration</b>	The depth and distribution to which a prescribed preservative is present in the timber or wood-based product
<b>Penetration test</b>	A test where chemical reagents are applied to samples of the treated timber or wood-based products, using methods described in AS/NZS 1605.2
<b>Penetration tracer</b>	A non-diffusible, chemical compound added to a treating solution and used as a penetration indicator chemical for the active ingredient(s).
<b>Plywood</b>	An assembled product made up of two or more plies bonded together with the direction of the grain in alternate plies usually at right angles
<b>Preservative</b>	A chemical, or combination of chemical(s), applied to timber or wood-based products to protect from biodegradation
<b>Retention</b>	The concentration of preservative or active ingredients expressed as a percentage of the wood density
<b>Round</b>	Logs for use as piles, poles, or posts



<b>Sapwood</b>	The outer portion of a tree trunk containing living cells and water conducting and storage tissue, which can be differentiated from heartwood by means of chemical reagents
<b>Sawn timber</b>	Timber which has been cut with a saw, which may or may not be subsequently machined
<b>Spot tests</b>	Colorimetric chemical test reagent applied to a freshly cut cross section of a timber or wood-based product, or boring , that reacts with a chemical active ingredient to determine its distribution, applied in accordance with AS/NZS 1605.2
<b>Timber</b>	Wood from trees whether sawn, hewn, split, or otherwise fashioned or manufactured into veneer or plywood
<b>Treated</b>	Timber or wood-based product impregnated with preservative in accordance with this standard
<b>Treatment plant</b>	The organisation, entity, or facility required to effect the preservative treatment and branding of timber or wood-based products
<b>Well fixed</b>	Treated timber to be surface dry and drip free. For copper chrome arsenate (CCA) treatment, this also refers to treated timber with at least 99% of chromium fixed or which gives a result of less than 0.5 ppm chromium (Cr) using a field test kit such as Merck Aquaquant Test Kit 14441 or equivalent
<b>Wood-based products</b>	Any product that consists of or is made from adhesive bonded sawn timber, lamina or plies.
<b>Wood density</b>	Oven dry weight of timber or wood-based product in relation to saturated volume, expressed as g/cm <sup>3</sup> or kg/m <sup>3</sup>

#### **1.4 Abbreviations**

Abbreviations have the following meanings:

As	Arsenic
BAE	Boric acid equivalent
CCA	Copper chrome arsenate
CuAz	Copper azole
CuN	Copper naphthenate
Cr	Chromium
DDAc	Didecyldimethyl ammonium chloride
DDAx	Didecyldimethyl ammonium chloride or didecyldimethyl carbonate/bicarbonate
DMDHEU	Dimethyloldihydroxyetheleneurea
H <sub>3</sub> BO <sub>3</sub>	Boric acid
IPBC	Iodo propynyl butyl carbamate
LOS	Light organic solvent
LOSP	Light organic solvent preservative

PTP	Propiconazole/ Tebuconazole/ Permethrin
TAE	Total active element
%m/m	The retention of active ingredient or chemical expressed as percentage of the oven dry weight of the timber or wood based product

## 2 Hazard classes and treatment requirements

### 2.1 Hazard classification

Five hazard classes are described in this standard for New Zealand uses. Each is denoted by a hazard number and is described in terms of service exposure and biological hazard as listed in Table 1. Hazard classes H1 and H3 have two subclasses.

Table 1: Hazard classification

Hazard class	Exposure	Service conditions	Biological hazard	Typical uses
H1.1	Protected from the weather, above ground	Protected from the weather, always dry	Borers	Interior finishing timber <sup>1,2</sup>
H1.2	Protected from the weather, above ground, but with a possibility of exposure to moisture	Protected from the weather, but with a risk of moisture content conducive to decay	Decay fungi and borers	Wall framing <sup>1</sup>
H3.1	Exposed to the weather, above ground	Periodic wetting, not in contact with the ground	Decay fungi and borers	Cladding, fascia, joinery <sup>2,3</sup>
H3.2	Exposed to the weather, above ground, or protected from the weather but with a risk of moisture entrapment	Periodic wetting, not in contact with the ground, more critical end uses	Decay fungi and borers	All H3.1 uses, plus structural and decking <sup>1</sup>
H4	Exposed to the weather, in ground or in fresh water	Ground contact, or conditions of severe or continuous wetting	Decay fungi and borers	Fence posts, landscaping timbers <sup>2</sup>
H5	Exposed to the weather, in ground or in fresh water	Ground contact, or conditions of severe or continuous wetting, where uses are critical and where a higher level of protection than H4 is required	Decay fungi and borers	House piles and poles <sup>1</sup> , crib walling
H6	Sea water or estuarine ground	Immersion in seawater or estuarine ground	Marine wood borers and decay	Marine timber and piles
1	Refer to NZS 3602. Note: NZS 3602 is currently under revision and has been released for public comment			
2	H3.1 and H4 are typically non-structural applications			
3	Refer to NZS 3602 for requirements on paint protection.			

**C Table 1**

*No hazard class 2 is included in Table 1, as that hazard class applies to protection of framing timber from termites, a biological hazard that is not applicable in New Zealand.*

*NZBC clause B2.3.1 refers to minimum durability requirements for building elements. Timber and wood-based products used for structural purposes is required to be durable in-service for the life of the building, being not less than 50 years unless the building has a specified intended life. Structural timber refers to timber and wood-based products that have been graded to characteristic strength and stiffness properties.*

*The minimum requirement for a H1.2 treatment for framing is to provide protection in-service but the preservative treatment is not designed to provide protection for extended exposure to an elevated moisture content.*

**2.2 Selection of timber treatment**

NZS 3602 sets out the requirements for the hazard class needed for particular uses of timber and wood-based products, in buildings. This treatment standard also includes non-structural products that are outside the scope of NZS 3602 such as fence posts, marine structures.

Note: Consideration should be given to the compatibility of fixings and other building components when choosing a particular preservative type.

**C2.2**

*Treatment for service at a higher hazard class number usually satisfies biological protection requirements for service at a lower hazard class number, except in the case of some H3.1 and H3.2 treatments identified in Table 6 and Table 7 as being excluded for timber framing use.*

**2.3 Preservative penetration and retention**

**2.3.1 Testing**

Where spot tests for the penetration of preservative or tests for determination of the retention of a preservative are required, such tests shall be carried out in accordance with the methods in AS/NZS 1605 series, and the results interpreted as per the requirements of this standard, NZS 3640.

The determination of DMDHEU, and acetylation wood modification treatments shall be by the methods in Appendix D of this standard.

**2.3.2 Penetration**

The penetration of the preservative active ingredients in timber and wood-based products shall be tested on a cut surface or boring from the full cross-section taken across the grain. The penetration test shall be with a chemical reagent appropriate to the preservative, and applied to the full cross-section in accordance with AS/NZS 1605.2. The results shall be interpreted as per the requirements of this standard, NZS 3640.

Boron may be present at a level below the sensitivity limit of the chemical reagent. In such cases, penetration shall be confirmed by chemical analysis to determine the presence of boron.

For other preservative active ingredients where there is no spot test chemical reagent available, a penetration tracer shall be included in the treatment solution. Validation to be available to show that the penetration of the tracer is correlated with the penetration of the active ingredient(s).

There is no penetration test for the DMDHEU and acetylation wood modification treatments.

**2.3.3 Retention**

The retention of preservative active ingredient shall be determined by chemical analysis in accordance with AS/NZS 1605.3 and shall be expressed as per cent mass of preservative per mass of oven dry wood.

DMDHEU as a nitrogen retention analysis shall be determined by the method in Appendix D of this standard.

Acetylation as an acetyl retention analysis shall be determined by the method in Appendix D of this standard.

Alternative analytical methods may be used when these are validated to methods included in AS/NZS 1605.3 or this standard, NZS 3640.

## **2.4 Penetration and retention sampling requirements**

### *2.4.1 General*

Penetration and retention sampling requirements shall be on 10 samples, per charge as borings or cross sections.

#### *C2.4.1*

*Cross-sections are appropriate for sawn timber and wood-based products while borings are preferred for rounds and part rounds.*

### *2.4.2 Sawn timber, Roundwood*

All samples should be taken at least 450 mm from the ends in clear straight-grained wood and at least 150 mm away from any defects. Borings should be taken at right angles to the growth rings. If mixed charges of different dimensions occur the sampling shall be directed at the most difficult material to treat. H6 samples shall be taken from the midpoint of a piece;

Cross-section samples shall be used when both cross-section and central ninth analyses are undertaken.

### *2.4.3 Glulam*

All samples should be taken at least 150 mm from the ends.

Cross-section samples shall be used when both cross-section and central ninth analyses are undertaken.

### *2.4.4 Plywood*

Samples shall be taken from any position at the midpoint of the width or length of the plywood sheet.

### *2.4.5 Borings*

The holes left after extracting the borings shall be plugged with dowels treated with the same preservative, and to the same or higher retention as the piece from which the boring was taken.

### *2.4.6 Compliance of a sample set*

When samples are assessed for preservative penetration and retention in accordance with section 4, the charge, lot, or parcel of timber and wood-based products they represent shall be deemed to have met the requirements of this standard if the characteristic values for penetration and retention are met.

### 3 Identification of treated timber and wood products

#### 3.1 Branding

##### 3.1.1 General

The treatment plant shall ensure that the finished product after cutting, machining, and treatment, as made available to the market, bears the correct branding in accordance with the requirements of this section. Such branding, where required, shall either be on the timber's end, edge or face, or on the packet containing the timber in accordance with Table 2

Timber treated for export to overseas standards shall be identified in accordance with the requirement of the importing country.

##### 3.1.2 Framing timber

Sawn timber framing for H1.2 shall also be coloured in accordance with Table 10.

**Table 2: Requirements for branding or identification of treated timber**

Product type	Brand position
<b>Solid timber</b>	
Fence battens Fence droppers	Branding not required
Bundled fence palings, pickets and cavity or roof battens	Packet branded
Sawn or machined timber < 1250 mm <sup>2</sup> cross-section	Branding not required
Mouldings	Branding not required
Sawn or machined timber < 1.5 m long; and cross-section < 5000 mm <sup>2</sup>	One end of each piece, or branded on a broad face 150 mm from an end, or packet branded
Other sawn or machined timber	One end of each piece, or edge or face branded
Posts – rounds, part rounds Poles	One end of each piece
Piles (sawn) including anchor piles and house piles – refer to NZS 3605	One third of the length of the piece, from and facing the top
<b>Engineered wood products</b>	
Glued laminated timber	One end of each piece, or edge or face branded
Laminated veneer lumber	One end of each piece, or edge or face branded
Plywood	Ink brand on the panel
<b>Other protection systems</b>	
Acetylated wood	One end of each piece, or edge or face branded
DMDHEU	One end of each piece, or edge or face branded
NOTE – The width of the member is the longest cross-section dimension, and the thickness is the smallest cross-section dimension.	

**C Table 2**

*The treatment plant's quality assurance systems need to ensure correct branding. This is not generally a problem when branding and treatment are performed at the same place, but on occasion these operations are performed at different times and at different places. In such instances the treatment plant's procedures need to ensure finished products are treated and labelled correctly.*

**3.1.3 Brand position**

Branding shall be by permanent ink, imprint, incision or burn brand applied directly to the timber or on a plastic tag affixed to the timber or wood-based product.

**3.1.4 Brand information**

The brand shall identify:

- (i) The treatment plant responsible for preservative treatment of the timber or wood-based product by means of a treatment plant number or trade name;
- (ii) The hazard class for which the timber or wood-based product has been treated or protected;
- (iii) The preservative type using the following code numbers:

CCA oxide .....	01
CCA salt.....	02
Boron .....	11
Copper naphthenate .....	57
Copper azole .....	58
Propiconazole + tebuconazole + permethrin .....	64
Triadimefon + cyproconazole + bifenthrin .....	66
Permethrin .....	70
Cypermethrin .....	71
Deltamethrin .....	72
DMDHEU .....	82
Acetylated wood .....	83
Micronised copper azole .....	88
Micronised copper quaternary .....	89
Alkaline copper quaternary .....	90

- (iv) An envelope penetration pattern with an 'E' included in the brand.

The sequence of the above information in the brand shall be treatment plant number, preservative code number, hazard class number, and 'E' penetration pattern where applicable, as shown in Figure 1.

**C3.1.4**

*The treatment plant number register is maintained by the Timber Preservatives Association of Australia*

*IPBC (63), TBTO (56), and TBTN (62) were previously included in this standard – see the foreword of this standard for further information.*



**Key**

Treatment plant number.....665  
 Preservative code number.....01  
 Hazard class number.....H4

**Envelope Treatment**



**Key**

Treatment plant number.....665  
 Preservative code number.....11  
 Hazard class number.....H1.2  
 Envelope treatment.....E

**Figure 1: Example of brandings**

Note: Figure 1

The branding may additionally include a logo for the manufacturer or quality assurance audit organisation, or to meet requirements for other specifications or the user.

### 3.2 Colouring

#### 3.2.1 Timber framing

In addition to branding, framing timber for H1.2 shall be colour coded or as specified in Table 3.

**Table 3: Colour coding for timber and wood-based products in H1.2**

Hazard class	Preservative	Colour
H1.2 <sup>1,2</sup>	Boron	Pink <sup>3</sup>
	Propiconazole, tebuconazole, permethrin	Green <sup>4</sup>
<p>1 LVL and plywood with a H1.2 glueline treatment or LVL H1.2 Envelope treatment (H1.2E) outlined in 4.1.3.4 and 4.1.3.5 does not require colour coding if it has edge or face branding.</p> <p>2 Where there is an appearance requirement such as solid walls without lining, the colour may be substituted with edge or face branding, or end branding.</p> <p>3 Colour (red or pink) is only required where there is no edge or face branding.</p> <p>4 The colour green is to be distinctly different from the green of copper-based preservatives.</p>		

#### 3.2.2 Colourant used to distinguish timber

The type and concentration of colourant used shall ensure the timber is distinguishable from untreated timber or wood products and other preservative treatments.



## 4 Hazard class specifications

### 4.1 Hazard classes H1.1 and H1.2

#### 4.1.1 General

The exposure and service conditions of H1.1 and H1.2 are defined in Table 1. The branding and the preservatives shall be as described in section 3 and appendix B respectively.

#### **C4.1.1**

*H1.1 and H1.2 timber must be kept dry during storage, when handled prior to use and in service.*

#### 4.1.2 Hazard class H1.1

##### 4.1.2.1 Sampling

A set of 10 samples shall meet both the characteristic value penetration and characteristic value retention. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention

##### 4.1.2.2 Penetration of Sawn timber

Complete sapwood penetration of sawn timber is required.

#### **C4.1.2.2**

*Compliance with this standard requires clear evidence at the time of sampling that the preservative is present in every part of the sapwood.*

*The analytical detectable limit for an active ingredient could vary with the chemical analytical method and sample size. The detectable limit in the central ninth core could be less than an effective concentration for that preservative. If the active is highly concentrated in a small portion of the cross section, it is possible that subsequent processing or fabrication could expose unprotected parts of the cross section, which could result in failure of the timber. Care is needed to ensure the durability of the treated timber in-service is not adversely affected by a preservative gradient across the timber cross section.*

##### 4.1.2.3 Analysis zone

For H1.1 timber, the analysis zone is the central ninth of the sapwood cross section. For dry boron treated timber (that is, moisture content less than 20%) the full sapwood cross section is the analysis zone.

#### **C4.1.2.3**

*No central ninth core concentrations have been set additional to the 'wet' cores for H1.1 in Table 4*

##### 4.1.2.4 Preservative retention requirement

The retention of preservative in the specified analysis zone of the treated timber shall be not less than specified in Table 4.

Table 4: Minimum preservative retention in the H1.1 analysis zone

Preservative type	Component	Retention % m/m oven-dry weight of wood
<b>Waterborne preservatives</b>		
CCA		
Hardwood or softwood core	As	0.04
Boron compounds-		
Hardwood core	H <sub>3</sub> BO <sub>3</sub>	0.20
Softwood core (wet)	H <sub>3</sub> BO <sub>3</sub>	0.10
Softwood cross-section (dry)	H <sub>3</sub> BO <sub>3</sub>	0.10
<b>Light organic solvent preservative (LOSP)</b>		
Synthetic pyrethroid		
Cross-section	Permethrin	0.0060
	Cypermethrin	0.0060
	Deltamethrin	0.0006

#### 4.1.3 Hazard class H1.2

##### 4.1.3.1 Sampling

A set of ten samples shall meet both the characteristic value penetration and characteristic value retention. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention.

##### 4.1.3.2 Sawn timber and Glulam

###### 4.1.3.2.1 Penetration

Sawn timber and Glulam shall have complete sapwood penetration.

Where evidence of complete sapwood penetration is to be confirmed by analysis, the samples shall comply if the preservative is found in the central one-ninth sapwood core of the sample.

###### C4.1.3.2.1

*Glulam requires treatment of individual lamina prior to fabrication. Where penetration is being confirmed by analysis of the central one-ninth sapwood core then this requirement applies to each lamina in the cross-section.*

###### 4.1.3.2.2 Preservative retention requirement

The retention of preservative in the specified analysis zone of the treated timber shall be not less than specified in Table 5.

###### 4.1.3.2.3 Analysis zone

The analysis zone shall be the full sapwood cross-section.

In addition, for azole treated timber 30mm thick or more, there is also a requirement for analysis of the central one-ninth of the sapwood cross section.

4.1.3.3 *Sawn timber envelope*

4.1.3.3.1 *Penetration*

Sawn timber treated with a boron polyol formulation identified with an H1.2 E brand, shall as a minimum have complete sapwood penetration to a depth of 10 mm from every edge and face.

4.1.3.3.2 *Preservative retention requirement*

The retention of preservative in the specified analysis zone of the treated timber shall be not less than specified in Table 5.

4.1.3.3.3 *Analysis zone*

For sawn timber with an envelope penetration, the analysis zone shall be the total sapwood cross-section.

4.1.3.4 *LVL Envelope*

4.1.3.4.1 *Penetration*

LVL treated with a boron envelope, identified with an H1.2 E brand, shall have complete penetration of the outer veneer with a minimum of 5 mm from every edge and face. Additionally, evidence of penetration throughout the 5 mm to 10 mm zone from the veneer surfaces shall be required

C4.1.3.4.1

*The penetration zone includes both heartwood and sapwood.*

4.1.3.4.2 *Preservative retention requirement*

The retention of preservative in the specified analysis zone of the treated timber shall be not less than specified in Table 5.

4.1.3.4.3 *Analysis Zone*

For LVL with an envelope penetration, the analytical zone shall be the total sapwood cross section.

4.1.3.5 *LVL and Plywood glueline*

4.1.3.5.1 *Penetration*

LVL and plywood treated with a glueline treatment identified with an H1.2 brand has no penetration requirement for the preservative.

4.1.3.5.2 *Preservative retention requirement*

The retention of preservative in the two retention zones of the treated LVL or plywood shall be not less than that specified in Table 5.

4.1.3.5.3 *Analysis zone*

The analysis zone shall be:

- (i) The outer 2 mm for LVL or plywood surface veneers; and
- (ii) The full cross section (less the outer surface veneers).

Table 5: Minimum preservative retention in the H1.2 analysis zone

Preservative type	Component	Retention %m/m oven-dry weight of wood
<b>SAWN TIMBER, GLULAM <sup>1</sup></b>		
<b>Waterborne preservatives</b>		
Boron compounds –		
Softwoods (sapwood cross-section)	H <sub>3</sub> BO <sub>3</sub>	0.40 <sup>2</sup>
Propiconazole + tebuconazole (1:1) <sup>3</sup>		
Cross section	Propiconazole + tebuconazole	0.04 + 0.04 <sup>4</sup>
Central ninth core	Propiconazole + tebuconazole	0.01 + 0.01 <sup>4</sup>
<b>SAWN TIMBER Envelope</b>		
Softwoods <sup>5</sup> (envelope)	H <sub>3</sub> BO <sub>3</sub>	0.60 <sup>2,6</sup>
<b>LAMINATED VENEER LUMBER Envelope</b>		
Softwoods <sup>5</sup> (envelope)	H <sub>3</sub> BO <sub>3</sub>	0.60 <sup>2,7</sup>
<b>LAMINATED VENEER LUMBER and PLYWOOD Glueline</b>		
Triadimefon + cyproconazole <sup>8,9,10</sup>	Triadimefon + cyproconazole	0.042 + 0.005 (glueline) 0.174 + 0.024 (surface)
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Glulam requires treatment of the individual lamina prior to fabrication, but with testing on the final shape and form product.</li> <li>2. This sapwood cross-section retention is required in the timber or wood product after drying.</li> <li>3. Formulated as a water-based emulsion. The formulation is to include permethrin to give retention 0.0060% m/m or more.</li> <li>4. The requirement for azoles shall be a 50:50 ratio in the retention zone, and the minimum proportion of any one azole is to be 45 % of the total.</li> <li>5. Softwoods refers to radiata pine.</li> <li>6. The boron polyol treatment solution shall contain 15% w/v or greater polyol content.</li> <li>7. The boron treatment will be solubilised with ethanolamine.</li> <li>8. This treatment shall be applied only to LVL with a maximum veneer thickness of 4.3 mm and as a glueline additive equal to or greater than 450 g/m<sup>3</sup> triadimefon and 45 g/m<sup>3</sup> cyproconazole. A second separate application is also required to the outer veneer surface.</li> <li>9. Bifenthrin is required in the glueline.</li> <li>10. Glueline and surface treatment sampling of LVL shall be in final state and form prior to dispatch from the treatment plant.</li> </ol>		

**C Table 5**

*For the LVL and plywood glueline treatment, extended time in block stack after hot pressing can affect analytical recovery of the active ingredients. To ensure the samples are typical of normal production, analytical samples should only be taken after the glueline treated product has completed the full production process. Samples should not be taken directly off the end of the press.*

**4.2 Hazard class H3.1 and H3.2**

**4.2.1 General**

The exposure and service conditions of H3.1 and H3.2 are defined in Table 1. The branding and the preservatives shall be as described in section 3 and appendix B respectively.

- H3.1 treatments are not intended for treatment of framing identified as a H1.2 treatment in NZS 3602.
- H3.2 water-borne copper treatments may be used for treatment of framing when specified.
- No H3.2 LOSP preservative treatment nor wood modification treatment are approved for framing.

**C4.2.1**

*See Table 1 and C table 1 for descriptions of H3.1 and H3.2 hazard classes.*

**4.2.2 Hazard class H3.1**

**4.2.2.1 Sampling**

A set of 10 samples shall meet both the characteristic value penetration and characteristic value retention. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention for the set.

**4.2.2.2 Penetration**

Complete sapwood penetration shall be required.

For timber treated in final shape and form, no minimum heartwood penetration is specified.

**4.2.2.2.1 Machining after treatment**

Where timber is not treated in final shape and form, there shall be complete heartwood penetration to a depth of 5 mm after machining. Unpenetrated heartwood shall be permitted if it comprises less than 20% of the cross section of the piece, does not extend through the piece from one surface to the opposite surface, and does not exceed half the dimension of any side of the cross section.

**C4.2.2.2.1**

*Glulam requires treatment of individual lamina prior to fabrication. Surface planing after treatment or fabrication of glulam will affect heartwood penetration.*

**4.2.2.3 Sawn timber and Glulam**

**4.2.2.3.1 Preservative retention requirement**

The retention of preservative in the analysis zone of the treated timber shall be not less than specified in Table 6.

**4.2.2.3.2 Analysis zone**

The analysis zone shall be:

- (i) The outer 25 mm from any sapwood surface, or the full depth of sapwood where the sapwood depth is less than 25 mm;
- (ii) For timber treated with a propiconazole plus tebuconazole treatment and when the timber is 30 mm thickness or more, there is an additional requirement for analysis of the central ninth of the sapwood cross section.

4.2.2.4 *LVL and Plywood Glueline*

4.2.2.4.1 *Application*

The preservative shall be applied as a glueline additive to every glueline during manufacture, followed by a surface treatment to the outer surface veneers.

4.2.2.4.2 *Preservative retention requirement*

The retention of preservative in the two retention zones of the treated LVL or plywood shall be not less than specified in Table 6.

4.2.2.4.3 *Analysis zone*

The analysis zone shall be the full cross-section (less the outer surface veneers).

4.2.2.5 *Other protection systems (DMDHEU and acetylated wood)*

4.2.2.5.1 *Application*

These treatments shall only be used on radiata pine sawn timber and shall contain less than 20% heartwood of the cross section, does not extend through the piece from one surface to the opposite surface, and does not exceed half the dimension of any side of the cross-section.

C4.2.2.5.1

*The treatments are required to penetrate and protect the total cross-section. There is no penetration test requirement.*

4.2.2.5.2 *Preservative retention requirement*

Wood properties shall be as specified in Table 6.

4.2.2.5.3 *Analysis zone*

The analysis zone shall be the full cross section.

DMDHEU has an additional central ninth analytical zone retention requirement.

**Table 6: Minimum preservative retention in the H3.1 analysis zone**

<b>Preservative type</b>	<b>Component</b>	<b>Retention % m/m oven dry weight of wood</b>
<b>SAWN TIMBER and GLULAM<sup>(1)</sup></b>		
<b>Waterborne preservatives</b>		
Boron compounds	H <sub>3</sub> BO <sub>3</sub>	0.80 <sup>(2)</sup>
Propiconazole + tebuconazole (1:1) <sup>(3)</sup>	Propiconazole + tebuconazole	0.03 + 0.03 <sup>(4) (5) (6)</sup> and 0.01 + 0.01 <sup>(4) (7)</sup>
<b>Light organic solvent preservative (LOSP)</b>		
CuN	Cu	0.05 <sup>h (8)</sup>
Propiconazole + tebuconazole (1:1) <sup>(3)</sup>	Propiconazole + tebuconazole	0.03 + 0.03 <sup>(4) (5)</sup> and 0.01 + 0.01 <sup>(4) (7)</sup>
Copperazole <sup>(9)</sup>	Cu + tebuconazole (25:1)	0.23 <sup>(5)</sup>

**DRAFT ONLY**

<b>SAWN TIMBER</b>		
DMDHEU <sup>(10)</sup>	Nitrogen  Density	3.0 <sup>(11)</sup> and 2.0 <sup>(12)</sup> 25% increase
Acetylated wood <sup>(10)</sup>	Acetyl	19.0
<b>ENGINEERED WOOD PRODUCTS</b>		
<b>LVL and PLYWOOD Glueline</b>		
Triadimefon + cyproconazole <sup>(13) (14) (15)</sup>	Triadimefon + cyproconazole	0.095 + 0.0097 (glueline)  0.186 + 0.025 (surface)
<p>(1) Glulam requires treatment of the individual lamina prior to fabrication, but with testing on the final shape and form.</p> <p>(2) Boron compounds are approved only for timber boards to be used for fascia, cladding, joinery, cavity battens, and other timber components less than 30 mm thick and only when an oil alkyd, modified acrylic, or modified latex grey pigmented coating is applied to all timber surfaces, after treatment and before dispatch from the treatment plant.</p> <p>(3) Propiconazole + tebuconazole shall be used only in combination with permethrin. The minimum permethrin retention is 0.0060% m/m. See Appendix B (1.2.5.2).</p> <p>(4) The requirement for azoles shall be a 50:50 ratio in the retention zone and the minimum proportion of any one azole is to be 45% of the total.</p> <p>(5) Retention required in the sapwood cross-section for all timber dimensions.</p> <p>(6) The water-based azole treatment at this H3.1 retention shall not be used for timber framing. See Table 5 for the H1.2 retention requirements.</p> <p>(7) Additional retention requirement to analyse sapwood present in the central ninth when the timber is 30 mm thick or more.</p> <p>(8) CuN is approved for timber boards for fascia, cladding, joinery and other timber components less than 30 mm thick and provided a continuous face brand is applied along the full length of the timber at the treatment plant.</p> <p>(9) Includes micronised copper – see Appendix B</p> <p>(10) Any sawn timber, for H3.1, shall contain less than 20% heartwood of the cross section, does not extend through the pieces from one surface to the opposite surface, and does not exceed half the dimension of any side of the cross-section.</p> <p>(11) Retention requirement for the total cross section.</p> <p>(12) Retention requirement in the central ninth of the cross section.</p> <p>(13) This treatment shall be applied only to LVL and plywood with a maximum veneer thickness of 4.3mm and as a glueline additive equal to or greater than 900 g/m<sup>3</sup> triadimefon and 90 g/m<sup>3</sup> cyproconazole. A second separate application is also required to the outer veneer surfaces.</p> <p>(14) Bifenthrin is required in the glueline as outlined in Appendix B – 1.5</p> <p>(15) Glueline and surface treatment sampling of LVL and plywood shall be in final shape and form prior to dispatch from the treatment plant.</p>		

## DRAFT ONLY

---

### 4.2.3 Hazard class H3.2

#### 4.2.3.1 Sampling

A set of ten samples shall meet both the characteristic value penetration and the characteristic value retention. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention.

#### 4.2.3.2 Penetration

Complete sapwood penetration shall be required.

For timber treated in final shape and form, no minimum heartwood penetration is specified.

##### 4.2.3.2.1 Machining after treatment

If timber is machined after treatment, then 5 mm penetration of heartwood shall be required following machining. Unpenetrated heartwood shall be permitted if it comprises less than 20% of the cross section of the piece, does not extend through the piece from one surface to the opposite surface, and does not exceed half the dimension of any side of the cross section.

##### C4.2.3.2.1

*The penetration requirements are for sawn timber and glulam. The DMDHEU and acetylated wood treatments are required to penetrate and protect the total cross-section but have no penetration test requirement.*

#### 4.2.3.3 Preservative retention requirement

The retention of preservative in the analysis zone of the treated timber shall be not less than specified in Table 7.

#### 4.2.3.4 Analysis zone

The analysis zone shall be the outer 25 mm from any sapwood surface, or the full depth of sapwood where the sapwood depth is less than 25 mm.

#### 4.2.3.5 Other protection systems (DMDHEU and acetylated wood)

##### 4.2.3.5.1 Application

These treatments shall only be used on radiata pine sawn timber and shall contain less than 20% heartwood of the cross section, does not extend through the pieces from one surface to the opposite surface, and does not exceed half the dimension of any side of the cross-section.

##### 4.2.3.5.2 Preservative retention requirement

The requirements for sawn timber shall be as specified in Table 7.

##### 4.2.3.5.3 Analysis zone

The analysis zone shall be the full cross section. The DMDHEU additionally has a central ninth analysis zone requirement.



Table 7: Minimum preservative retention in the H3.2 analysis zone

Preservative type	Component	Retention % m/m oven dry weight of wood
<b>SAWN TIMBER and GLULAM <sup>(1)</sup></b>		
<b>Waterborne preservatives</b>		
CCA	Cu + Cr + As	0.37 <sup>(2)</sup>
Copper quaternary <sup>(4)</sup>	Cu + DDAX where X = chloride or carbonate/bicarbonate	0.35 <sup>(2)</sup>
Copper azole <sup>(4)</sup>	Cu + tebuconazole (25:1)	0.23 <sup>(2)</sup>
<b>Light organic solvent preservative (LOSP)</b>		
CuN	Cu	0.10 <sup>(3)</sup>
Copper azole <sup>(4)</sup>	Cu + tebuconazole (25:1)	0.23 <sup>(5)</sup> + 0.08 <sup>(6)</sup>
<b>SAWN TIMBER</b>		
<b>Other wood protection systems</b>		
DMDHEU <sup>(7)</sup>	Nitrogen	3.0 <sup>(8)</sup> and 2.0 <sup>(9)</sup>
	Density	25% increase
Acetylated wood <sup>(7)</sup>	Acetyl	19.0 <sup>(8)</sup>
<ol style="list-style-type: none"> <li>1. Glulam requires treatment of the individual lamina prior to fabrication, but with testing on the final shape and form.</li> <li>2. CCA, copper quaternary and copper azole treatments meet the requirements of H1.2 and H3.1.</li> <li>3. The CuN treatment meets the requirements of H3.1 but not the requirements of H1.2.</li> <li>4. Includes micronised copper – see appendix B</li> <li>5. Retention requirement for the total sapwood cross section.</li> <li>6. Retention requirement in sapwood in the central ninth of the cross section.</li> <li>7. Sawn timber, selected for sapwood only, is restricted to use as deck boards and railings only (refer NZS3602).</li> <li>8. Retention requirement for the total sapwood cross section.</li> <li>9. Retention requirement in the central ninth of the cross section.</li> </ol>		

**4.3 Hazard class H4**

*4.3.1 General*

The exposure and service conditions of H4 are defined as per Table 1. The branding and the preservatives shall be as described in section 3 and appendix B respectively. Glulam and other engineered wood products shall not be permitted.

*4.3.2 Sampling*

A set of ten samples shall meet both the characteristic value penetration and characteristic retention requirements. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention.

*4.3.3 Penetration*

Complete sapwood penetration shall be required with a minimum of 10 mm from any surface, including heartwood.

*4.3.4 Preservative retention requirement*

The retention of preservative in the analysis zone of the treated timber shall be not less than specified in Table 8.

*4.3.5 Analysis zone*

The analysis zones shall be:

Sapwood: The outer 25 mm, or the full sapwood depth when this is between 10 mm and 25mm.

Heartwood: The outer 10 mm.

For sawn timber with the DMDHEU treatment the analytical zone is the full sapwood depth with a minimum of 25 mm.

**Table 8: Minimum preservative retention in the H4 analysis zone**

Preservative type	Component	Retention % m/m oven dry weight of wood
<b>SAWN TIMBER, PART ROUNDS, ROUNDS</b>		
CCA	Cu + Cr + As	0.72
Copper quaternary <sup>(1)</sup>	Cu + DDAX where x = chloride or carbonate/bicarbonate	1.02
CuAz <sup>(1)</sup>	Cu + tebuconazole	0.42
<b>ROUNDS - Other protection systems</b>		
DMDHEU <sup>(2)</sup>	Nitrogen Density	3.0 25% increase
Note: (1) Includes micronised copper – See Appendix B (2) Round posts, with a maximum diameter of 115 mm, the penetration zone is the full sapwood depth with a minimum of 25 mm and shall be a complete round. Compliance requires both an increase in wood weight (density) of 25% or more, and analysis for nitrogen content following the drying/curing process.		

**4.4 Hazard class H5**

*4.4.1 General*

The exposure and service conditions of H5 are defined as per Table 1. The branding and the preservatives shall be as described in section 3 and appendix B respectively. Glulam and other engineered wood products shall not be permitted.

*4.4.2 Sampling*

A set of ten samples shall meet both the characteristic value penetration and characteristic value retention requirements. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention for the set.

*4.4.3 Penetration*

Complete sapwood penetration shall be required with a minimum of 30 mm from any surface, including heartwood.

*4.4.4 Preservative retention requirement*

The retention of preservative in the analysis zone of the treated timber shall be not less than specified in Table 9.

*4.4.5 Analysis zone*

The analysis zones shall be the outer 30 mm, regardless of sapwood or heartwood.

**Table 9: Minimum preservative retention in the H5 analysis zone**

Preservative type	Component	Retention % m/m oven dry weight of wood
<b>SAWN TIMBER AND ROUNDWOOD</b>		
CCA	Cu + Cr + As	0.95
Copper quaternary <sup>(1)</sup>	Cu + DDAx where x = chloride or carbonate/bicarbonate	1.35
CuAz <sup>(1)</sup>	Cu + tebuconazole	0.76
Includes micronised copper – see appendix B		

*4.4.6 Hazard class H6*

*4.4.6.1 General*

The exposure and service conditions of H6 are defined as per Table 1. The preservatives and the branding shall be as described in section 3 and appendix B respectively. Glulam and other engineered wood products shall not be permitted.

*4.4.7 Sampling*

A set of ten samples shall meet both the characteristic value penetration and characteristic value retention requirements. Where a single sample in this set fails the penetration test, the failed sample shall meet the characteristic value retention for the set.

*4.4.8 Penetration*

Complete sapwood penetration, with a minimum of 40 mm penetration from any face, including heartwood.

**C4.2.12**

*Because of difficulty in obtaining the required penetration and retention in heartwood, care should be taken in selecting predominantly sapwood for treatment to this specification.*

**4.4.9 Preservative retention requirement**

The retention of preservative in the analysis zone of the treated timber shall be not less than specified in Table 10.

**4.4.10 Analysis zone**

The analysis zone shall be the outer 40 mm of the sample. With sawn timber, this shall be taken from any face.

**Table 10: Minimum preservative retention in the H6 analysis zone (rounds, part rounds and sawn timber)**

<b>Preservative type</b>	<b>Component</b>	<b>Retention</b> % m/m oven dry weight of wood
CCA	Cu + Cr + As	1.66
Cu shall be 0.40% m/m minimum.		

## APPENDIX A- GUIDANCE FOR PENETRATION PATTERNS

(Informative)

Figure 2: Examples for penetration patterns for copper based treatments – Sawn timber treated with water-borne copper preservative

### Example 1



2a: Presence of sapwood only confirmed by sapwood/heartwood spot test



2b: Appearance of same cross-section following rubenic acid spot-test showing complete penetration of copper compound. This is a **pass** for penetration

### Example 2



2c: Presence of both sapwood and heartwood confirmed by sapwood/heartwood spot test.



2d: Appearance of same cross-section following rubenic acid spot-test showing complete penetration of sapwood by copper compound. Timber treated in final shape and form so no heartwood penetration depth specified. This is a **pass** for penetration.

**Example 3**



**2e:** Presence of sapwood and heartwood confirmed by sapwood/heartwood spot test.



**2f:** Appearance of same cross-section following rubeanic acid spot-test showing complete penetration of sapwood (left of sample) and evidence of penetration in heartwood.

If the timber was treated in final cross-section dimensions then this would be a **pass**.

If timber was machined following preservative treatment, then the heartwood penetration requirement applies and this would also be a **pass**.

**Example 4**



**2g:** Presence of 100% sapwood confirmed by sapwood/heartwood spot test



**2h:** Cross-section appearance following rubeanic acid spot-test showing incomplete copper penetration of sapwood. This would be a **fail**.

**Figure 3: Examples for penetration patterns for sawn timber treated with water borne copper preservative and planed after treatment**

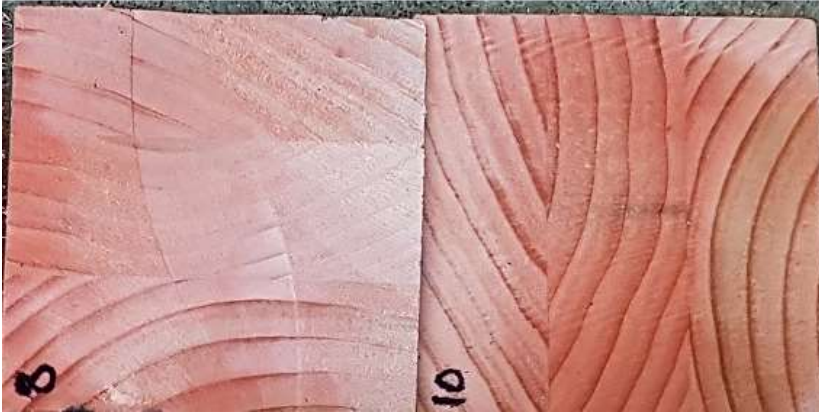


**3a:** Presence of sapwood and heartwood confirmed by sapwood/heartwood spot test.



**3b:** The appearance of the same cross-section following the rubeanic acid spot-test showing incomplete penetration of all the sapwood (left side sample) and some evidence of penetration of heartwood. This is a penetration **fail** for penetration for both the sapwood and heartwood.

Figure 4: Examples for penetration patterns for sawn timber treated with LOSP azole preservative and fabricated as glulam after treatment



4a: Cross-section appearance using a spot-test for zinc tracer chemical showing complete penetration of sapwood (pink colour). This is a **Pass**.



4b: Cross-section appearance using spot-test for zinc tracer chemical showing incomplete penetration of sapwood. This is a fail.



4c: The same cross-section using spot-test for sapwood/heartwood showing all sapwood that needs to be penetrated.



Figure 5: Examples for penetration patterns for sawn timber treated with LOSP azole preservative



**5a:** The cross-section using a spot-test for sapwood/heartwood showing one sample with heartwood, which corresponds to the untreated zone in the tracer spot test showing complete penetration of sapwood, in photo on the right.

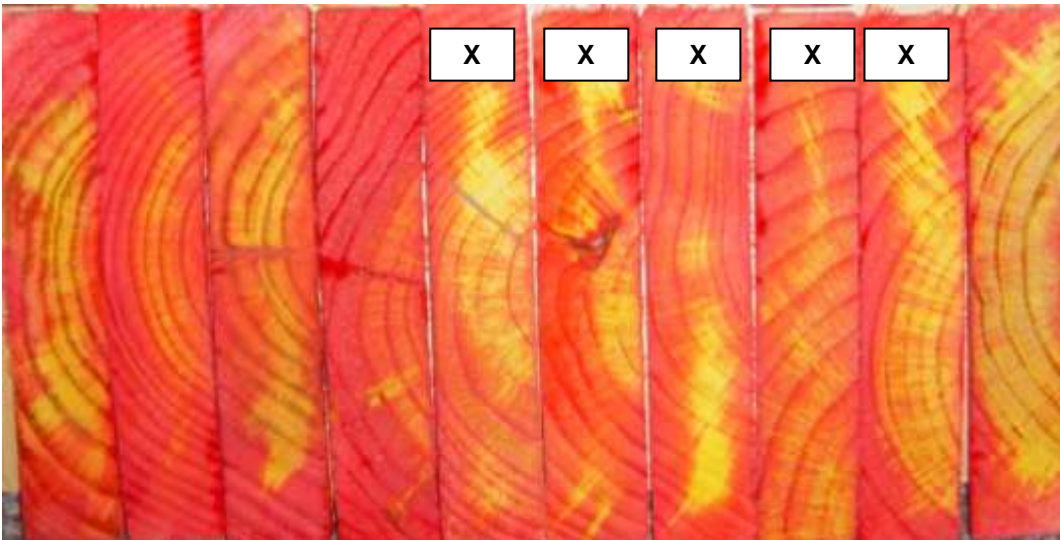


**5b:** The same cross-section showing the spot-test results for zinc tracer chemical with complete penetration of sapwood (pink colour). This is a **Pass**.

Figure 6: Examples for penetration patterns for penetrations patterns for boron treatment

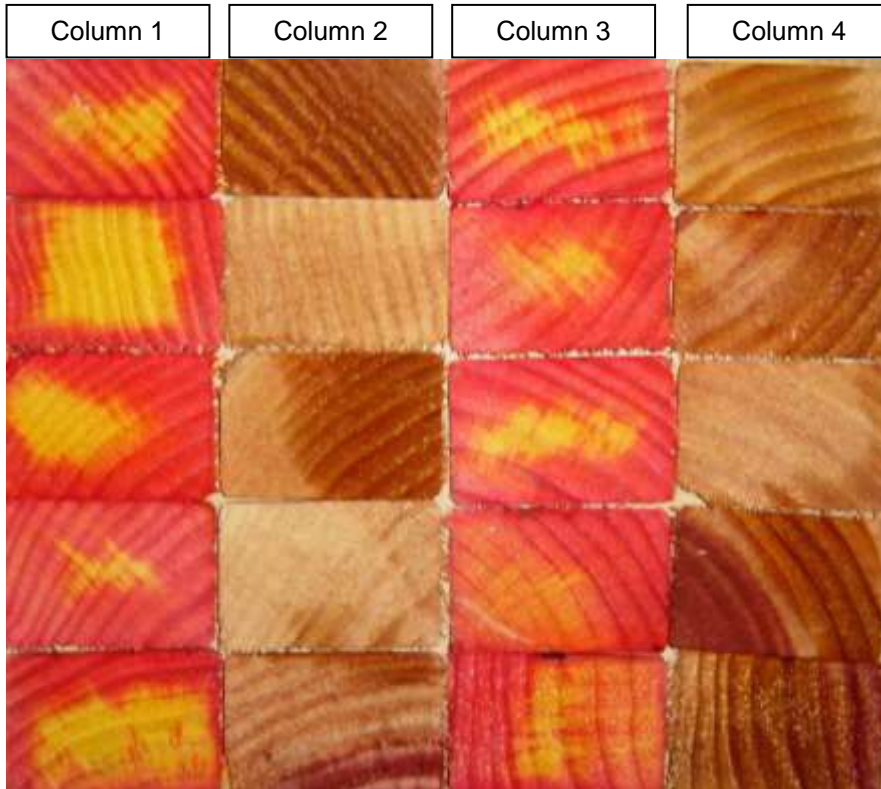


6a: Ten samples showing sapwood and heartwood confirmed by a sapwood/heartwood spot test.



6b: The same cross-sections following a spot-test for boron showing complete penetration of sapwood in 5 samples [PASS] and incomplete sapwood penetration in 5 samples [FAIL] marked with a X

Figure 7: Sawn timber treated with boron preservative to envelope penetration pattern (identified with 'E' in brand)



**7a:** Sapwood only confirmed by sapwood/heartwood spot test (samples in columns 2 and 4)

The same sample cross-section appearance following the boron spot-test showing a range of penetration patterns achieved. This is a PASS for an envelope penetration pattern.



**7b:** LVL treated with boron ethanolamine preservative with an envelope penetration pattern (identified with 'E' in brand). This is a PASS for an envelope penetration pattern.

## APPENDIX B – CHEMICAL PRESERVATION

(Normative)

### B1 Chemical preservation

#### B1.1 Approved preservatives

Preservative formulations shall be approved substances under the Hazardous Substances and New Organisms (HSNO) Act.

##### **C B1.1**

*This standard lists preservative actives and combinations but does not approve formulations or proprietary mixtures. Fitness for purpose of commercial formulations and treated product is the responsibility of the preservative supplier and treatment plant.*

#### B1.2 Fixed waterborne preservatives

##### B1.2.1 Fixation

Fixed waterborne preservatives shall be well fixed before leaving the treatment plant facility.

Copper chrome arsenate (CCA) treated wood products shall be confirmed as well fixed using the method described under Definitions.

##### **C B1.2.1**

*These preservatives are deposited in the wood in a relatively insoluble form and are therefore suitable for use where leaching by water could occur.*

##### B1.2.2 Copper chrome arsenate (CCA)

###### B1.2.2.1 Hazard class

CCA preservatives are suitable for use in all hazard classes as specified in section 4 (except H1.2). Preservative penetration and retention shall be as required by section 4.

###### B1.2.2.2 Specification

Copper, chromium, and arsenic salts or oxides shall be dissolved in water to give a solution containing the active elements within the proportions given by Table 11.

**Table 11: Relative proportions of CCA components**

Copper (%)	Chromium (%)	Arsenic (%)
23 to 25	38 to 45	30 to 37

##### B1.2.3 Copper quaternary

###### B1.2.3.1 Hazard class

Copper quaternary preservatives are approved for use in hazard classes H3.1, H3.2, H4, and H5 as specified in section 4. Preservative penetrations and retentions shall be required by section 4.

###### B1.2.3.2 Specification

Copper quaternary preservatives shall comprise mixtures of inorganic copper compounds and didecyldimethyl ammonium quaternary compound (either DDA chloride (DDAc) or DDA carbonate/bicarbonate (DDAx)). Alkaline or ammoniacal formulations are dissolved in water. Alternatively, the copper may be micronised to form a dispersion in water. The treating solution containing the active ingredients shall be within the proportions given by Table 12.

**Table 12: Relative proportions of alkaline copper quaternary components**

<b>Elemental copper</b> (%)	<b>DDAx</b> (%)
56 to 67	33 to 44

*B1.2.4 Copper azole (CuAz)*

*B1.2.4.1 Hazard class*

Copper azole preservatives are suitable for use in hazard classes H3.1, H3.2, H4, and H5 as specified in section 4. Preservative penetrations and retentions shall be as required by section 4.5.

*B1.2.4.2 Specification*

Copper azole preservatives shall comprise mixtures of an inorganic copper salt and triazole fungicide (tebuconazole) formulated as an emulsion, or as a suspension of micronised copper and triazole fungicide (tebuconazole), that can be readily diluted with water to give a treating solution containing the active ingredients within the proportions given in Table 13.

**Table 13: Relative proportions of CuAz components**

<b>Elemental copper</b> (%)	<b>Tebuconazole</b> (%)
95.8 to 96.4	3.6 to 4.2

*B1.2.5 Propiconazole/tebuconazole/permethrin (PTP)*

*B1.2.5.1 Hazard class*

The combination of propiconazole, tebuconazole, and permethrin is suitable for use in hazard classes H1.2 and H3.1 as specified in section 4. Preservative penetrations and retention shall be required by section 4.

*B1.2.5.2 Specification*

Propiconazole, tebuconazole, and permethrin shall be formulated as a microemulsion for dilution in water to give a treating solution containing the azole active ingredients in a 1:1 ratio as given in Table 14.

The total azole to permethrin ratio shall be 10:1 to meet the permethrin retention in timber for H1.2 but does not preclude the use of a higher concentration of permethrin, such as a total azole to permethrin ratio of 3:1, where the treating solution may also be used for treating timber for export, for example to Australia.

A penetration tracer shall be required for the active ingredient(s) and shall not impair the preservative efficacy, penetration of actives into the timber, treatment solution stability, or analytical methods.

**Table 14: Relative proportions of propiconazole and tebuconazole**

<b>Propiconazole</b> (%)	<b>Tebuconazole</b> (%)
45.0 to 55.0	45.0 to 55.0

**B1.3 Non-fixed (diffusible) waterborne preservatives**

*B1.3.1 Boron compounds*

*B1.3.1.1 Hazard class*

Boron preservatives are suitable for use in hazard class H1.1 and H1.2 for sawn timber and H1.2 for LVL. Boron preservatives are suitable for use in hazard class H3.1 for sawn timber provided a paint primer coating is applied to seal all timber surfaces, after treatment and before dispatch from the treatment plant. Preservative penetration shall be as required in section 4.

*B1.3.1.2 Specification*

Boron preservatives shall be expressed as boric acid equivalent (BAE) and shall comprise boric acid or water soluble borate compounds such as sodium octaborate, sodium tetraborate, sodium pentaborate, or mixtures of these that are to be dissolved in water, monoethanolamine, or polyol solvent.

The Boron glycol for H1.2E treating solution shall contain a minimum of 15% ethylene glycol in the treating solution

*C B1.3.1.2*

*The H1.2E specification for sawn timber applies only to the boron polyol treatment, and the H1.2 E specification for LVL applies only to a boron in monoethanolamine treatment.*

**B1.4 Light organic solvent preservatives (LOSPs)**

*B1.4.1 Hazard class*

LOSPs are suitable for use in hazard classes as specified in Table 15.

*C B1.4.1*

*Refer to NZS 3602 for conditions of use for H3.1 applications and painting requirements.*

**Table 15: LOSP fungicides**

<b>Fungicides</b>	<b>Hazard classes <sup>a</sup></b>
Copper naphthenate (CuN) <sup>b</sup>	H3.1 and H3.2
Propiconazole + tebuconazole (1:1) <sup>c</sup>	H3.1
Micronised copper + tebuconazole (25:1) <sup>d</sup>	H3.1 and H3.2
<p>a For further information on hazard classes, and especially H3.1, see Table 1.</p> <p>b CuN is specifically excluded from H1.2 framing.</p> <p>c Propiconazole + tebuconazole shall be used only in combination with permethrin.</p> <p>d The copper plus tebuconazole is specifically excluded for use as H1.2 framing</p>	

*B1.4.1.1 Light organic solvent specification*

The light organic solvent (LOS) shall either comply with Table 1 of AS 3530 or be a de-aromatised hydrocarbon solvent with an aniline point between 65°C and 75°C, maximum aromatic content of 0.5% by weight, and distillation boiling point range between 150°C and 220°C. The light organic solvent is commonly referred to as white spirits.

*B1.4.2 Specification*

*B1.4.2.1 Naphthenic acid specification*

The naphthenic acid component of CuN shall conform to AWPA Standard P36-16.

**C B1.4.2**

Any change in solvent specification can affect the solubility and stability of the active ingredients or additives in the treatment solution so any change in solvent will require appropriate testing by the preservative supplier to confirm fitness for purpose.

**B1.4.2.2 Methylene chloride**

Methylene chloride may be used as an alternative solvent carrier to LOSP for propiconazole plus tebuconazole.

The use of any formulation with methylene chloride as the solvent carrier and for use at specific treatment facilities requires separate Environmental Protection Authority (EPA) approvals and specific controls under the HSNO Act to cover the importation, storage, transport, site handling, treating, solvent recovery, and disposal requirements. The solvent recovery process shall be capable of achieving a maximum tolerable exposure limit for methylene chloride of 3 mg/m<sup>3</sup>.

**B1.4.2.3 Penetration tracer**

Penetration tracer chemicals shall be required where there is no chemical reagent spot test for the active ingredient and shall not impair the preservative efficacy, penetration of actives into the timber or wood-based product, treatment solution stability, or analytical methods.

**B1.4.2.4 Additive specification**

Other additives such as water-repellent waxes, resins, and colourants are permitted but shall not impair the preservative efficacy, penetration of actives into the timber, or treatment solution stability.

**B1.4.3 LOSP fungicides**

**B1.4.3.1 Situation**

The fungicides approved for use in LOSP formulations are listed in Table 5

**B1.4.3.2 Copper naphthenate**

The naphthenate acid component of CuN shall conform to AWWA Standard P36-16 . Copper naphthenate (CuN) at 0.05% m/m elemental copper is suitable for use in hazard class H3.1 for fascia, cladding, joinery, and other timber components less than 30 mm thick but is not suitable for H1.2 framing. Preservative penetration shall be as required in section 4

**B1.4.3.3 Propiconazole/tebuconazole/permethrin (PTP – LOS)**

Propiconazole, tebuconazole, and permethrin shall be formulated to give a treating solution containing the azole active ingredients in a 1:1 ratio as give in Table 16

**Table 16: Relative proportions of propiconazole and tebuconazole**

<b>Propiconazole (%)</b>	<b>Tebuconazole (%)</b>
45.0 – 55.0	45 to 55

**B1.4.3.4 Copper azole**

Copper azole preservative shall comprise a mixture of a suspension of micronized copper and tebuconazole in light organic solvent to give a treating solution containing the active ingredients within the proportions given in Table 17.

**Table 17: Relative proportions of CuAz components**

<b>Elemental copper (%)</b>	<b>Tebuconazole (%)</b>
95.8 – 96.4	3.6 to 4.2

*B1.4.4 LOSP insecticides*

LOSP insecticides include synthetic pyrethroid compounds of permethrin, cypermethrin, or deltamethrin.

**B1.5 Glueline preservative**

Triadimefon and cyproconazole Triadimefon and cyproconazole formulated as a suspension and added to phenol formaldehyde resin shall be permitted as a glueline veneer treatment for H1.2 and H3.1. The triadimefon and cyproconazole shall be within the proportions given in Table 18. The bifenthrin shall be added to the glueline in proportion to achieve the required retention of 0.0023% m/m for the analysis zone described in section 4.

**Table 18: Relative proportions of triadimefon and cyproconazole components**

<b>Triadimefon (%)</b>	<b>Cyproconazole (%)</b>
90.0 to 91.8	8.2 to 10.0
Triadimefon and cyproconazole to be used in combination with bifenthrin.	

*B1.5.1 Glueline treated laminated veneer lumber (LVL) and plywood Application*

The preservative shall be applied as a glueline additive to every glueline followed by a surface treatment to the outer surface veneers.

**B1.6 Other wood protection systems**

*B1.6.1 DMDHEU*

The treatment solution shall contain 20% to 30% of dimethyldihydroxyetheleneurea (DMDHEU) and 1.5% to 2% magnesium chloride and shall be formulated as an aqueous ready-to-use solution.

Radiata pine shall be pressure impregnated with an uptake of 600 L/m<sup>3</sup> or more, then dried/cured at a temperature greater than 100°C.

**B1.6.1**

*Manufacturing process controls are critical and require validation for each treatment plant.*

*B1.6.2 Acetylation*

Wood is reacted with acetic anhydride and free hydroxyl is converted into acetyl groups. This increases the durability of wood, and has secondary benefits in improving dimensional stability and surface hardness. The maximum residual acetic acid in any piece is to be <1.8% m/m, with average for a set to be ≤ 1.0% m/m.

**B1.6.2**

*Manufacturing process controls are critical and require validation for each treatment plant.*



## APPENDIX C – SUPPLEMENTARY TREATMENTS

(Informative)

### C1 Supplementary treatments

#### C1.1 General

For H3.1 and above, the cutting, machining/shaping or notching of treated timber, could expose less well-treated inner zones. This includes heartwood where the protection could only be an envelope. For H3.1 and above, supplementary treatment to these cut surfaces is a requirement to protect the integrity of the preservative treatment. This protection, however, shall not be expected to be as effective as the original treatment.

#### C1.2 Boron

A Boron in ethylene glycol formulation <sup>5</sup>at equivalent to elemental boron 52 g/L applied by brush or roller as two coats to surfaces has been shown to be effective for H1.2 timber. Allow the first coat to dry before applying the second coat.

The treatment can be applied to dry or damp timber. The presence of some moisture in timber enhances diffusion and will increase the depth of penetration.

Formulations may be colourless or include a red dye.

A supplementary boron treatment for H3.1 timber is also suitable provided a protective paint coating is also applied afterwards to the cut end or notch.

#### C1.3 Copper naphthenate

This is formulated as a concentrate in a hydrocarbon solvent. The treatment solution is a bright green colour. Concentrates are diluted with white spirit before application.

Copper naphthenate at equivalent to at least elemental copper 15 g/L is to be applied by brush or roller as two coats to surfaces. Allow the first coat to dry before applying the second coat.

This treatment is a surface treatment. This treatment is suitable for hazard class H3.1 and higher.

#### C1.4 Zinc naphthenate

This is formulated as a concentrate in a hydrocarbon solvent. The treatment solution is colourless when applied. Concentrates are diluted with white spirit before application.

Zinc naphthenate at equivalent to at least elemental zinc 25 g/L is to be applied by brush or roller as two coats to surfaces. Allow the first coat to dry before applying the second coat.

This treatment is a surface treatment. This treatment is suitable where a non-colourless treatment is required and for hazard class H3.1 and higher.

---

<sup>5</sup> Add the link to the report on MBIE report

## APPENDIX D – ANALYTICAL METHODS

(Normative)

### D1 DMDHEU

#### D1.1 Analysis for Nitrogen

The minimum nitrogen content is 3.0% m/m in the cross-section, and 2.0% m/m in the central ninth analytical zone.

Use a method based on ISO 16634-1 and ISO 16634-2 that has been validated for timber.

$$\text{Nitrogen (\% m/m)} = \frac{(\text{Weight of N in treated sample} - \text{weight of N in untreated sample}) * 100}{\text{Weight of dried treated sample}} \dots\dots\dots(\text{Eq.1})$$

#### D1.2 Wood density

A minimum 25% increase in wood density is required. This requires a wood density measurement before the DMDHEU treatment that is repeated following treatment.

Use a mass volume method such as ASTM D2395 Test Method

C D1.2  
The DMDHEU treatment makes it difficult to wet up the timber so use of a saturated timber volume is not suitable.

### D2 Acetylation

#### D2.1 Analysis of bound acetyl groups

The minimum acetyl content is to be 19.0% m/m for any single sample. The maximum acetic acid content is to be <1.8% m/m with an average of ≤1% m/m.

$$\text{Acetyl content (\% m/m)} = \frac{\text{Weight of acetyl groups in sample} * 100}{\text{Weight of dried acetylated sample}} \dots\dots\dots(\text{Eq.2})$$

$$\text{Residual acetic acid (\% m/m)} = \frac{\text{Weight of acetic acid in sample} * 100}{\text{Weight of dried acetylated sample}} \dots\dots\dots(\text{Eq.3})$$

The acetyl content of wood can be determined either by:

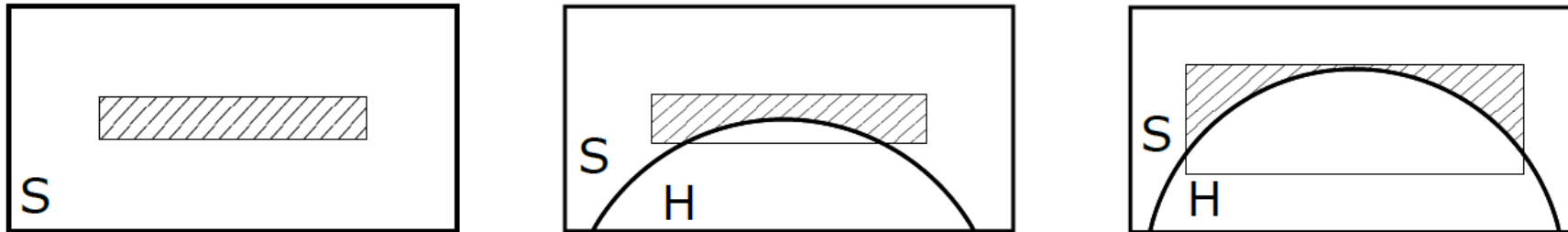
- a. De-acetylation of the acetyl groups and then quantifying by chromatography (HPLC), or
- b. Infrared spectroscopy (NIR).

C D2.1  
If NIR is used then the method required calibration to a validated HPLC method and is usually specific to a particular supplier/model.

## APPENDIX E- CENTRAL NINTH ANALYTICAL ZONE

(Informative)

Figure 8 shows diagrams to assist in identifying central ninth analytical zone when heartwood is present in sample



Sapwood analysis zone is  $\frac{1}{9}$  of the total cross-section area  
and equidistant from all four sides

Left: Cross-section 100% sapwood

Centre: Cross-section includes  
sapwood and heartwood, but only  
sapwood area of zone shown is  
analysed.

Right: Cross-section includes sapwood  
and heartwood, but only sapwood area  
of zone shown is analysed.

Figure 8 - Examples for determining central ninth zone

## APPENDIX F - SPECIFICATION ADVISORY NOTES

(Informative)

### F1 Timber and wood products

The mandatory provisions of this standard apply up to the treatment plant gate, but this appendix covers some of the issues with subsequent handling and use of treated timber and other wood products.

The care and proper handling of timber after treatment, prior to use, and in service should be covered by specific recommendations from suppliers detailing necessary or desirable maintenance procedures that could influence the performance of the product.

### F2 Care of treated timber

Treated timber should be properly cared for before use to avoid exposure to a biological or physical hazard situation for which it has not been protected. Examples include. H1.1, H1.2, H3.1 and H3.2 timbers should be stored out of contact with the ground, and H1.1 and H1.2 framing stored to protect from rainfall.

Waxes and resins are often added to LOSP treatments. These may serve different purposes:

- (i) To act as a binder for the active ingredients in the timber;
- (ii) To impart some measure of water repellence to the wood; and
- (iii) To prevent 'blooming' of the active ingredients during solvent evaporation.

The water repellence function is usually intended only as a temporary measure for protection from rain wetting until such time as the wood is painted or enclosed. It should not be assumed that the long-term performance of unpainted LOSP treated wood is significantly improved by the addition of waxes and repellents.

### F3 Fixation of CCA preservative

The fixation of CCA treated timber is a mandatory requirement.

AS/NZS 2843.1 contains requirements for timber treated with CCA preservatives to allow for fixing of the active ingredients to occur for environmental protection and occupational health and safety reasons.

Refer to the Best Practice Guidelines for the Safe Use of Timber Preservatives and Antisapstain Chemicals. [www.worksafe.govt.nz](http://www.worksafe.govt.nz)

### F4 Residue Solvent 'flash off' for LOSP preservatives

To reduce the health risks and potential incompatibility with other materials, the residual solvent in timber following treatment required timber shall be held in fillet (every layer) for a minimum of four (4) days in a well ventilated area, or use of an alternative method.

Refer to the Best Practice Guidelines for the Safe Use of Timber Preservatives and Antisapstain Chemicals. [www.worksafe.govt.nz](http://www.worksafe.govt.nz)

### F5 Building poles and piles

Ends cut after treatment should not be put into the ground.

Where possible, the cut ends should be continuously protected from the weather.

*Any cut or bored surfaces should have been allowed to surface dry before applying in situ preparations or connecting metal fasteners. Refer to NZS 3604 for the protection of metal fasteners.*

Treated timber that is to be used as driven timber piles should be allowed to stand for 3 weeks after treatment before being driven.

### F6 Machining and sawing treated timber

With timber is used in hazard class H3.1 and above, it is inadvisable to cut or machine the timber after treatment. When this is unavoidable, supplementary protection should be applied to the cut surface. Refer to Appendix C for suitable supplementary treatments. Manufacturers may prescribe supplementary treatment if timber or wood product is cut, notched or bored. This protection, however, cannot be expected to be as effective as the original treatment.

**F7 Disposal of treated wood**

Any shavings, sawdust or offcuts should not be burnt on site, unless there is a air-discharge consent. Otherwise disposed of in an approved landfill.

Any shavings, sawdust or offcuts should not be burnt (unless with a discharge to air consent) but disposed of in an approved landfill.

Do not use treated timber as fuel for heating or cooking fires.

**F8 Severe or extreme hazards**

The chemical treatments and protection methods for sawn timber and round wood included in this standard are based on test results from laboratory or field study results by comparison to reference products, or from a history of use.

Testing might not cover every possible exposure scenario for all the hazard class situations. When in doubt about the suitability of a particular treatment or protection system, seek technical advice.

Where treated timber shows evidence of decay and is being replaced, a high fungal inoculum potential may exist and have a potential negative impact on the durability of the replacement timber. This has been observed when replacing poles affected by brown rot in sandy soils. In these circumstances do not install the replacement pole in the same hole or position, or if repositioning is not possible, dig out the soil and replace with new fill material.

During construction such as when laying concrete pads or paths, if boxing timber (untreated or to low hazard class) is in ground contact and left in contact with posts or building poles, the boxing timber could ground decay and increase the fungal inoculum potential and be a risk to the long term durability of the post or pole.

The cutting, machining/shaping, or notching of treated timber will expose less well treated inner timber. Supplementary treatment to these surfaces is a requirement to protect the integrity of the preservative treatment, and these areas must be above the ground line.

## APPENDIX G - HOW TO APPLY FOR NEW OR VARIATIONS TO PRESERVATION TREATMENTS

(Informative)

Please contact Standard New Zealand via email [enquiries@standards.govt.nz](mailto:enquiries@standards.govt.nz) if you wish to submit an application for a new treatment

### PART A – GENERAL INFORMATION

Name of the timber preservative or treatment: \_\_\_\_\_

#### Applicant details

Company name \_\_\_\_\_

Postal address \_\_\_\_\_

Street address \_\_\_\_\_

Telephone number \_\_\_\_\_

Facsimile number \_\_\_\_\_

Email address \_\_\_\_\_

Contact person \_\_\_\_\_

#### Person acting on behalf of applicant (if applicable)

Name \_\_\_\_\_

Postal address \_\_\_\_\_

Street address \_\_\_\_\_

Telephone number \_\_\_\_\_

Facsimile number \_\_\_\_\_

Email address \_\_\_\_\_

#### Application type (delete yes/no as applicable)

(i) Amendment to existing approved preservative or treatment  Yes/No

(ii) Approval of new preservative or treatment  Yes/No

## PART B – INFORMATION ON THE NEW OR PROPOSED TREATMENT

- 1 Approval under the HSNO Act 1996 including the HSNO approval number.
- 2 Please attach written confirmation from the Environmental Protection Authority that the product matches an existing approved substance.
- 3 Formulation type (type of timber treatment formulation) – for example, Emulsifiable concentrate; Emulsion (oil in water/water in oil); Liquid (ready to use in water, ready to use in other solvent); soluble concentrate; water soluble granules; formulation types; micronized or nanoparticles based formulations; others (give details).

### Treatment specification

- 4 Provide a description and specification to be included in NZS 3640. The specification should be confirmed with a Certificate of Analysis using validated analytical methods and from a suitably accredited laboratory.

Description	
Specification for active ingredients:	
Component (%)	Allowable range

- Proposed method(s) checking penetration in wood.
- Proposed analytical methods for checking retention in wood.

### Hazard class

- 5 Identify the hazard class that this treatment is appropriate for, and for which approval is sought.
- 6 Identify what types of wood products the treatment would be used for, for example, sawn timber, posts/poles, and any engineered wood products.

### Application overview

- 7 Attach a summary document identifying the timber treatment and the purpose of this application. Indicate the retentions and appropriate hazard classification for the timber treatment method.
- 8 List any overseas regulatory status.

### Product information

- 9 Attach copies of the proposed product label, Safety Data Sheet, and any technical or marketing information providing background to the proposed product claims and end-use.

**PART C – EFFICACY AS A TIMBER TREATMENT**

- 10 When submitting the information please clearly identify any data or reports that could be interpreted as commercially sensitive and therefore confidential. Please note that all information provided will be treated as confidential and will only be made available to the technical committee. This information should be provided separately.
- 11 The efficacy information should include comprehensive data on the methodology used and the results from laboratory, accelerated field simulator (AFS) testing and field trials. Refer to AWPC Protocols for assessment of wood preservatives for guidance on the minimum requirements for biological testing. The information should clearly state where the data has been generated, for example in-house or by an external third party organisation.
- Efficacy trials – summarise the test reports
  - Justification for approval
  - Permanence of treated timber in-service, such as
    - (i) Data from in-service trials
    - (ii) Predicted long-term service life relevant to wood product in the proposed hazard class
    - (iii) Other information relevant to fitness for purpose properties that would be relevant to the performance or acceptability of the treatment for use in the proposed hazard class under normal use conditions, for example, effects of climatic/environmental conditions during exposure, painting, gluing, types of fasteners, handling.

**PART D - DECLARATION – PLEASE SIGN AND RETURN**

- The information is supplied to Standards New Zealand for consideration for inclusion as part of the revision of NZS 3640:2003.
- All information provided that is confidential is clearly identified.
- I declare all information that has been provided is true and correct.

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Organisation: \_\_\_\_\_

Date: \_\_\_\_\_

**CHECKLIST**

- (a) Covering letter
- (b) Four copies of completed information – PART A and B
- (c) Efficacy information (four copies) – PART C
- (d) Electronic copy of information (on memory stick)
- (e) Declaration