STANDARDS
NEW ZEALAND
PAEREWA AOTEAROA

NZS 3602:2003

New Zealand Standard

Timber and Wood-based Products for Use in Building

Superseding NZS 3602:1995

NZS 3602:2003

Single User PDF Terms & Conditions

You have material which is subject to strict conditions of use. Copyright in this material is owned by the New Zealand Standards Executive. Please read these terms and conditions carefully, as in addition to the usual range of civil remedies available to Standards New Zealand on behalf of the New Zealand Standards Executive for infringement of copyright, under New Zealand law every person who infringes copyright may be liable to a fine of up to $10,000 for every infringing copy or imprisonment of up to 5 years, or a fine of up to $150,000 or imprisonment not exceeding 5 years.

You have access to a single-user licence to read this non-revisable Adobe Acrobat PDF file and print out and retain ONE printed copy only.

We retain title and ownership of the copyright in this PDF file and the corresponding permitted printed copy at all times.

Under this license use of both the PDF file and the single permitted printed copy of this PDF file you may make are restricted to you. Under no circumstances are you permitted to save, sell, transfer, or copy this PDF file, the one permitted printed copy of this PDF file, or any part of either of them.

You undertake that you will not modify, adapt, translate, reverse engineer, decompile, disassemble or create derivative works based on any of the downloaded PDF file, nor will you merge it with any other software or document, even for internal use within your organization.

Under no circumstances may this PDF file be placed on a network of any sort without our express permission.

You are solely responsible for the selection of this PDF file and any advice or recommendation given by us about any aspect of this PDF file is intended for guidance only and is followed or acted upon entirely at your own risk.

We are not aware of any inherent risk of viruses in this PDF file at the time that it is accessed. We have exercised due diligence to ensure, so far as practicable, that this file does not contain such viruses.

No warranty of any form is given by us or by any party associated with us with regard to this PDF file, and you accept and acknowledge that we will not be liable in any way to you or any to other person in respect of any loss or damage however caused which may be suffered or incurred or which may arise directly or indirectly through any use of this PDF file.

Regardless of where you were when you received this PDF file you accept and acknowledge that to the fullest extent possible you submit to New Zealand law with regard to this licence and to your use of this PDF file.

COMMITTEE REPRESENTATION

This Standard was prepared by Technical Committee P 3602 for the Standards Council established under the Standards Act 1988. Committee P 3602 consisted of representatives of the following:

Building Industry Authority
Building Research Association of New Zealand Inc.
Business New Zealand
Consumer Representatives
Frame and Truss Manufacturers' Association of New Zealand
Institution of Professional Engineers New Zealand
New Zealand Building Industry Federation
New Zealand Forest Research Institute
New Zealand Institute of Architects
New Zealand Plywood Manufacturers' Association
New Zealand Timber Industry Federation
Registered Master Builders' Federation

ACKNOWLEDGEMENT

The financial assistance provided by the Building Industry Authority is gratefully acknowledged.

Published by Standards New Zealand, the trading arm of the Standards Council, Private Bag 2439, Wellington 6140.
Telephone: (04) 498 5990, Fax: (04) 498 5994.
Website: www.standards.co.nz

AMENDMENTS

No.	*Date of issue*	*Description*	*Entered by, and date*

CONTENTS **PAGE**

Figure

Table

REFERENCED DOCUMENTS

Reference is made in this Standard to the following:

NEW ZEALAND STANDARDS

NZS 3601:1973	Metric dimensions for timber
NZS 3603:1993	Timber structures Standard
NZS 3604:1999	Timber framed buildings
NZS 3605:2001	Timber piles and poles for use in building
NZS 3606:1987	Specification for the manufacture of glue laminated timber (superseded in part by AS/NZS 1328)
NZS 3610:1979	Specification for profiles of mouldings and joinery
NZS 3617:1979	Specification for profiles of weatherboards, fascia boards, and flooring
NZS 3618:1984	Mechanical stress grading of timber (superseded in part by AS/NZS 1748:1997)
NZS 3619:1979	Specification for timber windows
NZS 3631:1988	New Zealand timber grading rules
NZS 3640:2003	Chemical preservation of round and sawn timber
NZS 7202:- - - -	Synthetic resin adhesives (phenolic and aminoplastic) for wood
Part 1:1986	Specification for gap-filling adhesives
Part 2:1986	Specification for close-contact adhesives
NZS 7421:1990	Specification for installation of solid fuel burning domestic appliances
SNZ HB 4236:2002	Masonry veneer wall cladding

JOINT AUSTRALIAN/NEW ZEALAND STANDARDS

AS/NZS 1148:2001	Timber – Nomenclature – Australian, New Zealand and imported species
AS/NZS 1328:- - - -	Glued laminated structural timber
Part 1:1998	Performance requirements and minimum production requirements
Part 2:1998	Guidelines for AS/NZS 1328:Part 1 for the selection, production and installation of glued laminated structural timber
AS/NZS 1491:1996	Finger jointed structural timber
AS/NZS 1604:- - - -	Specification for preservative treatment
Part 3:2002	Plywood
Part 4:2002	Laminated veneer lumber (LVL)
Part 5:2002	Glued laminated timber products
AS/NZS 1605:2000	Methods for sampling and analysing timber preservatives and preservative-treated timber
AS/NZS 1748:1997	Timber–Stress-graded–Product requirements for mechanically stress-graded timber
AS/NZS 1859:- - - -	Reconstituted wood-based panels
Part 1(Int):2001	Particleboard
Part 2(Int):2001	Dry-processed fibreboard

AS/NZS 2098:- - - -	Methods of test for veneer and plywood
Part 1:1996	Moisture content of veneer and plywood
Part 2:1996	Bond quality of plywood (chisel test)
Part 3:1996	Bond quality and strength of scarf joints in plywood
Part 4:1996	Measurement of dimensions for sheets of veneer and plywood
Part 5:1996	Resistance of gluelines in plywood to attack micro-organisms
Part 6:1996	Depth of peeler checks in veneer and plywood
Part 7:1996	Density of veneer and plywood
Part 8:1996	Water absorption and thickness swelling of unpainted plywood
AS/NZS 2269:1994	Plywood – Structural
AS/NZS 2271:1999	Plywood and blockboard for exterior use
AS/NZS 2311:2000	Guide to the painting of buildings
AS/NZS 2908:- - - -	Cellulose-cement products
Part 1:2000	Corrugated sheets
Part 2:2000	Flat sheet
AS/NZS 4284:1995	Testing of building facades
AS/NZS 4357:1995	Structural laminated veneer lumber
AS/NZS 4787:2001	Timber – Assessment of drying quality

AUSTRALIAN STANDARD

AS 1720:- - - -	Timber structures (SAA Timber Structures Code)
Part 1:1997	Design methods

OTHER PUBLICATIONS

Bengelsdorf, M.F., American Plywood Association Report PT 80-1, Fastener Corrosion in Water-Borne Preservative Treated Wood.

Building Industry Authority, Approved Documents for NZBC Clauses B1 Structure; B2 Durability; C Fire Safety; D1 Access Routes; E2 External Moisture; E3 Internal Moisture.

Building Industry Authority, New Zealand Building Code (NZBC) 1992.

Building Research Association of New Zealand Technical Paper P21-1991 Supplement, A Wall Bracing Test and Evaluation Procedure.

Building Research Association of New Zealand Technical Paper P43-1984, Treated Timber Frame Foundation.

New Zealand Timber Industry Federation Timber Design Guide.

LATEST REVISIONS

The users of this Standard should ensure that their copies of the above-mentioned New Zealand Standards and referenced overseas Standards are the latest revisions or include the latest amendments. Such amendments are listed in the annual Standards New Zealand Catalogue which is supplemented by lists contained in the monthly magazine *Standards Update* issued free of charge to committee and subscribing members of Standards New Zealand.

FOREWORD

This revision of NZS 3602:1995 gives the requirements for certain timbers and wood-based products to achieve a stated life expectancy. This Standard has been prepared taking into account the relevant requirements of NZS 3604, NZS 3631 and NZS 3640.

This revision was driven by concerns about the durability of framing timbers where limitations of design, material performance or workmanship in modern buildings have created a risk of moisture penetration and retention leading to decay. The document is intended to align with proposed changes to the New Zealand Building Code (NZBC) Approved Document B2/AS1.

The Standard is separated into two parts. Part 1 calls up provisions related to NZBC Clause B2 “Durability” so that this Part can be cited in the Approved Document. Some provisions relating to New Zealand Building Code Clauses B1, E2 and E3 are also mentioned.

Part 2 sets out provisions for specifiers, manufacturers and constructors to assist in obtaining satisfactory construction and performance beyond the scope of the New Zealand Building Code (NZBC). This Part of the Standard provides useful information as a link between material and construction codes.

REVIEW OF STANDARDS

Suggestions for improvement of this Standard will be welcomed. They should be sent to the Chief Executive, Standards New Zealand, Private Bag 2439, Wellington 6140.

NOTES

NEW ZEALAND STANDARD

TIMBER AND WOOD-BASED PRODUCTS FOR USE IN BUILDING

PART 1 MANDATORY REQUIREMENTS FOR COMPLIANCE WITH THE DURABILITY PROVISIONS OF CLAUSE B2 OF THE NEW ZEALAND BUILDING CODE

Other provisions of the New Zealand Building Code related to Clauses B1, C1, D1, E2 and E3 are referenced.

101 SCOPE

101.1
This Standard gives the requirements for timber and wood-based products for particular uses in building so that they can be expected to give acceptable performance during the life of the building. To that end this Standard covers the materials themselves and aspects of design and construction that are relevant to their performance in use.

101.2
Part 1 of this Standard applies to the durability performance required of wood-based products in all types of buildings, whether or not they are constructed so as to comply with NZS 3604. However, Part 1 applies only to the required characteristics of wood-based products made from the wood species specified in table 1, table 2 and table 3. The required characteristics of wood-based products made from any other wood species (i.e. not as specified in those tables) are outside the scope of this Standard.

C101.2
The durability (in terms of New Zealand Building Code requirements) of wood species other than those specified in tables 1, 2 and 3 of this Standard should be established only on the basis of a written opinion from an authoritative source, such as from the Building Research Association of New Zealand (BRANZ) or Forest Research.

102 INTERPRETATION

102.1
The word "shall" identifies a mandatory requirement for compliance with this Standard. The word "should" refers to practices which are advised or recommended.

102.2 Commentary clauses
Clauses prefixed by "*C*" and printed in italic type are intended as comments on the corresponding mandatory clauses. They are not to be taken as the only or complete interpretation of the corresponding clause nor should they be used for determining in any way the mandatory requirements of compliance within this Standard. The Standard can be complied with if the comment is ignored.

102.3
The full titles of reference documents cited in this Standard are given in the list of Referenced Documents immediately preceding the Foreword.

102.4
The durability periods contained within this Standard are minima only – e.g. a durability of 50 years is to be read as not less than 50 years.

102.5
Permitted defects and warp allowances for the different grades of timber shall be as specified in NZS 3631.

102.6 Definitions
For the purposes of this Standard, the following definitions shall apply:

BALCONY means an open floor (i.e. no roof or walls) attached to the exterior of the main structure of a building and supported on cantilevered joists.

BOUNDARY JOIST OR HEADER JOIST means a joist running along the outer ends of the floor joists.

DECK means an open floor (i.e. no roof or walls) attached to the exterior of the main structure of a building and supported on ordinary joists.

ENCLOSED BALUSTRADE means a timber-framed balustrade that is closed in on all sides.

ENCLOSED DECK OR BALCONY means a timber-framed deck or balcony, whether over an interior or exterior space that has an impermeable upper surface and is closed in on the underside.

FLAT ROOF means a roof having its exterior surface at an angle of less than 10º to the horizontal, or at a slope of less than 1 in 6.

FRAMING means timber members to which lining, cladding, flooring or decking is attached, or which are depended upon for supporting the structure, or for resisting forces applied to it.

GRADE means the established quality or use classification of timber (see NZS 3631).

GROUND ATMOSPHERE means the atmosphere between the ground and the floor (i.e. in the subfloor space).

GROUND CONTACT means in contact with the ground or concrete without separation by a moisture barrier.

HEARTWOOD or HEART means the inner layers of the log which, in the growing tree, have ceased to contain living cells. Heartwood is generally darker in colour than sapwood.

LAMINATED VENEER LUMBER (LVL) is a structural product which is an assembly of veneers laminated with adhesive, in which the grain direction of the outer veneers and most of the other veneers is in the longitudinal direction.

MASONRY VENEER means a skin of concrete masonry or burnt clay masonry of maximum mass of 220 kg/m^2, which is attached to, and laterally supported by, a structural wall of masonry or timber in accordance with NZS 3604.

MONOLITHIC CLADDING is a term used in New Zealand to refer to types of exterior cladding systems used with framed walls to simulate plastered masonry. Typically, but not necessarily, the cladding systems have characteristics of very low water and vapour permeability.

PARAPET means a timber-framed wall that is closed in on all sides and runs along the edge of a roof, extending above the level of the roof cladding.

SKILLION ROOFING means a pitched roof where the ceiling lining is parallel and close to the roof cladding. The roof may be mono-pitch or may consist of more than one roof plane. These roofs sometimes have rafters exposed below the ceiling.

STRUCTURAL GRADES (OF TIMBER) means timber that has been graded, either visually or mechanically, and then assigned a suite of characteristic strength and stiffness properties (refer to NZS 3603). This excludes No. 2 Framing Grade which has no assigned characteristic strength and stiffness properties.

STRUCTURAL LVL is LVL manufactured in conformance with the requirements of AS/NZS 4357 and intended for structural application.

WOOD-BASED BUILDING COMPONENT means any component of a building which consists of, or is made primarily from wood or wood fibres, and includes:

(a) Unsawn wood members, such as logs, poles or posts;

(b) Sawn timber (whether or not dressed or gauged);

(c) Glue-laminated timber;

(d) Engineered wood products (EWP) such as composite joists and beams;

(e) Plywood and Laminated Veneer Lumber (LVL);

(f) Any other wood-based product.

103 GENERAL

103.1

This revision contains some requirements for treatment of framing timbers that were not present in the 1995 document. This should not be seen as an alternative to or replacement for the principles of sound weathertightness design. The principle that absence of moisture should be the primary safeguard against decay still applies.

Revisions to Building Industry Authority Approved Documents B2/AS1(1) and E2/AS1(1) and to NZS 3640 are taking place and are expected to align with this Standard. These revisions are influenced by deficiencies in material selection, design, componentry and workmanship that have become apparent. These resulted in moisture penetration and retention which is perceived as failure of the building envelope.

Specifiers are advised that:

- There is no single course of action that will overcome all the deficiencies.
- Face sealed claddings (often referred to as monolithic) facilitate the retention of moisture.
- Any timber framing whether treated or not which becomes damp and remains damp will be susceptible to decay.

NOTE –
(1) Throughout the Standard NZBC Acceptable Solutions are referred to by their number/letter assignment only (e.g. E2/AS1).

103.2
Wood-based building components are classified into durability ratings depending on their structural function, their ease of access, replacement, and detection of failure. The highest durability rating is for a minimum of 50 years unless the building has a specified intended life. Other wood-based building components require a durability of not less than either 5 or 15 years, unless the building has a specified intended life that is less than these, again dependent on ease of access, replacement and detection of failure. In order to meet these three levels of durability, Part 1 of this Standard primarily specifies the grades, moisture contents, and preservative treatments which are required in wood-based building components made from certain wood species.

103.3
Where paint coatings are required the durability will only be achieved when the coatings are maintained in good condition.

103.4
This Standard applies if all relevant design and detailing considerations necessary to control moisture to the appropriate level have been met, although it makes provision for instances where there is unintentional lack of moisture content control.

103.5
The visual grades with stresses assigned are Engineering, Framing No. 1 and Building Grade depending on species and grade in accordance with NZS 3631.

103.6
Machine graded timber graded in accordance with AS/NZS 1748 or NZS 3618 may be used as an alternative to visually graded timber.

103.7
Characteristic working stresses for Australian timbers for structural use graded to the relevant Australian standards may be found in AS 1720. For other timbers, refer to NZS 3603.

103.8
Timber is sold green sawn, green gauged, dry dressed in generic sizes and in proprietary branded dry dressed sizes.

Generic sizes are given in NZS 3601 and are related to a preferred range of call sizes.

Suppliers may supply these sizes or other sizes but the sales documentation should indicate the actual size.

103.9 Protection

103.9.1
All timber and wood-based products shall be protected to minimize increases in moisture content or physical damage which can reduce their durability or structural strength prior to installation.

103.9.2 *Damp proofing*
All timber and wood-based products shall be separated from concrete or masonry with a damp-proof membrane. This is not required for timber treated to H4 or H5 provided however that the transfer of moisture through this timber will not cause moisture related problems in adjacent materials.

103.9.3
Timber with a moisture content greater than 20 % must be dried to below 20 % prior to the application of internal linings and finishing timber. Any damage shall be made good or the timber replaced.

103.9.4
Primer paint will deteriorate if left exposed. The top coats should therefore be applied without undue delay. If the priming is exposed for more than a month, re-priming may be necessary. Refer to AS/NZS 2311.

104 TIMBER SPECIES, GRADE, QUALITY AND PRESERVATIVE TREATMENT

104.1
Timber and wood-based products for use in building shall comply with tables 1, 2 and 3.

The tables detail requirements, including the grade or type of product and preservative treatment, for the following:

Table 1 Wood-based building components, which provide structural stability to achieve a 50-year durability.

Table 2 Wood-based building components to achieve a 15-year durability.

Table 3 Wood-based building components to achieve a 5-year durability.

C104.1
The tables include the most commonly used and generally available timbers. They do not purport to be exhaustive, nor cover all of the species that may be available from time to time. Specifiers are advised to contact local suppliers to determine species availability.

104.1.1
Visual grading of timber shall comply with NZS 3631 except for the modifications required in 111.2.3. Profiles of exterior joinery, mouldings, weatherboards and fascia boards shall comply with NZS 3617, NZS 3610, or NZS 3619 as appropriate, except as provided for by 111.2.7. For the purposes of table 1C, interior flooring profiles shall comply with NZS 3617.

104.2 Plywood

104.2.1
Plywood shall be preservative treated in accordance with 105.1 when it is used in the following situations:

(a) As exterior cladding;

(b) Exterior use in a vertical situation where there is a life expectancy of more than 5 years and where water is not trapped or debris allowed to accumulate;

(c) Other exterior uses where dampness or water accumulation or debris accumulation will occur;

(d) Exposed to ground atmosphere in a subfloor or crawl space situation where dampness or condensation may occur except that flooring shall be as in table 1C;

(e) In interior use situations where persistent dampness or condensation may occur on a long term basis;

(f) Behind a cladding where dampness or condensation may occur as referenced in table 1D.

C104.2.1
Guidance as to which type of plywood should be used in any particular situation can be obtained from the forewords of AS/NZS 2098 Parts 1 to 8, AS/NZS 2271 and AS/NZS 2269. Additional information may be obtained from the manufacturers.

Structural plywood as specified in AS/NZS 2269 is plywood adequate for service outside and primarily intended as a construction material where strength properties are the main consideration. Characteristic stresses for structural plywood are given in NZS 3603.

104.2.2
When plywood is used outside, physical protection in the form of preservative treatment or preservative treatment in conjunction with paint, is necessary (refer to tables 1, 2 and 3) to ensure the required durability. Regular maintenance and replacement of the paint shall be undertaken during the life of the plywood.

104.2.3
Plywood conforming to AS/NZS 2271 or AS/NZS 2269, used in interior dry situations, (i.e. protected from the weather or dampness) does not need to be treated. The inside face of a drained ventilated cavity behind cladding is not an interior dry situation.

C104.2.3
Interior plywood as specified in AS/NZS 2271 or AS/NZS 2269 is suitable for use in interior situations where there is full protection from the weather and from high humidity.

104.3 Particleboard and other wood-based products
Although particleboard and other wood-based products are shown in tables 1, 2 and 3 their use is dependent on the demonstration, or prediction, that the required durability will be achieved. The acceptance of such demonstration, or prediction, is outside the scope of this Standard and shall be to the satisfaction of the territorial authority (TA).

104.4 Engineered wood products (EWP), including glue laminated timber

104.4.1
Tables 1 and 2 require preservative treatment of a particular species and quality of timber used in EWP or laminated timber component.

104.4.2
Materials, finishes and workmanship of glue laminated timber shall be specified in accordance with the requirements of NZS 3606 and AS/NZS 1328.

104.4.3
Manufacture of laminated veneer lumber shall be in accordance with AS/NZS 4357.

104.5 Glue laminated timber
Exemption from the treatment requirements of 104.4.1 shall apply if the glue laminated timber member is installed in an interior position in the building fully protected from the weather. In this circumstance the completely dimensioned and finished beam may have a surface coating of approved insecticide/fungicide treatment incorporated with the protective sealer or applied prior to the sealer. Migratory penetration of the sealer treatment shall be a minimum of 10 mm.

105 PRESERVATIVE TREATMENT

105.1
Timber and wood-based products which use those species of wood which table 1, table 2 and table 3 require to be treated shall be clearly identified in accordance with NZS 3640. Where required, plywood shall be treated and branded to the requirements of AS/NZS 1604.3. Where required, laminated veneer lumber shall be treated and branded to the requirements of AS/NZS 1604.4.

C105.1
For treated timber, Hazard Class specifications of relevance to building construction are H1.1, H1.2, H3.1, H3.2, H4 and H5. Specifiers should be familiar with their provisions, and nominate in their job specifications the Hazard Class specifications required for all wood-based building components. Branding requirements are stated in NZS 3640. Also see New Zealand Timber Industry Federation Timber Design Guide for more information.

Care should be taken in the disposal of waste pieces of treated timber. Treated timber offcuts should not be burned in domestic fireplaces because this produces toxic air pollution, concentrates toxic wastes in ashes and accelerates corrosion of metal fireplaces.

In NZS 3640 Hazard Class H3 has been divided into H3.1 and H3.2 subclasses to recognize the difference in durability between LOSP-based (light organic solvent) preservatives and those containing copper. H3.1 includes LOSP-based preservatives except for those containing copper, and H3.2 comprises all preservatives containing copper.

Timber treated with preservatives containing copper has a varying natural green colour. NZS 3640 allows H3.1 framing to be coloured green to differentiate it from other Hazard Classes treated to LOSP. There is a readily available test that can be used on site to show a copper-based preservative has been used. (Refer to AS/NZS 1605).

105.2
Timber treated at plants participating in the Timber Preservation Council's Woodmark scheme carries the Woodmark symbol WOODmark® device ⩛. For the purposes of this Standard, the Woodmark symbol is accepted as automatic proof that the branded Hazard Class has been achieved. Where timber treatment will be undertaken at a plant not a participant in the Timber Preservation Council Woodmark scheme, then the territorial authority shall satisfy itself that the plant is operating to at least equal standards.

105.3
Treated timber shall be properly cared for before use to avoid exposure to a hazard situation for which it has not been treated and therefore against which it has not been protected. H1.1, H1.2 and H3.1 shall be stored undercover and out of contact with the ground. H3.2 timbers should be stored out of contact with the ground.

C105.3
The care and proper handling of timber after treatment and prior to use (and in service where the relevant Hazard Class contains recommendations relating to necessary or desirable maintenance procedures) can have a bearing on its durability in service.

105.4
Preservative treated timber may affect the durability of metal fixings and components, including protective coating systems, building wraps, sealants and adhesives. To satisfy the durability provisions of Clause B2 of the NZBC and those acceptable solutions set out in NZS 3604 the correct protective system or grade of stainless steel shall be used.

Where the structural integrity of the building is dependent on a fastening and that fastening has a limited life, then the life of the fastening shall be the specified intended life of the building.

C105.4
Timber treatments may affect the life of fasteners and evidence, or opinions predicting, satisfactory performance may need to be supplied to the territorial authority. Hot dipped galvanized nails, wire ➤

dogs, bolts and sheet fixings in contact with copper chrome arsenate (CCA) treated timber in damp conditions can have an expected life of less than 15 years. Unprotected electroplate galvanized fixings will have considerably less life than hot dipped galvanized steel fixings. Additional proprietary coatings offer extended life to galvanized steel fixings, but their durability must be established in accordance with B2/VM1. Galvanized structural components incorporating a sacrificial thickness of metal for the life of the fitting are also acceptable. Type 304 or 316 stainless steel nails, wire dogs, bolts and sheet steel fixings offer a longer life than galvanized steel.

Specifiers may elect to specify a higher standard than that required by NZBC for other purposes. Where galvanized steel or aluminium components are used in conditions of dampness with timber that has been treated with preservatives containing copper, special precautions in accordance with the component manufacturer's instructions will be necessary to avoid corrosion.

105.5

Radiata pine framing members do not require preservative treatment to ensure their durability if:

(a) They are used only in the conditions specified in table 1E, table 2B and table 3; and

(b) They have been kiln-dried at 90 ºC or above to a moisture content of 18 % or less and have been planer gauged.

C105.5

In timber complying with the conditions in 105.5 attacks from the common New Zealand household borer (Anobium Punctatum), will be at an acceptably low level to comply with the strength properties and durability required by the NZBC. Care needs to be exercised in the use of untreated framing members adjacent to external absorbent claddings on walls and roofs that are susceptible to solar driven moisture transfer mechanisms which can cause high humidity in framing cavities. Cladding manufacturer's recommendations to prevent solar-driven moisture transfer through their absorbent cladding materials from entering framing cavities should be followed. Adequate prevention of moisture being conducted from the subfloor into the wall cavity should be implemented.

106 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS IN CONTACT WITH THE GROUND, TO ACHIEVE A 50-YEAR DURABILITY

106.1

Table 1A lists the species or type, grade, moisture content and preservative treatment required for wood-based building components in contact with the ground.

106.2

Round or square timber house piles and poles for use in buildings shall be in accordance with NZS 3605. Any cut or bored surfaces shall have *in situ* treatment according to NZS 3640. Cut ends or notches or similar, in poles and posts made after treatment shall not be put into the ground, nor closer than specified in NZS 3604 from the ground and shall be protected from the weather.

C106.2

Guidance on suitable timber preservative treatment preparations can be obtained from the New Zealand Timber Preservation Council in Wellington or Forest Research in Rotorua.

Treated wood must be surface dry before connecting metal fastenings.

In ground contact situations, the presence of untreated timber or wood residues (e.g. bark mulch) adjacent or attached to H4 or H5 treated timber, piles and poles can adversely affect the lifespan of these products.

106.3
Plywood used for treated frame foundations (All Weather Wood Foundations) shall be treated to the requirements of Hazard Class H5.

C106.3
BRANZ Technical Paper P43-1984 Treated Timber Frame Foundation provides details on the construction of treated timber foundations. Stainless steel nails and staples are recommended for use in this type of construction (refer to American Plywood Association's Report PT 80-1 Fastener Corrosion in Water-Borne Preservative Treated Wood). The life expectancy of other types of fixings is considerably less than stainless steel and may not provide a 50-year durability performance.

106.4
Crib walling shall be constructed of treated timber as required by table 1A.

C106.4
Crib walls are engineering designed retaining structures. Proprietary crib wall retaining wall systems, and design procedures, height limitations and construction methods for building such walls are available. Generally the wall's components are manufactured from timber which has a grade equivalent to Framing No. 1.

107 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS EXPOSED TO EXTERIOR WEATHER CONDITIONS AND DAMPNESS, TO ACHIEVE A 50-YEAR DURABILITY

107.1
Table 1B lists the species or type, grade, moisture content and preservative treatment required for wood-based building components exposed to exterior weather conditions and dampness and not in contact with the ground.

107.2 Exterior cladding used as bracing
Plywood cladding used as a bracing element, performance rated in accordance with the BRANZ P21 test procedure, shall be protected by the manufacturer's specified exterior paint systems which shall be regularly maintained. Detailing near doors and other fittings shall avoid the collection of debris which could damage the plywood surface. Battens and other items attached to the surface shall have capillary breaks and surfaces that encourage drainage of water and shedding of debris.

107.3 Adhesives
Adhesive for timber or wood-based products used in exterior or exposed situations shall be type WBP of NZS 7202. The above requirements apply to adhesives used in finger-joints to AS/NZS 1491. Adhesives for glue laminated timber shall be specified in accordance with NZS 3606 and AS/NZS 1328.

108 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS PROTECTED FROM THE WEATHER BUT EXPOSED TO GROUND ATMOSPHERE, TO ACHIEVE A 50-YEAR DURABILITY

108.1
Table 1C lists the species or type, grade, moisture content and preservative treatment required for wood-based building components protected from the weather but exposed to ground atmosphere.

108.2
The durability of suspended timber and wood-based products floors is dependent on the subfloor space being ventilated throughout the life of the building to the provisions of NZS 3604 or E2/AS1.

C108.2
Subfloor ventilation is vital in maintaining the moisture content of reconstituted wood products such as particleboard floors to a level less than 18 % moisture content required by E2/AS1. Cross ventilation can be achieved by the appropriate openings around the subfloor space or alternative measures as described in E2/AS1. A vapour barrier such as polythene is recommended to cover the ground especially when ventilation is not available on all four sides of a building subfloor space. The durability assessment of subfloor framing is related directly to the amount of ventilation of the subfloor area. If the ventilation is decreased then the moisture content of the timber structure is likely to increase thereby increasing the risk of degradation and hence reducing the life of the structure.

108.3
Vapour barriers required by E2/AS1 to control moisture content in subfloor areas shall be maintained in an effective condition throughout the life of the building.

108.4 Sheet bracing

108.4.1
Plywood sheet bracing in subfloor areas shall be treated as shown in table 1C.

108.4.2
Fibre boards, complying with AS/NZS 2908, shall be suitable for bracing when rated by the BRANZ P21 test procedure, provided that the surface treatment, coatings and details are appropriate to the exposure level and can be demonstrated to achieve at least a 50-year durability required by the NZBC Clause B2.

C108.4.2
Some fibre boards are specified by manufacturers as required to remain dry in service.

109 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS NOT EXPOSED TO WEATHER OR GROUND ATMOSPHERE BUT WITH A RISK OF MOISTURE CONTENT CONDUCIVE TO DECAY, TO ACHIEVE A 50-YEAR DURABILITY

109.1
Table 1D lists the species or type, grade, in-service moisture content and preservative treatment required for wood-based building components not directly exposed to the weather but at risk of raised moisture content conducive to decay.

109.2
This section applies to situations where there is a risk of timber framing or wood-based products becoming damp and staying damp during the service life of the building. This section applies to at least the following risk situations:

(a) Members supporting or those within enclosed decks or balconies (see figure 1):

(i) Members within enclosed decks or balconies with a risk of decay

(ii) Members supporting enclosed decks or balconies with a risk of decay, such as walls supporting decks

(iii) Members supporting enclosed decks or balconies with a risk of decay where failure is potentially life threatening, such as when the support is enclosed post and beam construction;

(b) Timber-framed elements exposed to exterior weather conditions on both faces such as parapets and balustrades, or exterior boxed beams, columns or chimneys (see figure 1);

(c) Timber-framed elements exposed to exterior weather conditions on one face, but where the penetration of moisture during the life of the building is likely and detection of elevated moisture levels is difficult such as:

(i) Members within enclosed flat roofs or skillion roofs

(ii) Sarking and framing not protected from solar driven moisture e.g. through absorbent roofing materials such as shingles

(iii) Valley boards and boards supporting flashings or box gutters to roof penetrations and upstands to roof decks

(iv) Sheet material providing wall bracing to external walls

(v) Battens used behind cladding to form a cavity

(vi) Framing members to which shelf angles and lintel angles supporting masonry veneers are fixed, and their supporting and adjoining members including lower studs

(vii) Framing and other members in exterior walls including boundary joists, that are not clad in masonry veneer described in 110.2(b).

C109.2
Risk situations described above include:

(a) Exterior wall framing supporting a projecting deck or balcony (refer to definitions) and both exterior and interior wall framing supporting an in-line deck or balcony;

(b) Timber-framed elements such as enclosed balcony rails and parapets;

(c) Timber-framed elements such as boxed beams, boxed columns and boxed chimneys (see figure 2).

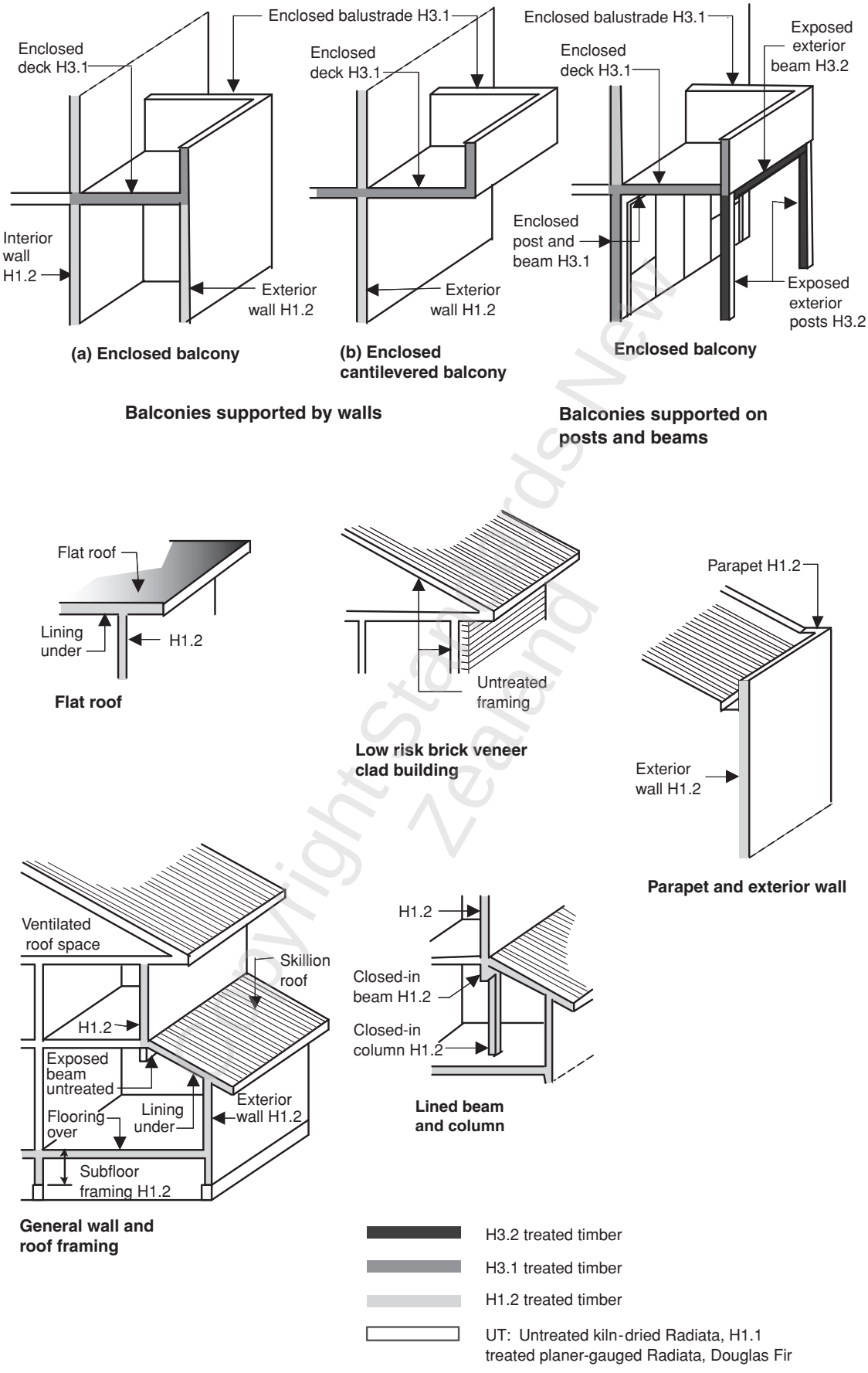


Figure 1 – Examples of treatment requirements for timber-framed buildings

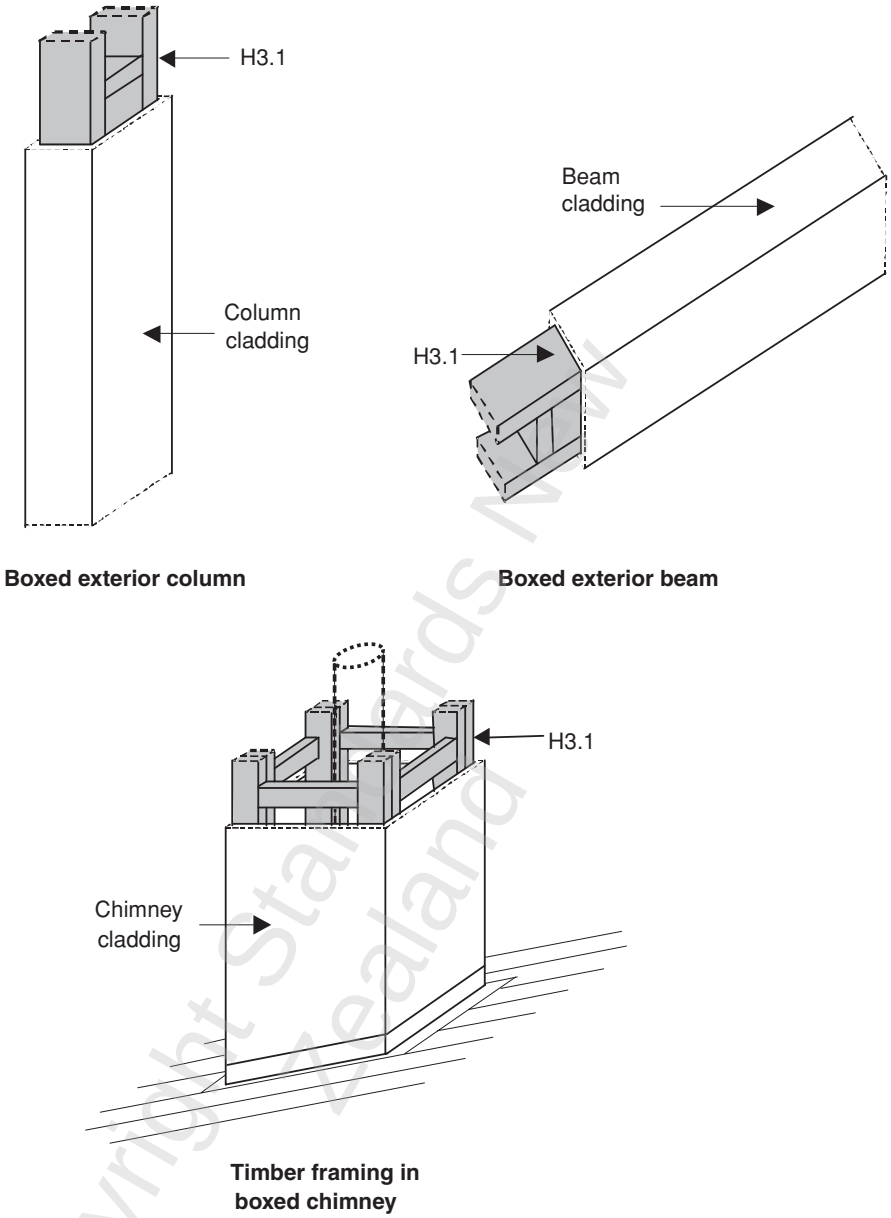


Figure 2 – Examples where H3.1 or higher treatment level is required for enclosed exterior elements

109.3

Timber battens are used behind some claddings to form a drained ventilated cavity. Treatment of these battens must be carried out in final shape and cross section to the level required in table 1D. Refer to E2/AS1 for claddings that are required to have a drained ventilated cavity.

110 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS PROTECTED FROM THE WEATHER AND IN DRY CONDITIONS AND NOT EXPOSED TO GROUND ATMOSPHERE, TO ACHIEVE A 50-YEAR DURABILITY

110.1
Table 1E lists the species or type, grade, in-service moisture content and preservative treatment required for wood-based building components protected from the weather and in dry conditions and not exposed to ground atmosphere.

110.2
This section applies to situations where there are dry conditions or a low risk of moisture content conducive to decay and applies to the following risk situations:

(a) All roof trusses, roof framing, ceiling and eaves framing, and sarking excluding that on enclosed skillion and flat roofs, or that not protected from solar-driven moisture e.g. through absorbent roofing materials. All mid-floor framing members and associated ceiling framing but excluding boundary joists;

(b) Timber framing (including boundary joists) in exterior walls clad with masonry veneer complying to SNZ HB 4236 on a single-storeyed building with no restriction on size but including the following conditions (see figure 3):

(i) Eaves all around of not less than 450 mm, and

(ii) Not more than 10 % of other type of cladding complying with E2/AS1 at recessed porches, panels above windows, or gable ends built out to the face of the brick

(iii) Hipped roof or gable end roof with masonry veneer gable

(iv) No habitable space below the floor;

(c) Internal walls excluding those supporting decks and balconies;

(d) Sheet materials providing bracing to internal walls;

(e) Interior flooring;

(f) Unlined buildings, except where used for purposes involving high humidity or moisture (such as saunas, spa pools or agricultural purposes where there is elevated moisture content conducive to decay).

C110.2
Ground adjacent to unlined boundary including garages and agricultural and industrial buildings should be shaped so as to direct surface water away from the building floor in order that the bottom plate is not at risk of prolonged elevated moisture content unless it is of appropriately treated timber.

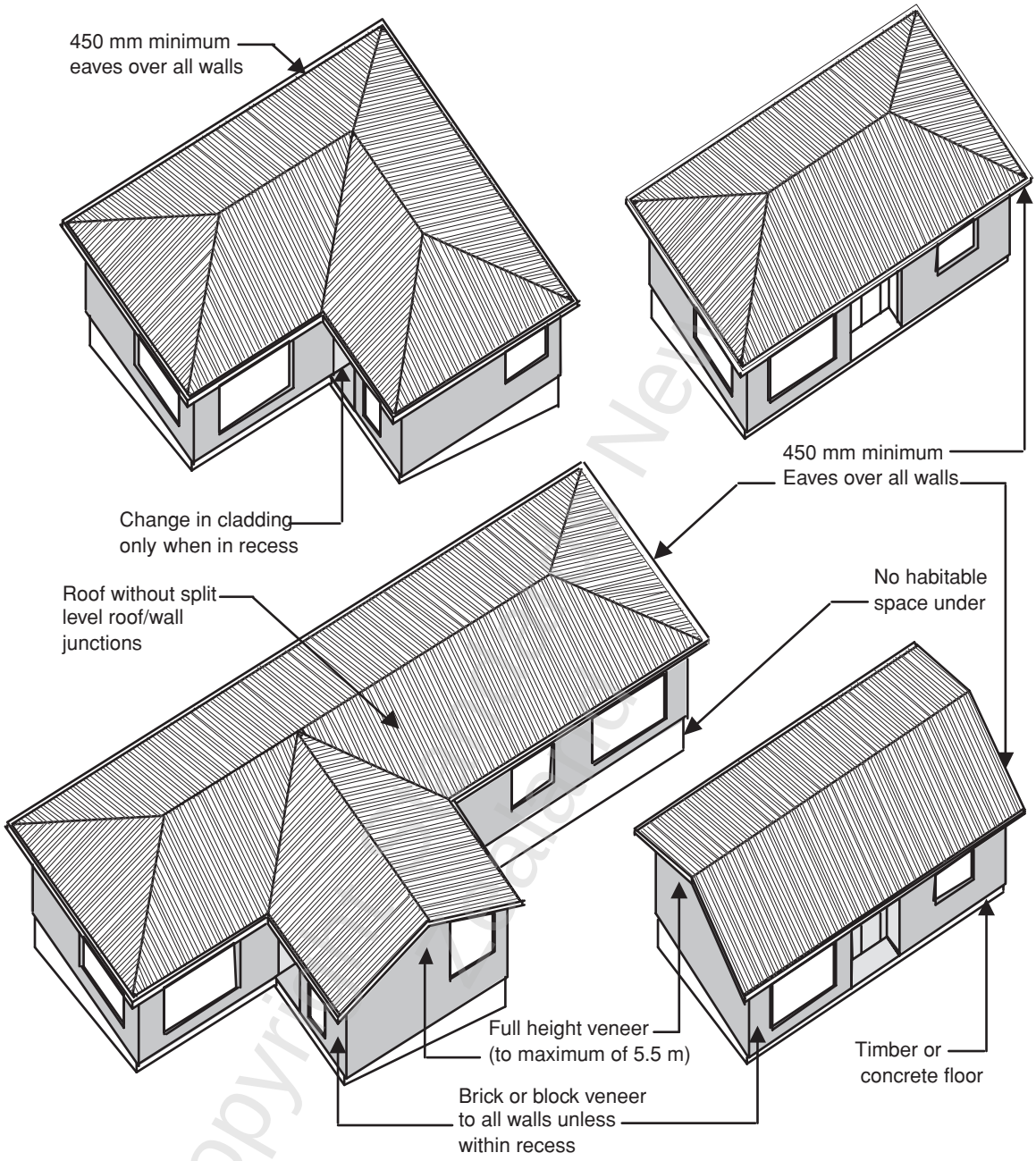


Figure 3 – Examples of low risk masonry veneer buildings

110.3 Protection of interior flooring

110.3.1

Floor coverings in "wet areas" such as laundries, bathrooms, kitchens and toilets shall be as set out in E3/AS1. Where maintenance of an impervious coating cannot be assured in wet areas plywood or timber flooring that has been treated to a minimum of H3.1 shall be used.

C110.3.1

Considerable undetected water damage to particleboard and surrounding wall floor framing can occur under baths used as a shower and under certain types of shower trays. It is recommended that H3 treated plywood be used under such fittings where maintenance cannot be assured. Adjoining timber framing and timber supporting these fittings should be treated.

110.3.2
Other floor coverings such as carpet, lino, tiles etc. and durable coatings such as specialized finishes shall be maintained to ensure the timber, particleboard, plywood or wood-based products' surface is protected.

110.3.3
Steam vents from clothes driers shall not exit into the subfloor area, roof spaces, walls or floor cavities and all floor drains shall be piped to the outside of the building.

110.3.4
Flooring at exterior doors and full-height windows shall be protected by incorporating sill and head flashings to prevent leakage and consequent moisture damage to particleboard, plywood or wood-based flooring.

110.3.5
Flooring shall be protected from localized heat sources, such as free standing heating appliances, space heaters, hot air ducts and pipes containing steam in accordance with NZS 7421. Protection for flooring as a consequence of the installation of solid fuel burning domestic appliances shall be in accordance with B1/AS3 and C/AS1.

110.4 Finger-jointing
Finger-jointed timber shall comply with the requirements of AS/NZS 1491.

110.5 Solar-driven moisture control and condensation

110.5.1
All timber and wood-based products shall be either protected from the effects of condensation and moisture or be treated to the appropriate Hazard Class. See tables 1, 2 and 3.

110.5.2
Construction shall comply with NZBC Clauses E2 and E3.

111 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS WITH A 15-YEAR DURABILITY

111.1
Table 2A lists the species or type, grade, in-service moisture content and preservative treatment required for wood-based building components exposed to exterior weather conditions and dampness. Table 2B lists the requirements for wood-based building components protected from the weather and dampness.

C111.1
Wood-based building components which are moderately difficult to access or replace and for which failure would go undetected during normal use of the building are required to have a durability of 15 years. Included in this category are the frames of non-loadbearing walls, weatherboards, exterior joinery, stair components and balustrades depending on the details of construction and hence the degree of difficulty to replace. Hidden fixings of the external envelope which are difficult to replace or inspect need a 50-year durability.

111.2 Weatherboards and exterior finishing timbers

111.2.1
Unless covered by 111.2.5, weatherboards and exterior finishing timbers required to have paint protection shall be primed on all faces (including cut ends) prior to fixing.

C111.2.1
Primer paint will deteriorate if left exposed. The top coats should therefore be applied without undue delay. If the priming is exposed for more than one month, re-priming may be necessary (refer to AS/NZS 2311). Water repellent application will improve the stability of painted timber but it must still be primed.

Water penetration of timber through end grain can readily occur and can cause timber decay even when covered by other wood-based building components, i.e. as in mitred weatherboards. Water repellent application will improve the stability of painted timber but it must still be primed.

111.2.2
Weatherboards which are protected by a well maintained three coat alkyd or 100 % acrylic paint in accordance with AS/NZS 2311 shall, if requiring treatment, be treated to at least H3.1 in accordance with table 2A.

111.2.3
Grading requirements additional to those set out in NZS 3631 are as follows:

(a) All holes, resin and bark pockets shall be excluded;

(b) Knot size shall not exceed 50 mm, or 25 mm width for spike knots.

C111.2.3
Dressing grade plus the additional requirements set out above is the lowest grade regarded as suitable in these locations. Where appearance is of major concern, the specification of superior grades should be considered.

111.2.4
The selection of paints or water repellents for knots and other resinous areas shall be obtained from AS/NZS 2311.

111.2.5
For “no finish” or “stained finish” condition only the following species are permitted; redwood, heart cypress, western red cedar and sawn H3.2 treated Radiata pine.

111.2.6
Profiles of weatherboards and fascia boards shall comply with NZS 3617 except as provided by 111.2.7.

C111.2.6
Boards narrower than 200 mm can be expected to be more stable than wider ones.

111.2.7
The acceptability, for particular uses of profiles of weatherboards and fascia boards not complying with NZS 3617 shall be determined in accordance with NZBC B2/VM1 or by tests carried out to AS/NZS 4284.

111.3 Finger-jointing
Finger-jointed timber shall comply with the requirements of AS/NZS 1491.

111.4 Exterior window joinery and door frames
Exterior window joinery and door frames shall comply with NZS 3610 or NZS 3619.

111.5 Exterior sheet claddings
Plywood for exterior use or for use in situations of high humidity shall have a weather-resistant glue line and comply with AS/NZS 2269.

111.6 Exterior floors

111.6.1
Exposed decking and verandah flooring have similar exposure hazards and no distinction is made between them in terms of grade, quality and treatment of timber. Refer to table 2A.

C111.6.1
The durability of eucalyptus species and some imported timber species varies considerably. Care should be taken when considering the selection of such species and this consideration should relate to the expected hazard. Balau decking has been reported to fail within 5 years and therefore is not recommended in this Standard. Some guidance on species is given in table 2A. Further information should be sought from Forest Research or the Building Research Association of New Zealand.

111.6.2
Plywood complying with 104.2.1 is suitable for exterior flooring, provided the appropriate grades and treatments are used. Refer to table 2A and AS/NZS 1604.3.

C111.6.2
Manufacturers recommend that plywood be covered with a suitable membrane when used horizontally in a deck.

111.6.3
Due attention shall be paid to acceptable slip resistance of all walking surfaces, both wet and dry in accordance with D1/AS1 as appropriate.

111.7 Protective surface coatings
Surface coatings shall be a paint type or surface treatment applied in accordance with AS/NZS 2311, regularly maintained so that the building element concerned will have a durability of 15 years as required by the NZBC.

C111.7
The type and colour of protective finish influences the rate and amount of moisture that will be absorbed or lost from timber. Dark coloured finishes on exterior cladding can result in high surface temperatures and the moisture content of the cladding can fall to well below that expected of similar cladding with a light coloured finish resulting in excessive shrinkage, checking and failure of the finishing material. (See also the New Zealand Timber Industry Federation Timber Design Guide.)

112 REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS TO ACHIEVE A 5-YEAR DURABILITY

112.1
Table 3 lists the species or type, grade, moisture content and preservative treatment required for non-structural components protected from the weather.

C112.1
Wood-based building components which are easy to access and replace and where failure is easy to detect are required by the NZBC to have a durability of 5 years. Included in this category are interior finishing timbers and mouldings.

112.2 Finishing timber and timber linings
Finishing timber and timber linings exposed in any position where condensation or dampness will normally occur, for example in spa rooms, bathrooms, laundries, shall be protected against decay by appropriate protection such as preservative treatment, or painting.

112.3 Finger-jointing
Finger-jointed timber shall comply with the requirements of AS/NZS 1491.

112.4 Surface coatings
Surface coatings shall be paint type or surface treatment to maintain a 5-year durability of the element and be applied in accordance with AS/NZS 2311.

112.5 Plywood, particleboard, fibreboard and wood-based products
Purpose made grades of plywood, particleboard and fibreboards are suitable for most uses to achieve a durability of 5 years in dry conditions.

C112.5
Particular care is required in the choice of material in any position where condensation and dampness may occur. Plywood used in interior situations, protected from the weather or dampness does not need to be treated.

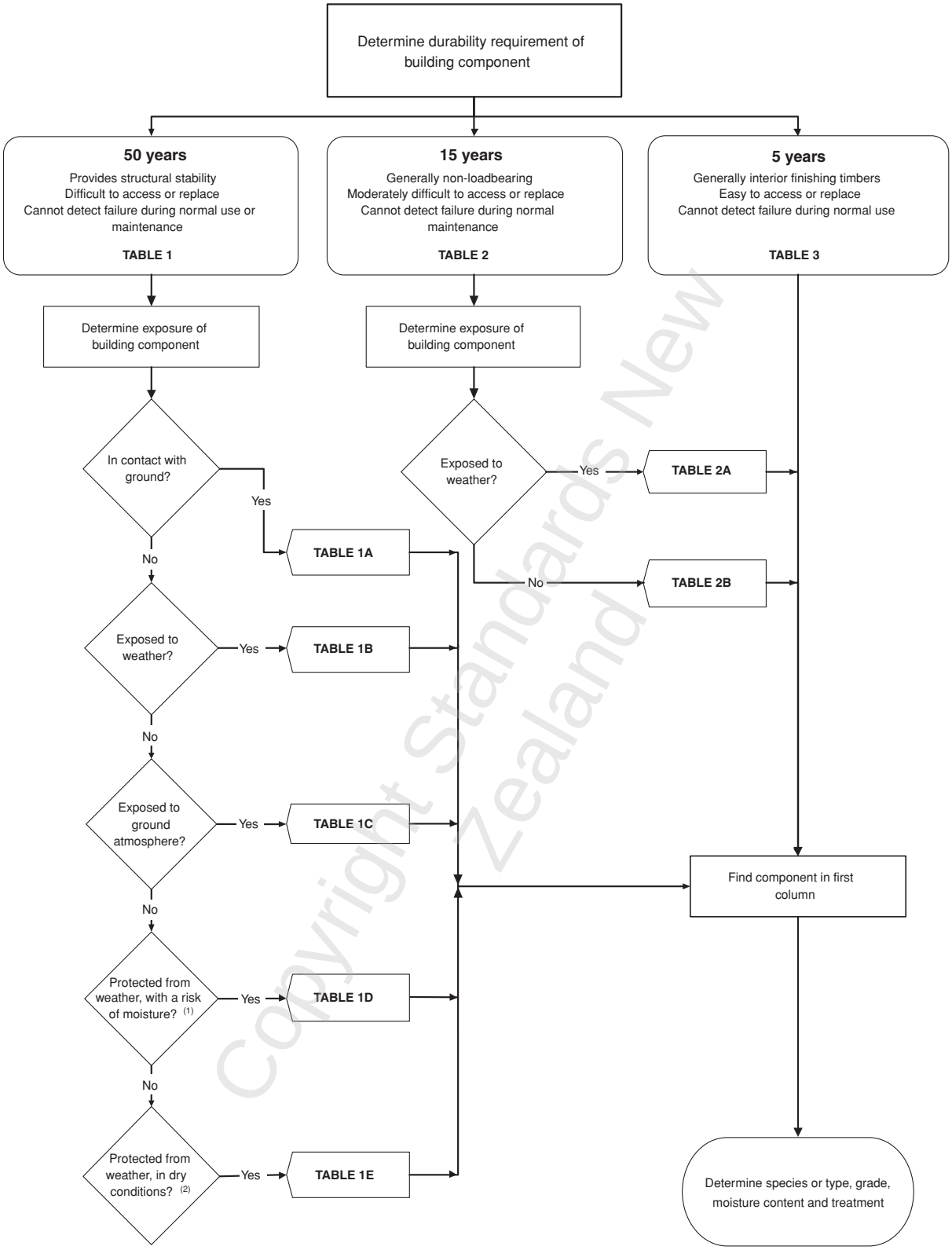
113 USE OF TABLE 1, TABLE 2 AND TABLE 3

113.1
The tables are arranged in order of descending expected service life. Table 1 specifies the use of timber where a durability of 50 years is required, table 2 specifies where a durability of 15 years is required, and table 3 specifies where a durability of 5 years is required.

113.2
In order to determine which table to consult, reference should be made to the flow chart, figure 4.

113.3 Alternative solutions
The use of different timbers or timber treatments to those listed in table 1 may still comply with the NZBC in particular applications. Where the use of a different timber or timber treatment is proposed, this would be an alternative solution and evidence must be provided to the TA or Building Certifier that the intended use will meet the NZBC. For example, if imported hardwood is to be used to surface a deck, evidence that the timber was durable for a minimum of 15 years in the expected exposure conditions is required.

113.4 Treatment level is a minimum
Throughout the tables, the treatment level specified to NZS 3640 is a minimum; timber treated to a higher level satisfies the minimum requirements.



NOTE –
(1) See section 109.
(2) See section 110.

Figure 4 – Flow chart guiding the use of tables 1, 2 and 3

Table 1 – Requirements for wood-based building components to achieve a 50-year durability performance

Ref No.	Wood-based building components	Species or type(1)	Grade or Standard ref.	In-service moisture range %	Level of treatment(2) to NZS 3640 or AS/NZS 1604(3)	See clause/ section
A Members in contact with the ground (see section 106)						
1A.1	Building piles	Radiata pine	NZS 3605	Not limited	H5	106.2
1A.2	Plywood and timber frame foundations		BRANZ P43		H5	106.3 106.2
1A.3	Crib walling		NZS 3605		H5	C106.4
1A.4	Sawn poles				H5	–
1A.5	House poles				H5	106.2
1A.6	Retaining walls –uprights				H5	–
1A.7	Retaining walls –horizontal members				H4	–
B Members exposed to exterior weather conditions and dampness but not in ground contact (see section 107)						
1B.1	Laminated beams	Radiata pine	AS/NZS 1328 & NZS 3606	Not limited	H3(3)(4) or specific design	104.4
1B.2	Laminated posts				H3(3)(4)	104.4
1B.3	Posts, bearers, beams, floor joists, rafters, guardrails, stair stringers	Radiata pine	Structural grades		H3.2(5)	–
1B.4	Cladding as wall bracing	Plywood(4)	AS/NZS 2269		H3(3)(4)	107.2
C Members protected from the weather but exposed to ground atmosphere (see section 108)						
1C.1	Jackstuds, subfloor braces, bearers, wall plates, floor joists to the subfloor, blocking, subfloor wall studs, walings and battens, wall studs and nogs, diagonal boards	Radiata pine	Structural grades	20 % or less	H1.2	108
		Larch	Structural grades		None	
		Cypress species(6)	Structural grades sapwood		H1.2	
		Cypress species(6)	Structural grades heart		None	
		Douglas fir	Structural grades		H1.2	
		LVL	AS/NZS 4357	18 % or less	None	–
1C.2	Plywood sheet bracing	Radiata pine	AS/NZS 2269	18 % or less	H1.2	108.4
1C.3	Interior flooring, suspended ground floors	Plywood(7) LVL	AS/NZS 2269 AS/NZS 4357	18 % or less	None	108.2
		Particleboard and other wood-based products(7)	AS/NZS 1859.1 AS/NZS 1859.2		None	104.3 108.2
		Radiata pine	Dressing		H1.1	108.2
		Cypress species(6)	Dressing sapwood		H1.1	
		Cypress species(6)	Dressing heart		None	
		Matai	Dressing sapwood		H1.1	
		Matai	Dressing heart		None	
		Rimu	Dressing sapwood		H1.1	
		Rimu	Dressing heart		None	
		Eucalyptus species	Dressing		None	
		Tawa	Dressing		H1.1	

NOTES to table 1A to 1C

(1) Wood-based building components made from wood species other than those listed may also achieve the required durability but there is not enough data on their durability to permit their inclusion in this Standard. Refer to C101.2.

(2) Throughout table 1, timber treated to a higher level than the minimum satisfies the minimum requirements.

(3) NZS 3640 specifies treatment for round and sawn timber. Plywood shall be treated to AS/NZS 1604:Part 3. Laminated beams and posts shall be treated to AS/NZS 1604: Part 5.

(4) H3 LOSP treated items exposed to the exterior must be painted to achieve a 50-year durability.

(5) H3.1 refers to tin-based Light Organic Solvent Preservatives (LOSP). H3.2 refers to CCA, Alkaline Copper Quaternary, Copper Naphthenate and Copper Azole preservatives. See also Note 2.

(6) Cypress species include Cupressus macrocarpa (macrocarpa), C. lustanica (Mexican cypress) and Chamaecyparis lawsoniana (Lawson's cypress). Refer to AS/NZS 1148.

(7) In wet areas where maintenance of an impervious coating cannot be assured plywood or timber flooring that has been treated to a minimum of H3.1 shall be used. (Refer to 110.3.1.)

Table 1 – Requirements for wood-based building components to achieve a 50-year durability performance (continued)

Ref No.	Wood-based building components	Species or type[1]	Grade or Standard ref.	In-service moisture range %	Level of treatment[2] to NZS 3640 or AS/NZS 1604[3]	See clause
D Members protected from the weather but with a risk of moisture penetration conducive to decay (see section 109)						
Roof members (in or associated with)						
1D.1	Sarking and framing not protected from solar driven moisture through absorbent claddings materials[8]	Plywood	AS/NZS 2269	20 % or less	H3[3]	104.2
		Radiata pine	Merchantable		H3.1	109.2
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
1D.2	Enclosed flat roof framing and associated supporting members	Radiata pine	Structural grades	20 % or less	H3.1	102.6
1D.3	Enclosed skillion roof framing and associated members	Radiata pine	Structural grades	20 % or less	H1.2	102.6 109.2
		Douglas fir	Structural grades		H1.2	
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
1D.4	Valley boards and boards supporting flashings or box gutters, and flashings to roof penetrations and upstands to roof decks [10]	Radiata pine	Merchantable		H3.1	109.2
		Plywood	AS/NZS 2269		H3[3]	
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
Wall members (in or associated with)						
1D.5	Framing and other members within or beneath a parapet except in situations detailled in 1D.13	Radiata pine	Structural grades	20 % or less	H1.2	109.2
		Douglas fir	Structural grades		H1.2	
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
1D.6	Framing and other members within enclosed decks or balconies [9] (see figure 1)	Radiata pine	Structural grades		H3.1	
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
1D.7	Framing and other members supporting enclosed decks or balconies where failure is potentially life threatening, such as when the support is enclosed post and beam construction	Radiata pine	Structural grades		H3.1	109.2
		Larch	Structural grades		None	
		Cypress species	Structural grades heart		None	
			Structural grades sapwood		H1.2	
1D.8	Framing and other members supporting enclosed decks or balconies [9] (see figure 1)	Radiata pine	Structural grades		H1.2	109.2
		Douglas fir	Structural grades		H1.2	
1D.9	Sheet material providing wall bracing	Plywood	AS/NZS 2269		H3[3]	104.2

Table 1 – Requirements for wood-based building components to achieve a 50-year durability performance (continued)

Ref No.	Wood-based building components	Species or type[1]	Grade or Standard ref.	In-service moisture range %	Level of treatment[2] to NZS 3640 or AS/NZS 1604[3]	See clause
1D.10	Battens used behind cladding to form a cavity	Radiata pine	Merchantable	20 % or less	H3.1	109.2
1D.11	Framing and other members to which shelf angles and lintel angles supporting masonry veneers are fixed and their adjoining and supporting members, including lower storey studs	Radiata pine	Structural grades		H3.1	109.2
1D.12	Framing and other members in exterior walls including boundary joists, where monolithic claddings are fixed directly to the framing and do not comply with E2/AS1	Radiata pine	Structural grades		H3.1	109.2
1D.13	Framing and other members in exterior walls including boundary joists, where monolithic claddings are fixed directly to the framing and comply with E2/AS1	Radiata pine	Structural grades		H1.2	109.2
		Douglas fir	Structural grades		H1.2	109.2
1D.14	All other exterior wall framing and other members including exterior and boundary joists[11], except those clad in masonry veneer covered by 110.2(c)[12]	Radiata pine	Structural grades		H1.2	109.2
		Douglas fir	Structural grades		H1.2	

NOTE –

(1) Wood-based building components made from wood species other than those listed may also achieve the required durability but there is not enough data on their durability to permit their inclusion in this Standard. Refer to C101.2.

(2) Throughout table 1, timber treated to a higher level than the minimum satisfies the minimum requirements.

(3) NZS 3640 specifies treatment for round and sawn timber. Plywood shall be treated to AS/NZS 1604:Part 3. Laminated beams and posts shall be treated to AS/NZS 1604: Part 5.

(4) H3 LOSP treated items exposed to the exterior must be painted to achieve a 50-year durability.

(5) H3.1 refers to tin-based Light Organic Solvent Preservatives (LOSP). H3.2 refers to CCA, Alkaline Copper Quaternary, Copper Naphthenate and Copper Azole preservatives. See also Note 2.

(6) Cypress species include Cupressus macrocarpa (macrocarpa), C. lustianica (Mexican cypress) and Chamaecyparis lawsoniana (Lawson's cypress). Refer to AS/NZS 1148.

(7) In wet areas where maintenance of an impervious coating cannot be assured plywood or timber flooring that has been treated to a minimum of H3.1 shall be used. (Refer to 110.3.1.)

(8) Timber shakes and shingles, and similar absorbent claddings, absorb moisture that can be driven into frame cavities by evaporation. Unless the cavities are adequately drained and ventilated, continuing condensation caused by solar driven transfer increases the moisture content in the cavities and timber framing requiring a higher level of timber treatment to resist decay.

(9) Such as joists, lintels, wall plate and studs, together with parapets, enclosed balustrades, boxed columns and chimneys.

(10) Any metal flashing shall be separated from the treated timber with building paper.

(11) Exposed ends of joists shall be protected by a boundary joist.

(12) Refer to table 1 row 1E .4.

Table 1 – Requirements for wood-based building components to achieve a 50-year durability performance (continued)

Ref No.	Wood-based building components	Species or type[1]	Grade or Standard ref.	In-service moisture range %	Level of treatment[2] to NZS 3640 or AS/NZS 1604[3]	See clause
E Members not exposed to weather or ground atmosphere and in dry conditions (see section 110)						
1E.1	All roof trusses, including gable end trusses, roof, ceiling and eaves framing, purlins and battens excluding skillion roof framing, and sarking described in 1D.1	Radiata pine	Structural grades	20 % or less	H1.1	–
		Douglas fir	Structural grades		None	
		Larch	Structural grades		None	
		Cypress species [6]	Structural grades sapwood		H1.1	
		Cypress species[6]	Structural grades heart		None	
1E.2	All midfloor framing excluding boundary joists but including associated ceiling framing	Kiln dried and gauged Radiata pine	Structural grades	18 % or less	None	105.5
		LVL	AS/NZS 4357	18 % or less	None	104.4.2
1E.3	Unlined buildings except those not allowed in 110.2(f)					
1E.4	Timber framing (including boundary joists) in exterior walls clad with masonry veneer complying to SNZ HB 4236 on a single storeyed building but with restrictions set out in 110.2(b) and in figure 3	Radiata pine	Structural grades	20 % or less	H1.1	110.2
		Douglas fir	Structural grades		None	
		Larch	Structural grades		None	
		Cypress species [6]	Structural grades sapwood		H1.1	
		Cypress species[6]	Structural grades heart		None	
		Kiln dried and gauged Radiata pine	Structural grades	18 % or less	None	
		LVL	AS/NZS 4357		None	104.4.2
1E.5	Internal walls excluding those supporting decks and balconies	Radiata pine	Framing - No. 2 or Structural grades	20 % or less	H1.1	–
		Douglas fir	Structural grades		None	
		Larch	Structural grades		None	
		Cypress species [6]	Structural grades sapwood		H1.1	
		Cypress species [6]	Structural grades heart		None	
		Kiln dried and gauged Pinus species	Framing - No. 2 or Structural grades	18 % or less	None	105.5
		LVL	AS/NZS 4357		None	–
1E.6	Internal wall bracing	Plywood	AS/NZS 2269	18 % or less	None	104.4.2
		Particleboard and wood-based products	AS/NZS 1859		None	104.3

Table 1 – Requirements for wood-based building components to achieve a 50-year durability performance (continued)

Ref No.	Wood-based building components	Species or type(1)	Grade or Standard ref.	In-service moisture range %	Level of treatment(2) to NZS 3640 or AS/NZS 1604(3)	See clause
1E.7	Interior flooring	Plywood	AS/NZS 2269	18 % or less	None (7)	104.4.2
		Particleboard and wood-based products(13)	AS/NZS 1859		None (7)	104.3
		Pinus species	Dressing	16 % or less	H1.1	–
		Cypress species (6)	Dressing sapwood		H1.1	
		Cypress species (6)	Dressing heart		None	
		Matai	Dressing sapwood		H1.1	
		Matai	Dressing heart		None	
		Rimu	Dressing sapwood		H1.1	
		Rimu	Dressing heart		None	
		Beech – silver, red, hard	Dressing sapwood		H1.1	
		Beech – silver, red, hard	Dressing heart		None	
		Eucalyptus species	Dressing sapwood		H1.1	
		Eucalyptus species	Dressing heart		None	
		Tawa	Dressing		H1.1	

NOTE –

(1) Wood-based building components made from wood species other than those listed may also achieve the required durability but there is not enough data on their durability to permit their inclusion in this Standard. Refer to C101.2.

(2) Throughout table 1, timber treated to a higher level than the minimum satisfies the minimum requirements.

(3) NZS 3640 specifies treatment for round and sawn timber. Plywood shall be treated to AS/NZS 1604:Part 3. Laminated beams and posts shall be treated to AS/NZS 1604: Part 5.

(6) Cypress species include Cupressus macrocarpa (macrocarpa), C. lustanica (Mexican cypress) and Chamaecyparis lawsoniana (Lawson's cypress). Refer to AS/NZS 1148.

(7) In wet areas where maintenance of an impervious coating cannot be assured plywood or timber flooring that has been treated to a minimum of H3.1 shall be used. (Refer to 110.3.1.)

(13) Wood-based panels must have a proven durability performance against dampness.

Table 2 – Requirements for wood-based building components to achieve a 15-year durability performance

Ref No.	Wood-based building components	Species or type[1]	Grade or Standard ref.	Installation moisture range %	Level of treatment[2] to NZS 3640 or AS/NZS 1604[3]	See clause
A Members exposed to exterior weather conditions and dampness (see section 111)						
2A.1	Weatherboards	Radiata pine	Dressing	18 % or less	H3.1	111.2
		Larch	Dressing heart		None	
		Cypress species[4]	Dressing heart		None	
2A.2	Base battens	Redwood	Dressing heart		None	
		Western red cedar	Dressing heart		None	
2A.3	Fascia, barge, and coverboards	Plywood	AS/NZS 2269		H3[3]	
		Wood-based panels[5]	Exterior		H3[7]	
2A.4	Sheet cladding not providing bracing	Plywood	AS/NZS 2269	18 % or less	H3[3]	111.5 104.2.1
2A.5	Exterior joinery, including windows frames, sills, and sashes, exterior door frames, sills and doors	Radiata pine	Select A	18 % or less	H3[3]	–
		Redwood	Select A heart		None	
		Western red cedar	Select A heart		None	
2A.6	Timber reveals for aluminium windows	Cypress species[4]	Select A heart		None	
2A.7	External stairs, stair handrails and balustrades, verandah floors, unroofed decking (which can be easily replaced) with either a paint, stain, clear or no finish	Radiata pine	Merchantable	Not limited	H3.2	111.7
		Cypress species[4]	Dressing heart		None	
		Vitex, Kwila	Dressing heart		None	
		Rimu	Dressing heart		None	
		Eucalyptus[6]	Dressing heart		None	
		Beech – silver, red, hard	Dressing heart		None	
		Plywood	AS/NZS 2269		H3[3]	104.2.1 111.7
		Wood-based panels[5]	Exterior		H3 [7]	104.3 111.7
B Members protected from the weather and dampness (see section 111)						
2B.1	Non-loadbearing[8] interior wall framing	Radiata pine	Structural grades or Framing – No. 2	20 % or less	H1.1	–
		Douglas fir	Structural grades or Framing – No. 2		None	
		Larch	Structural grades or Framing – No. 2		None	
		Cypress heart [4]	Structural grades or Framing – No. 2		None	
		Kiln dried and gauged Radiata pine or Corsican pine	Structural grades or Framing – No. 2	18 % or less	None	105.5

Table 2 – Requirements for wood-based building components to achieve a 15-year durability performance (continued)

Ref No.	Wood-based building components	Species or type(1)	Grade or Standard ref.	Installation moisture range %	Level of treatment(2) to NZS 3640 or AS/NZS 1604(3)	Clause reference
2B.2	Stair treads, risers and handrails	Radiata pine	Select A	16 % or less	None	–
		Douglas fir	Select A			
		Cypress species(4)	Select A			
		Yaka	Select A			
		Rimu	Premium			
		Eucalyptus species(6)	Premium			
		Beech – silver, red, hard	Premium			
		Tawa	Premium			
		Plywood	AS/NZS 2269			
		Wood-based products(5)	AS/NZS 1859			

NOTE –

(1) Wood-based building components made from wood species other than those listed may also achieve the required durability but there is not enough data on their durability to permit their inclusion in this Standard. Refer to C101.2.

(2) Throughout table 2, timber treated to a higher level than the minimum satisfies the minimum requirements.

(3) NZS 3640 specifies treatment for round or sawn timber. Plywood shall be treated to AS/NZS 1604: Part 3. Laminated beams and posts shall be treated to AS/NZS 1604: Part 5.

(4) Cypress species include Cupressus macrocarpa (macrocarpa), C. lustianica (Mexican cypress) and Chamaecyparis lawsoniana (Lawson's cypress). Refer to AS/NZS 1148.

(5) Wood-based products must have a proven durability performance against dampness.

(6) Eucalyptus species include E.botryoides, E.saligna, E.globoidea, E.muellerana, E.obliqua, E. pilularis.

(7) NZS 3640 specifies treatment for round or sawn timber. Other products are to be treated to AS/NZS 1604.

(8) Walls that provide bracing are load-bearing walls.

Table 3 – Requirements for wood-based building components to achieve a 5-year durability performance

Ref No.	Wood-based building components	Species or type	Grade or Standard ref.	In-service moisture range %	Level of treatment	See section
3.1	All interior finishing timbers, such as mouldings, skirtings, architraves, panelling, decorative sarking	Radiata pine	Dressing	16 % or less	None	112
		Douglas fir	Dressing			
		Cypress species (1)	Dressing			
3.2	Shelves	Eucalyptus species	Dressing			
3.3	Any other timber component that can be easily replaced and not specified in tables 1, 2 and 3	Beech – silver, red, hard	Dressing			
		Tawa	Dressing			
		Wood-based products	AS/NZS 1859			
		Plywood	AS/NZS 2269			

NOTE –

(1) Cypress species include Cupressus macrocarpa (macrocarpa), C. lustianica (Mexican cypress) and Chamaecyparis lawsoniana (Lawson's cypress). Refer to AS/NZS 1148.

PART 2 CONSTRUCTION PROVISIONS OUTSIDE THE MANDATORY REQUIREMENTS OF THE NEW ZEALAND BUILDING CODE

201 PURPOSE

Where this specification is cited, Part 2 shall be read in conjunction with Part 1. The purpose of Part 2 is to cover construction and contract provisions outside the mandatory requirements of the NZBC. Such matters are important to specifiers and constructors to ensure acceptable levels of finish and construction in the building process. Part 2 also contains useful information and comments intended to assist specifiers, manufacturers and constructors.

C201

The NZBC deals with matters related to health and safety in buildings. Safety is dependent on structural strength and its durability for the life of the building. Protection against external and internal moisture relates to health and is also part of the NZBC. Part 2 deals principally with matters related to timber moisture contents, before and after construction and other matters necessary to achieve acceptable standards of finish.

202 GENERAL

C202

"Time of installation" is the time at or during which this Standard applies and depends on the purpose to which this Standard is put. The quality of the goods can vary with moisture changes between the time of purchase and installation such that the goods may not comply with this Standard or its related documents.

This Standard states the acceptable performance of timber for building construction purposes. Building owners, architects, lending institutions, and other interested parties are entitled to specify more exacting requirements to suit their particular interests, and users of this Standard are therefore advised to ascertain the position in this regard at an early stage.

202.1

Structural timber shall be specified as either rough sawn, gauged to width only, gauged to thickness only, or gauged to both width and thickness.

202.2

Unless otherwise specified, all joinery and finishing timbers shall be supplied free from saw, machine and other marks that impair the production of a smooth, even finish.

203 PLYWOOD AND LAMINATED VENEER LUMBER

Protection shall be applied to the manufacturer's specifications to minimize damage to faces and edges.

204 PARTICLEBOARD, FIBREBOARD AND OTHER WOOD-BASED PANEL PRODUCTS

204.1

The use of each particular grade of particleboard, fibreboard and other wood-based panel products shall be in accordance with the manufacturer's printed instructions current at the time of use.

C204.1
The grades of particleboard, fibreboard and other wood-based panel products usually produced in New Zealand are as follows:

(a) High density;

(b) Medium density;

(c) Low density.

Different types of wood-based panel products are available overseas and may be imported into New Zealand.

204.2
The manufacturer or importer should have established that the performance of the particleboard, wood-based products or fibreboards will meet the provisions of the NZBC.

204.3
Strict adherence to the manufacturer's printed instructions on such things as the use, fixing and finishing of particleboard, wood-based products or fibreboards shall be followed.

C204.3
It should be noted that each manufacturer's instructions apply only to that manufacturer's product and care should therefore be taken to ensure that the printed instructions being followed are those for the manufacturer of the actual product being used. Reference should be made to AS/NZS 1859 for detailed information on the fixing and use of fibreboards and on the range of textured, veneered and pre-finished boards produced.

205 MOISTURE CONTENT AND QUALITY CONTROL REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS PROTECTED FROM THE WEATHER AND IN DRY CONDITIONS WITH A 50-YEAR DURABILITY PERFORMANCE

205.1
Wood-based building components which are protected from the weather and in dry conditions, which are not subject to ground atmosphere, or not in any position where condensation or dampness will occur, shall conform to the moisture content and quality controls set out in this section. They shall be of grade, quality and level of preservative treatment listed in table 1E.

C205.1
This section deals with all protected wood-based building components above subfloor areas and concrete floors at ground level which covers the entire floor area.

205.2
At the time of installation the moisture content of timbers, unless expressly stated to the contrary, shall be within the moisture content limits set out in table 4.

Table 4 – Allowable moisture content (%)(1) at time of installation or in the case of framing timber at time of enclosure

	Use category level of finish	Air-conditioned or centrally heated buildings	Intermittently heated buildings(2)	Unheated buildings
1	Timber to which linings are attached to achieve a "level of finish" 4 to 5	8 – 18	12 – 18	12 – 18
2	Enclosed framing (including roof trusses) to achieve a "level of finish" 0 to 3	12 – 18	12 – 24	12 – 24
3	Load-bearing lintels and beams	8 – 18	12 – 20	12 – 20
4	Weatherboards, exterior joinery and finishing timbers	14 – 18	14 – 18	14 – 18
5	Flooring exposed to ground atmosphere	10 – 14	12 – 16	14 – 18
6	Interior joinery and finish, furniture, corestock	8 – 12	10 – 14	12 – 16
7	Flooring not exposed to ground atmosphere	8 – 12	10 – 14	12 – 16

NOTE –

(1) Allowable ranges of moisture content are specified on the basis that 90 % of pieces shall be within the specified range, the remainder shall be within a further 2 % moisture content above or below. The moisture content of individual boards shall be normally distributed within the range allowed. In special circumstances, e.g. flooring exposed in rooms with large window area, the upper limits may be reduced.

(2) Buildings periodically heated by open fires, electric heaters, etc., such as most domestic buildings.

205.3

At the time of the installation of wall linings, the moisture content of framing members shall be such that the specified "level of finish" is maintained beyond the time of construction.

C205.3

The standard of surface finish for many thin wall linings fixed to timber framing can be affected by framing movement due to the timber drying many months after installation of linings. This clause identifies levels of finished wall linings and recommends the maximum moisture content of wall framing at the time of installation of linings to reduce the visual surface distortions due to moisture change in frames.

205.4

Following is a scale of levels of finish for the final decoration:

Level 0: This level of finish may be useful in temporary construction or whenever the final decoration has not been determined.

Level 1: For use in plenum areas above ceilings, in attics, in areas where the assembly would generally be concealed, or in building service corridors and other areas not normally open to public view.

Level 2: For use in garages, warehouse storage or other structures where appearance is not of primary concern.

Level 3: For use in appearance areas which are to receive heavy or medium texture (spray or hand applied) finishes before final painting, or where heavy grade wall coverings are to be applied as the final decoration.

Level 4: For use where light textures or wall coverings are to be applied, or economy is of concern. Also for non-critical lighting areas where flat and low sheen paints are to be applied.

Level 5: This level of finish is for use where gloss, semi-gloss, low sheen, or non-textured flat paints are specified or where critical lighting conditions occur.

Refer to the manufacturer's specifications on how to achieve the recommended level of finish dictated by the type of wall decoration specified.

205.5
Where nail popping, joint peaking and ridges formed by stud warping and twisting are undesirable on the finished surfaces within 12 months of installation of wall linings, kiln dried timber shall be used, or alternatively the timber framing shall be dried to less than 18 % moisture content before wall linings are installed.

C205.5
Some check on the moisture content of timbers immediately prior to installation is desirable and is essential for certain critical applications. Such checks should be the responsibility of the contractor. Where dry framing is specified, checks on moisture content immediately prior to closing in are desirable.

205.6
Where bulk insulation is used, wall framing timber shall not be totally enclosed until it is dried to within the moisture content limits set out in table 4. Any timber that at the time of installation has degraded beyond the shape limits permitted by NZS 3631 for the relevant grade shall not be installed.

205.7
The required moisture content for framing timbers shall be achieved either by drying the timber prior to use or by force drying or allowing the erected framing to dry before it is enclosed.

205.8
Any timber, including that in a pre-nailed frame which has degraded in shape beyond the limits permitted by NZS 3631, prior to lining, shall be replaced.

C205.8
Problems resulting from the installation of timber having too high a moisture content can occur long after completion of the building. Shrinkage, distortion, checking, and mould growth can occur. Degrading of the timber can occur with changes in moisture content which results in changes in bow, crook, cup, twist and cross section, all of which can end up beyond the limits permitted by NZS 3631. Such dimensional changes can affect the "level of finish" of surfaces well after construction is completed. The long term deflection of framing timber installed green and dried under load is greater than that of framing timber installed dry. Temporary support during drying will control deflection of beams of green timber. Installation at the specified moisture content is recommended for critical applications such as lintels, headers, ridge beams and exposed rafters (refer to NZS 3603). The pulling away of scotia and architraves and moulding from corners and re-entries can occur where the underlying top and bottom plates shrink with loss of moisture after installation. Likewise excessive movement can occur at junctions between storeys impacting on the performance of essential weathertightness details.

205.9 Drying

205.9.1
Timber that is specified to a moisture content shall have been dried according to recognized principles by air drying, by forced air drying, or by kiln drying complying with AS/NZS 4787.

C205.9.1
Orders for dry timber should specifically state the required moisture content range. It should be noted that in most areas of New Zealand it is not possible to achieve these moisture contents by air drying (see also the New Zealand Timber Industry Federation Timber Design Guide).

205.9.2
Once timber is dry, it shall be protected from moisture pick-up until it is installed.

For monitoring of moisture content, the minimum number of samples shall be 1 per 50 pieces for oven-drying and 1 per 20 pieces for moisture metering over the full range of material dried.

205.9.3
Moisture meters shall only be used for the range of 8 % to 30 % moisture content.

205.9.4
Any dispute concerning moisture content shall be decided by use of the oven-dry method specified in AS/NZS 4787.

205.10 Protection up to installation

205.10.1
All timber and wood-based products shall be properly protected against physical damage which will affect its appearance prior to being installed.

205.10.2
All dry timber and wood-based products, whether or not they are primed or treated with water-repellent, shall be protected as follows:

(a) At all stages after drying, the timber shall be adequately protected against rain wetting by covers or stored in the building.

(b) In the interval between delivery and installation, dry timber shall also be adequately protected against moisture pick-up from the ground or from green concrete. Except as provided in (a), dry timber shall be kept block-stacked more than 100 mm off the ground or concrete. The block stack shall not be disturbed until immediately before use.

(c) For wood-based products, the manufacturer's instructions with regard to protection and conditioning shall be followed.

C205.10.2
Attention to timing of delivery is important. Prolonged storage after kiln drying is bad practice. Moisture pick-up accompanied by swelling and possibly by distortion can occur if dry timber and wood-based products are stored in unfinished damp buildings, particularly in concrete structures.

205.11 Construction
Pre-laying of strip floors, that is, laying of floors before erection of walls and roof, shall be avoided where a high quality floor free from shrinkage gaps or squeaks is required. The sealer or primer used as a temporary protection shall be compatible with the scheduled finish.

205.12 Protection after installation

Any physical damage to timber and wood-based products during the currency of the contract shall be made good.

C205.12

In centrally-heated and air-conditioned buildings care should be taken to operate the plant so as to avoid excessively high temperatures and low humidity, particularly just after the interior finishing timbers have been installed. Extreme conditions suddenly applied are likely to cause unsightly shrinkage, distortion, and checking of timber wood-based building components.

205.13 Protective surface coatings

Surface coatings shall be the appropriate paint type or surface treatment systems applied in accordance with AS/NZS 2311, or other specialized coating systems applied strictly to the manufacturer's instructions.

C205.13

Primer paint will deteriorate if left exposed. The top coats should therefore be applied without undue delay. If the priming is exposed for more than a month, re-priming may be necessary. Refer to AS/NZS 2311.

205.14 Interior flooring

205.14.1 *Grading requirements additional to those set out in NZS 3631*

For strip flooring, which is exposed to view, all resin, bark pockets and spike knots, greater than 25 mm in width shall be excluded from the species dressing grade as referred to in table 1C.

205.14.2

For strip flooring which is to be covered by suitable floor coverings, inclusion of resin pockets, partially intergrown and tightly encased knots is acceptable.

205.15 Structural framing

Where timber framing is installed green or kiln dried timber that is wetted and allowed to dry, those members which are likely to deflect under their own weight shall be propped until they dry below a moisture content of 20 %.

C205.15

The long-term deflection of framing timber installed green or kiln dried timber that is wetted and dried under load is greater than that of framing timber installed dry. Temporary support during drying will control deflection of beams of wet timber.

206 MOISTURE CONTENT AND QUALITY CONTROL REQUIREMENTS FOR WOOD-BASED BUILDING COMPONENTS WITH A 5 OR 15-YEAR DURABILITY PERFORMANCE

206.1 Moisture content

206.1.1

At the time of installation the moisture content of weatherboard, exterior joinery and finishes shall be within the limits specified in table 4.

206.1.2

At the time of installation of all finishing timber, interior joinery, furniture and corestock etc. their moisture content shall be within the limits specified in table 4.

C206.1.2
Note that figures in table 4 are for 90 % of pieces, with the remaining pieces within ±2 % moisture content of the range specified.

206.2 Fibreboards
The use of each particular type of fibreboard shall be in accordance with the manufacturer's printed instructions and be appraised for its use in the New Zealand environment.

C206.2
Reference should be made to AS/NZS 1859 for detailed information on the fixing and use of fibreboards and on the range of textured veneer and pre-finished boards produced. A range of fibreboard products are available that are made overseas. Their acceptability for particular uses may be determined on the basis of satisfactory experience with their use over a reasonable period of time, if used in New Zealand or by independent appraisal where no New Zealand performance is available.

206.3 Surface coatings
Surface coatings shall be the appropriate paint type or surface treatment systems applied in accordance with AS/NZS 2311, or other specialized coating systems applied strictly to the manufacturer's instructions.

C206.3
Primer paint will deteriorate if left exposed. The top coats should therefore be applied without undue delay. If the priming is exposed for more than a month, re-priming may be necessary. Refer to AS/NZS 2311.

206.4 Protection up to installation

206.4.1
All timber and wood-based products shall be properly protected against physical damage which will affect their appearance prior to being installed.

206.4.2
The building should be closed in and the ground floor laid before the delivery of dry interior finishing timber, whether or not it has been primed or sealed with a water-repellent.

206.4.3
The area concerned shall be fully protected from the weather and from other building operations before dry interior finishing is fixed, whether or not it has been primed or sealed with a water-repellent.

C206.4.3
Attention to timing of delivery is important. Prolonged storage after kiln drying is bad practice. Moisture pick-up accompanied by swelling and possibly by distortion can occur if dry timber and wood-based products are stored in unfinished damp buildings, particularly in concrete structures.

206.5
Dry interior finishing timber and wood-based products for centrally heated or air-conditioned buildings shall be protected as follows prior to installation:

(a) If the heating system is effectively in operation, the timber shall be fillet-stacked without wrapping inside the building for at least 1 week to enable the timber to attain a moisture content in equilibrium with the prevailing conditions before surface-coating and fixing.

(b) If the heating system is not effectively in operation, the timber shall be block-stacked and fully wrapped inside the building. The wrapping shall be of non-permeable sheet material and shall cover

the sides and ends as well as the top of the stack. The stack should be more than 100 mm clear of the concrete. Unless done before delivery, surface-coating should be done immediately the block stack is opened up.

C206.5
In heated buildings it is very desirable for a heating system to be installed and in operation before the interior finishing timbers are installed. If this is impossible, then;

(a) The time interval between timber installation and the turning on of the heating system should be as short as possible; and

(b) The timber should not be installed before the drying out of the interior has progressed to the appropriate range listed in table 4.

207 PROTECTION AFTER INSTALLATION

207.1
Any physical damage to timber and wood-based products during the currency of the building works shall be made good.

207.2
In centrally-heated and air-conditioned buildings the contractor shall operate the plant so as to avoid excessively high temperatures and low humidity, particularly just after the interior finishing timbers have been installed.

C207.2
Extreme conditions suddenly applied are likely to cause unsightly shrinkage, distortion, and checking of timber items.

208 WORKMANSHIP
Work shall be in accordance with the best trade practice, and this shall be deemed to include those methods, practices and processes contained in current syllabuses for the New Zealand Trade Certificates in carpentry, joinery, and New Zealand Timber Industry Federation Timber Design Guide. Reference should also be made to the appropriate New Zealand Standards.

209 WOOD-BASED COMPONENTS OTHER THAN BUILDING COMPONENTS

209.1
This section refers to those components not regarded as building components but which require treatment in order to achieve the stated durability.

209.2
Table 5 lists non-building components and associated treatment levels in common use for Pinus species.

Table 5 – Treatment of non-building wood-based components

Typical uses	Hazard Class
Boat building	H4
Bridge beams	H4
Bridge decking	H4
Cattle grids	H4
Compost bins	H4
Cooling towers	H5 or H6
Decking in contact with planter boxes or soil	H4
Drain or watercourse lining	H4
Fence battens, palings, rails and droppers	H3.2
Fruit or vegetable bins	H3.2
Garden furniture	H3.2
Gates	H3.2
Greenhouse framing	H3.2
Jetty and wharf timbers (above high water line)	H4
Jetty and wharf timbers (below high water line)	H6
Marine farms	H6
Marine piles and fendering	H6
Pergola framing	H3.2
Pergola posts	H4
Piles, freshwater	H4
Plant containers	H4
Plywood, ground contact, bins, races	H4
Poles, electricity transmission, telecommunication	H5
Posts, guardrail	H4
Posts, horticultural (severe sites)	H5
Posts, sawn, for domestic fencing	H4
Roof shingles	H3.2
Seed boxes	H4
Slipways, freshwater	H4
Slipways, marine (below high water line)	H6

NOTES

Approved by the Standards Council on 27 November 2003 to be a New Zealand Standard pursuant to the provisions of section 10 of the Standards Act 1988.

First published: 23 December 2003

The following SNZ references relate to this Standard:

Project No. P 3602
Draft for comment No. DZ 3602:2003
Typeset by: Standards New Zealand
Printed by: The Colour Guy