

Australian/New Zealand Standard™

**Timber—Solid—Stress-graded for
structural purposes**

Part 1: General requirements



AS/NZS 1748.1:2011

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TM-003, Timber Grading. It was approved on behalf of the Council of Standards Australia on 27 January 2011 and on behalf of the Council of Standards New Zealand on 17 December 2010.

This Standard was published on 24 February 2011.

The following are represented on Committee TM-003:

A3P
Australian Timber Importers Federation
BRANZ
Forest and Forest Products Employment Skills Company
Forest and Wood Products Research and Development Corporation
Forests New South Wales
Master Builders Australia
New Zealand Timber Industry Federation
New Zealand Timber Suppliers Group
Scion
Tasmanian Timber Promotion Board
Timber and Building Materials Association (NSW)
Timber Queensland
University of Technology, Sydney
Wood Processors Association

Additional Interests:

Dr Geoff Boughton

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR2 AS/NZS 1748.1.

Australian/New Zealand Standard™

Timber—Solid—Stress-graded for structural purposes

Part 1: General requirements

Originated in Australia as SAA MP18—1996.
Consequent Australian editions AS 1748—1978 and AS 1749—1978.
Originated in New Zealand as part of NZS 3618:1984.
AS 1748—1978, AS 1749—1978 and part of NZS 3618:1984 jointly revised, amalgamated and redesignated AS/NZS 1748:1997.
Second edition 2006.
AS/NZS 1748:2006 revised, in part, and redesignated AS/NZS 1748.1:2011.
Reissued incorporating Amendment No. 1 (October 2012).

COPYRIGHT

© Standards Australia Limited/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140.

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TM-003, Timber Grading, to supersede, in part, AS/NZS 1748:2006, *Timber—Mechanically stress-graded for structural purposes*.

This Standard incorporates Amendment No. 1 (October 2012). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

The AS/NZS 1748 series, *Timber—Solid—Stress-graded for structural purposes*, comprises the following parts:

AS/NZS

- 1748 Timber—Solid—Stress-graded for structural purposes
- 1748.1 Part 1: General requirements (this Standard)
- 1748.2 Part 2: Qualification of grading method

The objective of the AS/NZS 1748 series is to specify requirements for structural timber produced using a qualified grading method. Timber that complies with the requirements of this Standard series is suitable for use in accordance with NZS 3603, *Timber Structures Standard*, NZS 3604, *Timber Framed Buildings*, the AS 1684 series, *Residential timber-framed construction*, and the AS 1720 series, *Timber structures*.

The 2006 edition of AS/NZS 1748 was applicable to timber produced using mechanical stress-grading relying on bending of timber about its minor axis. In this revision, the scope has been widened to enable the qualification and use of other grading methods. Part 2 of this AS/NZS 1748 series provides qualification exemptions, under certain conditions, for those producers who have previously satisfied the requirements of AS/NZS 1748:2006.

The requirements of AS 2858, *Timber—Softwood—Visually stress-graded for structural purposes*, AS 2082, *Timber—Hardwood—Visually stress-graded for structural purposes*, AS 3519, *Timber—Machine proof grading*, and NZS 3631, *New Zealand timber grading rules*, are not affected by the provisions of this Standard. Producers grading timber in compliance with those Standards are encouraged to consider the use of the latest edition of AS/NZS 4490, *Timber—Solid—Stress-graded for structural purposes—Verification of properties*, for verification of their structural products.

The structure of the new AS/NZS 1748 series is as follows:

- (a) Part 1, *General requirements* (this Standard), specifies general structural and non-structural requirements for stress-graded timber. It includes a requirement that the grading method has been qualified in accordance with Part 2 and that the structural and other nominated properties have been verified in accordance with the latest edition of AS/NZS 4490.
- (b) Part 2, *Qualification of grading method*, specifies the requirements for qualifying the grading method in accordance with Part 1 of this Standard series. Qualification requirements include evaluation of the characteristic values from tests of the stress-graded timber against the specified characteristic values for design, selection of indicator properties and establishment of target values, correlation and responsiveness analyses and the compilation of a grading method qualification report.

Changes to AS/NZS 1748:2006 are as follows:

- (i) Limitation of the scope of the Standard series to solid timber. All data that underpins the provisions of this Standard series pertains to solid sawn timber. Additional requirements may be needed for manufacture of structural timber products that do not meet the definition of solid wood.

- (ii) Inclusion of the derivation of indicator property target values and their use in verification to demonstrate that the timber has the claimed properties.
- (iii) Inclusion of requirements for the qualification of grading methods.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
1 SCOPE	5
2 APPLICATION	5
3 NORMATIVE REFERENCES	5
4 DEFINITIONS	6
5 ABREVIATED TERMS	6
6 REQUIREMENTS	6
6.1 General	6
6.2 Other properties	7
7 DEMONSTRATION OF COMPLIANCE	7
 APPENDICES	
A UTILITY REQUIREMENTS—SOFTWOOD SPECIES	8
B UTILITY REQUIREMENTS—HARDWOOD SPECIES	10
C PRODUCT IDENTIFICATION REQUIREMENTS	12
 BIBLIOGRAPHY	13

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND**Australian/New Zealand Standard
Timber—Solid—Stress-graded for structural purposes****Part 1: General requirements****1 SCOPE**

This Standard sets out general requirements for stress-graded solid timber intended for use in accordance with the AS 1720 series, AS 1684 series, NZS 3603 and NZS 3604.

2 APPLICATION

This Standard shall be read in conjunction with AS/NZS 1748.2 and AS/NZS 4490.

This Standard is primarily intended for use by manufacturers. It may also be referenced by the following users:

- (a) Designers and specifiers when specifying timber for use in structures.
- (b) Purchasers when purchasing structural timber.
- (c) Certifiers and any other parties interested in the manufacture, specification or certification of structural timber.

The product-related requirements of this Standard are intended to apply to timber at the time of manufacture.

3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

- 1080 Timber—Methods of test
- 1080.1 Part 1: Moisture content
- 1604 Specifications for preservative treatment
- 1604.1 Part 1: Sawn and round timber
- 1613 Timber—Colours for marking F-grades
- 1684 Residential timber-framed construction (all Parts)
- 1720 Timber structures (all Parts)

AS/NZS

- 1748 Timber—Solid—Stress-graded for structural purposes
- 1748.2 Part 2: Qualification of grading method
- 4490 Timber—Solid—Stress-graded for structural purposes—Verification of properties
- 4491 Timber—Glossary of terms in timber-related Standards

NZS

- 3603 Timber Structures Standard
- 3604 Timber Framed Buildings
- 3622 Verification of timber properties

The New South Wales Timber Marketing Act 1977

4 DEFINITIONS

For the purpose of this Standard, the definitions given in AS/NZS 4491 and those below apply. Where the definitions in this Standard differ from those given in AS/NZS 4491, for the purpose of this Standard, those below apply.

4.1 Characteristic value

A percentile value of a statistical distribution estimated with a specified level of confidence.

NOTE: Characteristic values generally apply to either a sample mean or fifth (5th) percentile value that is estimated with 75% confidence.

4.2 Characteristic value for design

Characteristic value determined suitable for structural design in accordance with AS 1720.1 or NZS 3603.

4.3 Grading method

A method of assigning individual timber pieces to a stress-grade.

4.4 Indicator property

A primary structural property identified during the qualification process and used to verify the structural properties of stress-graded timber.

4.5 Qualification

A process for demonstrating the ability of a grading method to allocate reliably structural timber to a specified stress-grade(s) prior to the normal commercial use of the grading method.

4.6 Stress-grade

A classification of structural timber that indicates a suite of design characteristic values for strength and stiffness properties.

4.7 Solid timber

Timber that is not jointed, glued, laminated or reconstituted.

4.8 Stress-graded timber

Timber that has been assigned to a stress-grade.

4.9 Verification

A process for demonstrating that stress-graded timber complies with the relevant product Standard and is suitable for use in conjunction with the structural property design values for the specified stress-grade.

5 ABBREVIATED TERMS

The following symbols/abbreviated terms are used in this Standard:

MC = moisture content as determined in accordance with AS/NZS1080.1

S = when used in product identification, indicates that the stress-graded timber has been seasoned.

6 REQUIREMENTS

6.1 General

Timber shall be stress-graded using a grading method that is qualified in accordance with AS/NZS 1748.2.

The stress-graded timber shall be verified in accordance with AS/NZS 4490. The verification shall include structural properties and the other properties as defined in Clauses 6.2.

6.2 Other properties

6.2.1 Moisture content (MC)

Where timber is claimed to be seasoned, the moisture content, at the time of manufacture, shall comply with the following requirements:

- (a) *For Australian end-use*—not greater than 15% average and no piece exceeding 21%.
- (b) *For New Zealand end-use*—not greater than 16% average and no piece exceeding 21%.

NOTES:

- 1 The above limits define the expected moisture content in seasoned timber. Verification of moisture content by testing is given in AS/NZS 4490.
- 2 In order to achieve the above moisture content values, target moisture content for drying should be less than the required limit value of the average moisture content.
- 3 Attention is drawn to the consumer protection provisions of the *Timber Marketing Act 1977* in New South Wales, regarding the special considerations applying to seasoned timber in NSW. The requirements of this Act may be more stringent than those in this Standard.
- 4 Where this moisture content is unsuitable for a particular location or purpose, the required moisture content is a matter for agreement between the purchaser and the supplier (MC specified timber).
- 5 Attention is drawn to the need to consider any circumstances that may require seasoning to a particular moisture content outside the range specified above (e.g., in areas of high or low equilibrium moisture content). Information on the equilibrium moisture content applicable to species under particular use conditions may be available from timber associations, State Forestry Departments and the CSIRO.

6.2.2 Utility

The utility requirements for stress-graded softwood timber species shall comply with the requirements given in Appendix A.

The utility requirements for stress-graded hardwood timber species shall comply with the requirements given in Appendix B.

6.2.3 Product identification

Stress-graded timber shall comply with the product identification requirements given in Appendix C.

7 DEMONSTRATION OF COMPLIANCE

Timber marked or otherwise identified as complying with this Standard shall meet all of its relevant normative requirements.

NOTE: Attention is drawn to legislation in Australia and New Zealand that protects consumers from false or misleading claims concerning a product. Manufacturers making a statement of compliance with this Standard on product, packaging or promotional material related to that product are advised to ensure that such compliance is capable of being verified.

APPENDIX A
UTILITY REQUIREMENTS—SOFTWOOD SPECIES
(Normative)

A1 DIMENSIONS

The following shall apply:

- (a) The length shall be not less than the specified length.
- (b) For width and thickness, except where permitted want and wane occur—
 - (i) 2 mm difference in actual dimension within any piece; and
 - (ii) measured at any point on its length, the difference between actual dimensions and specified dimensions shall be—
 - (A) *for unseasoned timber*—
 - (1) *up to and including F7*—+2, -4 mm; and
 - (2) *stress grade F8 and above*—±3 mm;
 - (B) *for seasoned rough sawn or MC specified timber*—+5, -0 mm;
 - (C) *for sized timber*—as for Items (A) or (B) with an additional requirement of a maximum 2 mm difference between all pieces within a parcel for the sized dimension of the timber; and
 - (D) *for dressed timber*—+2, -0 mm of the specified finished size.

NOTE: The dimensional tolerances for width and thickness given here are serviceability tolerances only. Individual stress-grading machines may require tighter tolerances on the input timber in order to provide suitable grading accuracy.

A2 SQUARENESS

The tolerance on squareness shall be ±0.5 degrees, that is, the angle at the arrises shall be 90 ±0.5 degrees.

NOTE: This is equivalent to less than 1 mm per 100 mm across the surface.

A3 OTHER LIMITATIONS

The following shall apply:

- (a) *Resin pockets, bark pockets*—
 - (i) *extent*—not extending from one surface to the opposite surface; and
 - (ii) *individual length*—not exceeding the width of the piece.
- (b) *Splits other than end splits*—not permitted.
- (c) *End splits*—
 - (i) *aggregate length at each end*—not exceeding the lesser of twice the width and 200 mm; and
 - (ii) *individual length*—not exceeding half the width of the piece.
- (d) *Wane, want, in aggregate or individually*—
 - (i) not exceeding one-third of the width of the edge on which it occurs; and
 - (ii) not exceeding one-half of the width of the face on which it occurs.

(e) *Machine-skip for dressed material, when on the face or edge for the full length of the piece*—not exceeding 0.5 mm.

(f) *Bow, spring and twist*—not exceeding the limits given in Table A1.

NOTE: The limits for bow, spring and twist are based on timber of thickness up to 50 mm.

(g) *Cupping*—not exceeding 1 mm per 50 mm of width.

NOTE: These limits are appropriate for general use framing structural timber. Structural timber for other uses may require tighter limits. Where timber is ordered with tighter limits, the revised limits are subject to agreement between supplier and purchaser.

TABLE A1
MAXIMUM PERMISSIBLE BOW, SPRING AND TWIST

Nominal length m	Bow mm	Spring, mm		Twist, mm			
		Nominal size width		Nominal size width			
		Up to 125	150 and over	Up to 100	100 to 150	151 to 200	201 to 300
Up to: 2.4	20	6	6	5	7	10	15
3.0	30	9	9	7	10	14	20
3.6	40	18	14	8	13	18	25
4.2	50	22	18	9	15	21	29
4.8	60	29	24	10	16	23	33
5.4	65	36	30	11	18	26	37
6.0 and over	70	44	36	12	20	28	40

NOTE: The permissible allowances for nominal lengths between those quoted in the Table should be obtained by interpolation.

APPENDIX B
UTILITY REQUIREMENTS—HARDWOOD SPECIES
(Normative)

B1 DIMENSIONS

The following shall apply:

- (a) The length shall be not less than the specified length.
- (b) For width and thickness except where permitted want and wane occur—
 - (i) 2 mm difference in actual dimension within any piece; and
 - (ii) measured at any point on its length, the difference between actual dimensions and specified dimensions shall be—
 - (A) *for unseasoned timber*— ± 3 mm;
 - (B) *for seasoned rough sawn or MC specified timber*—+5, -0 mm;
 - (C) *for sized timber*—as for Items (A) or (B) with an additional requirement of a maximum 2 mm difference between all pieces within a parcel for the sized dimension of the timber; and
 - (D) *for dressed timber*—+2, -0 mm of the specified finished size.

NOTE: The dimensional tolerances for width and thickness given here are serviceability tolerances only. Individual stress-grading machines may require tighter tolerances on the input timber in order to provide suitable grading accuracy.

B2 SQUARENESS

The tolerance on squareness shall be ± 2 degrees, that is, the angle at the arrises shall be 90 ± 2 degrees.

NOTE: This is equivalent to less than 1 mm per 100 mm across the surface.

B3 OTHER LIMITATIONS

The following shall apply:

- (a) *Loose gum veins and ring shakes*—
 - (i) *width*—not exceeding 3 mm;
 - (ii) *aggregate length*—not exceeding one-third the length of the piece;
 - (iii) *extent*—not extending from one surface to the opposite surface; and
 - (iv) *intersecting an end and extending from surface to surface*—to be considered as end splits (see Item (g)).
- (b) *Gum pockets, latex pockets, resin pockets, bark pockets, overgrowth of injury*—
 - (i) *extent*—not extending from one surface to another; and
 - (ii) *individual length*—not exceeding the width of the piece.
- (c) *Cross-shakes*—not permitted.
- (d) *Splits other than end splits*—not permitted.

(e) *End splits*—

(i) *aggregate length at each end*—not exceeding the lesser of twice the width and 200 mm; and

(ii) *individual length*—not exceeding half the width of the piece.

(f) *Wane, want, in aggregate or individually*—

(i) not exceeding one-third of the width of the edge on which it occurs; and

(ii) not exceeding one-half of the width of the face on which it occurs.

(g) *Machine-skip for dressed material, when on the face or edge for the full length of the piece*—not exceeding –0.5 mm.(h) *Bow, spring and twist*—not exceeding the limits given in Table B1.

NOTE: The limits for bow, spring and twist are based on timber of thickness up to 50 mm.

(i) *Cupping*—not exceeding 1 mm per 50 mm of width.(j) *Sapwood susceptible to lyctid attack*—not permitted unless treated to AS 1604.1.

NOTE: These limits are appropriate for general use framing structural timber. Structural timber for other uses may require tighter limits. Where timber is ordered with tighter limits, the revised limits are subject to agreement between supplier and purchaser.

TABLE B1
MAXIMUM PERMISSIBLE BOW, SPRING AND TWIST

Nominal length m	Bow mm	Spring, mm		Twist, mm			
		Nominal size width		Nominal size width			
		Up to 125	150 and over	Up to 100	100 to 150	151 to 200	201 to 300
Up to: 2.4	20	6	6	5	7	10	15
3.0	30	9	9	7	10	14	20
3.6	40	18	14	8	13	18	25
4.2	50	22	18	9	15	21	29
4.8	60	29	24	10	16	23	33
5.4	65	36	30	11	18	26	37
6.0 and over	70	44	36	12	20	28	40

NOTE: The permissible allowances for nominal lengths between those quoted in the Table should be obtained by interpolation.

APPENDIX C
PRODUCT IDENTIFICATION REQUIREMENTS
 (Normative)

C1 GENERAL

Where timber is purported to comply with this Standard, each piece shall be clearly marked to identify the following:

- (a) The stress-grade of the timber.
- (b) The manufacturer of the timber (entity responsible for grading).
- (c) Reference to this Standard, i.e., AS/NZS 1748.1, or the generic number of this series of Standards, i.e., AS/NZS 1748.
- (d) Where the stress grade has seasoned and unseasoned options and, if graded as seasoned, the inclusion of one of the following:
 - (i) The word 'SEASONED' or the abbreviations (e.g., 'SEAS', 'S').
 - (ii) If kiln dried, 'KD'.

The timber marking shall be one of the following:

- (A) Marked with a brand, or stamp, that will remain legible in service.
- (B) Marked with a label that cannot be removed without obvious damage to the mark.
- (C) Tagged with an end tag (only where an appearance requirement has been specified).

NOTES:

- 1 In many applications, pieces are used in lengths shorter than the production lengths and stress grade marking at 1200 mm centres, or less, will give the appropriate stress grade information on shorter pieces that are cut from the originally graded lengths.
- 2 Additional information may also be incorporated in the marking.

C2 ASSIGNMENT AND MARKING OF STRESS-GRADE

Each piece of stress-graded timber shall be assigned to a single stress-grade and a written stress-grade mark(s) shall be used to indicate that stress-grade.

NOTE: Where continuous or intermittent colours have been used for production purposes by manufacturers, it is particularly important for them to apply written stress-grade marks at close centres so that users of the timber can associate the correct stress-grade with shorter pieces cut from the originally graded length. Stress-grade colours (e.g., as specified in AS 1613) have no meaning in relation to the stress-grade marking requirements of this Standard.

C3 OTHER REQUIREMENTS

The following documents contain specific marking requirements for structural timber, which, where applicable, shall be additional to the marking requirements of in this Standard:

- (a) The New South Wales Timber Marketing Act 1977.
- (b) AS 1604.1.
- (c) NZS 3622.

BIBLIOGRAPHY

AS
1613 Timber—Colours for marking F-grades

AS/NZS 1748.1:2011

Amendment No. 1 (2012)

REVISED TEXT

SUMMARY: This Amendment applies to Appendix C.

Published on 31 October 2012.

NOTES

NOTES

Standards Australia

Standards Australia is an independent company, limited by guarantee, which prepares and publishes most of the voluntary technical and commercial standards used in Australia. These standards are developed through an open process of consultation and consensus, in which all interested parties are invited to participate. Through a Memorandum of Understanding with the Commonwealth government, Standards Australia is recognized as Australia's peak national standards body.

Standards New Zealand

The first national Standards organization was created in New Zealand in 1932. The Standards Council of New Zealand is the national authority responsible for the production of Standards. Standards New Zealand is the trading arm of the Standards Council established under the Standards Act 1988.

Australian/New Zealand Standards

Under a Memorandum of Understanding between Standards Australia and Standards New Zealand, Australian/New Zealand Standards are prepared by committees of experts from industry, governments, consumers and other sectors. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect the latest scientific and industry experience. Australian/New Zealand Standards are kept under continuous review after publication and are updated regularly to take account of changing technology.

International Involvement

Standards Australia and Standards New Zealand are responsible for ensuring that the Australian and New Zealand viewpoints are considered in the formulation of international Standards and that the latest international experience is incorporated in national and Joint Standards. This role is vital in assisting local industry to compete in international markets. Both organizations are the national members of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission).

Visit our web sites

www.standards.org.au

www.standards.co.nz

www.standards.com.au



GPO Box 476 Sydney NSW 2001
Phone (02) 9237 6000
Fax (02) 9237 6010
Email mail@standards.org.au
Internet www.standards.org.au
SAI Global Customer Service
Phone 13 12 42
Fax 1300 65 49 49
Email sales@saiglobal.com



Level 10 Radio New Zealand House
155 The Terrace Wellington 6011
(Private Bag 2439 Wellington 6140)
Phone (04) 498 5990
Fax (04) 498 5994
Customer Services (04) 498 5991
Information Service (04) 498 5992
Email snz@standards.co.nz
Internet www.standards.co.nz

This page has been left intentionally blank.