Australian Standard®

Timber structures

Part 4: Fire-resistance of structural timber members

This Australian Standard was prepared by Committee TM/1, Timber Structures. It was approved on behalf of the Council of Standards Australia on 27 October 1989 and published on 2 April 1990.

The following interests are represented on Committee TM/1:

Association of Consulting Engineers Australia
Australian Uniform Building Regulations Coordinating Council
CSIRO Division of Building, Construction and Engineering
Chisholm Institute of Technology
Curtin University of Technology
Master Builders Construction and Housing Association Australia
National Association of Forest Industries
Plywood Association of Australia
Public Works Department, New South Wales
University of Technology, Sydney

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

Australian Standard®

Timber structures

Part 4: Fire-resistance of structural timber members

First published as AS 1720.4–1990.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 6012 6

PREFACE

This Standard was prepared by the Standards Australia Committee on Timber Engineering as an additional Part of AS 1720 *SAA Timber Structures Code*. In considering the revision of AS 1720–1975 the Committee recognized the need to restructure the Standard to allow for additional topics to be included as research knowledge became established. This led to the Standard being prepared as four separate parts as follows:

Part 1: *Design methods*
Part 2: *Timber properties*
Part 3: *Non-standard connectors*
Part 4: *Fire resistance of structural timber members* (this Standard)

Part 1 of the Standard has been published as AS 1720.1–1988 *Timber Structures* Part 1: *Design methods.*

© Copyright – STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

Page

STANDARDS AUSTRALIA

Australian Standard
Timber Structures

Part 4: Fire-resistance of structural timber members

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard provides a computational method for determining the fire-resistance of solid and glued-laminated structural timber members as an alternative to testing in accordance with AS 1530.4.

This Standard also provides guidance on methods for protecting metal connectors from the effects of fire.

NOTES:

1. This Standard is not relevant to the determination of the early fire hazard properties of materials for which a method of assessment is given in AS 1530.3.
2. This Standard is not relevant to structural accreditation through furnace testing for which the appropriate Standard is AS 1530.4.

1.2 REFERENCED AND RELATED DOCUMENTS.

1.2.1 Referenced documents. The following documents are referred to in this Standard:

AS		
1170	SAA Loading Code	
1170.1	Part 1:	Dead and live loads and load combinations
1328	Glued-laminated structural timber	
1530	Methods for fire tests on building materials, components and structures	
1530.3	Part 3:	Test for early fire hazard properties of materials
1530.4	Part 4:	Fire-resistance tests of elements of building construction
1720	SAA Timber Structures Code	
1720.1	Part 1:	Design methods

1.2.2 Related documents. Attention is drawn to the following related documents:

DIN		
4102	Fire behaviour of building materials and building components	
	Part 4:	Summary and use of classified building materials, building components and special building components

Building Code of Australia

1.3 DEFINITIONS. For the purpose of this Standard the definitions below apply.

1.3.1 Standard fire—the standard heating conditions as specified in AS 1530.4.

1.3.2 Structural timber member—any timber component or element forming part of the load-bearing framework of a structure including but not limited to structures as classified in the Building Code of Australia.

1.3.3 Fire-resistance—an assessment of the ability of a structural timber member to fulfil, for a stated period of time, the required structural adequacy only, if exposed to the fire test methods specified in AS 1530.4.

1.3.4 Fire-resistance period, (FRP)—the time, in minutes, for a member to reach the appropriate failure criterion, specified in AS 1530.4, if tested in accordance with that Standard.

1.3.5 Fire-resistance level, (FRL)—the performance criteria for fire-resistance, as specified in Building Regulations.

1.3.6 Notional charring rate (for design purposes)—the rate at which timber is assumed to be converted to char when exposed to fire.

1.3.7 Effective depth of charring—the calculated depth to which the timber is considered as being charred.

1.3.8 Effective residual section—the timber section remaining after removal of the calculated effective depth of charring from all fire exposed surfaces. The effective residual section is considered to retain the same mechanical properties it possessed before exposure to the standard fire.

1.3.9 Fire-resistant protective insulation—the permanent fixing of materials, to the fire exposed surfaces of a timber member, which can increase the fire-resistance by providing additional thermal insulation, as measured by AS 1530.4.

1.4 MATERIALS.

1.4.1 Untreated timber. The design procedures given in this Standard apply only to untreated timber, that is, timber which has not been treated with preservative or fire-retardant chemicals.

NOTE: The primary purpose of fire-retardant treatments, either pressure impregnation or fire-retardant coatings, is to alter the surface burning characteristics of a timber substrate by lowering the substrate's early fire hazard indices as measured by AS 1530.3. The use of fire-retardant treatments is administered through Building Regulations.

The ability of fire-retardant treatments to improve the fire-resistance of a timber member can only be assessed through furnace testing in accordance with AS 1530.4. Generally fire-retardant treatments do not materially improve the fire-resistance of timber.

1.4.2 Glued-laminated timber. The design procedures outlined in this Standard apply only to glued-laminated timber fabricated with phenol, resorcinol, phenol-resorcinol or polyphenolic glues, in accordance with AS 1328. The effect of glue lines on the notional charring rate (see Clause 2.4) shall be ignored.

COPYRIGHT