

AS 1530.4—1990

Australian Standard[®]

**Methods for fire tests on building
materials, components and
structures**

**Part 4: Fire resistance tests of
elements of building construction**

This Australian Standard was prepared by Committee BD/18, Fire Tests—Building Materials, Components and Structures. It was approved on behalf of the Council of Standards Australia on 26 September 1989 and published on 19 January 1990.

The following interests are represented on Committee BD/18:

Australian British Chamber of Commerce
Australian Fire Protection Association
Australian Institute of Building
Australian Uniform Building Regulations Coordinating Council
Board of Fire Commissioners, New South Wales
Bureau of Steel Manufacturers of Australia
Cement and Concrete Association of Australia
Commonwealth Fire Board
Confederation of Australian Industry
CSIRO, Division of Building Construction and Engineering
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PREFACE

This Standard was prepared by the Standards Australia's Committee on Fire Tests on Building Components, Materials and Structures, to supersede AS 1530, *Methods for fire tests on building materials, components and structures*, Part 4—1985, *Fire-resistance test of elements of construction*.

This Standard represents a further development of the philosophy and procedures adopted in the previous edition. The test method also follows the basic principles and procedures contained in ISO 834, *Fire-resistance tests—Elements of building construction*. Relatively minor departures from the ISO recommendations have been made only where specific performance requirements for elements of building construction have been traditionally acceptable in Australia.

It is intended, however, that the next edition will further address minor variances between this Standard, ISO 834 and other national Standards.

This edition further addresses the subject of incipient spread of fire, and excludes from consideration certain materials with a thin surface finish of not greater than 1 mm thick.

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CONTENTS

Page

SECTION 1. SCOPE AND GENERAL

1.1	SCOPE	5
1.2	PRINCIPLE	5
1.3	APPLICATION TO FIRE HAZARD ASSESSMENT	5
1.4	REFERENCED DOCUMENTS	5
1.5	DEFINITIONS	5
1.6	LINEAR DIMENSIONS	6

SECTION 2. GENERAL REQUIREMENTS

2.1	FURNACE	7
2.2	MEASUREMENT OF TEMPERATURE	7
2.3	MEASUREMENT OF TIME	8
2.4	MEASUREMENT OF DEFLECTION	8
2.5	MEASUREMENT OF EMITTED RADIANT HEAT FLUX	8
2.6	RECORDING OF TEMPERATURE	9
2.7	TEST SPECIMEN	9
2.8	LOADING AND RESTRAINT	9
2.9	TEST PROCEDURE	10
2.10	OBSERVATIONS	10
2.11	CRITERIA OF FAILURE	12
2.12	TEST RESULTS	12
2.13	DETERMINATION OF FIRE-RESISTANCE	12
2.14	REPORTING OF RESULTS	12
2.15	REFERENCE IN OTHER AUSTRALIAN STANDARDS	13
2.16	COMMERCIAL LITERATURE	13

SECTION 3. WALLS AND PARTITIONS

3.1	APPLICATION OF SECTION	14
3.2	TEST SPECIMEN	14
3.3	INSTRUMENTATION	14
3.4	LOADING AND RESTRAINT	14
3.5	TEST PROCEDURE	14
3.6	OBSERVATIONS	14
3.7	CRITERIA OF FAILURE	14

SECTION 4. FLOORS, ROOFS, FLOOR/CEILING SYSTEMS AND ROOF/CEILING SYSTEMS

4.1	APPLICATION OF SECTION	15
4.2	TEST SPECIMEN	15
4.3	INSTRUMENTATION	15
4.4	LOADING AND RESTRAINT	17
4.5	TEST PROCEDURE	17
4.6	OBSERVATIONS	17
4.7	CRITERIA OF FAILURE	17
4.8	TEST RESULTS-INCIPIENT SPREAD OF FIRE	17
4.9	TEST REPORT	17

SECTION 5. COLUMNS

5.1	APPLICATION OF SECTION	18
5.2	TEST SPECIMEN-SIZE	18
5.3	INSTRUMENTATION	18
5.4	LOADING AND RESTRAINT	18

	<i>Page</i>
5.5 TEST PROCEDURE–HEAT EXPOSURE	18
5.6 OBSERVATIONS	18
5.7 CRITERIA OF FAILURE–STRUCTURAL ADEQUACY	18
5.8 DETERMINATION OF FIRE–RESISTANCE	18
 SECTION 6. BEAMS, GIRDERS AND TRUSSES	
6.1 APPLICATION OF SECTION	19
6.2 TEST SPECIMEN	19
6.3 INSTRUMENTATION	19
6.4 LOADING AND RESTRAINT	19
6.5 TEST PROCEDURE	19
6.6 OBSERVATIONS	19
6.7 CRITERIA OF FAILURE–STRUCTURAL ADEQUACY	19
6.8 DETERMINATION OF FIRE–RESISTANCE	19
 SECTION 7. DOORSETS, SHUTTER ASSEMBLIES AND DAMPER ASSEMBLIES	
7.1 APPLICATION OF SECTION	21
7.2 TEST SPECIMEN	21
7.3 INSTRUMENTATION	21
7.4 TEST PROCEDURE	22
7.5 OBSERVATIONS	22
7.6 CRITERIA OF FAILURE	22
7.7 DETERMINATION OF FIRE–RESISTANCE	23
7.8 TEST REPORT	23
 SECTION 8. GLAZING	
8.1 APPLICATION OF SECTION	24
8.2 TEST SPECIMEN	24
8.3 INSTRUMENTATION	24
8.4 TEST PROCEDURE	24
8.5 OBSERVATIONS	24
8.6 CRITERIA OF FAILURE–INTEGRITY	24
8.7 DETERMINATION OF FIRE–RESISTANCE	24
8.8 TEST REPORT	24
 SECTION 9. AIR DUCTS	
9.1 APPLICATION OF SECTION	25
9.2 TEST SPECIMEN	25
9.3 POSITIONING OF THERMOCOUPLES	25
9.4 PROCEDURE	25
9.5 OBSERVATIONS	26
9.6 CRITERIA OF FAILURE	26
9.7 TEST REPORT	26
 SECTION 10. ELEMENTS PENETRATED BY SERVICES	
10.1 APPLICATION OF SECTION	27
10.2 TEST SPECIMEN	27
10.3 POSITIONING OF THERMOCOUPLES	27
10.4 TEST PROCEDURE	27
10.5 OBSERVATIONS	27
10.6 CRITERIA OF FAILURE	28
10.7 TEST REPORT	28
 APPENDIX A. RADIANT HEAT FLUX MEASUREMENTS	
	29

STANDARDS AUSTRALIA

Australian Standard
Methods for fire tests on building materials, components and structures

Part 4: Fire-resistance tests of elements of building construction

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard applies to heating conditions, test procedures, and criteria for the determination of fire-resistance of an element of building construction. In most cases, a single test, carried out in accordance with this Standard, establishes the fire-resistance for the element of construction concerned.

In addition to providing information on which the fire-resistance of an element of construction can be assessed, the test report includes information which may be of use to the designer. (Records of temperature at critical times may be used by a designer to assess the fire-resistance of a variant of the tested prototype flexural member where the procedure for such an assessment is defined in the appropriate design code.)

In certain cases, the test methods described herein provide information for the determination of—

- (a) resistance to the incipient spread of fire through ceiling systems;
- (b) safe distances for the spacing of combustible materials from elements that provide a separating function;
- (c) radiant heat flux emitted from doorsets, shutter assemblies, damper assemblies and glazing; and
- (d) the free-cross-sectional area of air ducts to provide functional operation while providing fire-resistance.

1.2 PRINCIPLE. A representative specimen of an element of construction is conditioned and then exposed to heat under controlled conditions in a furnace which is operated to satisfy a specified time/temperature curve. In order to minimize the effect of variation in ambient temperature on the outcome of the test, the heating curve is expressed in terms of temperature increments above ambient rather than actual temperature. Where it is not possible to model the element or system of construction satisfactorily with one specimen, it may be necessary to test more than one specimen. Observations are made on the performance of the specimen while it is subjected to thermal and, where applicable, physical loading. The elapsed times at which various failures occur are recorded.

1.3 APPLICATION TO FIRE HAZARD ASSESSMENT. The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions.

Each test shall be performed in accordance with the general requirements of Section 2 and with the following Sections, as appropriate:

- (a) Section 3—Walls and partitions.
- (b) Section 4—Floors, roofs, floor/ceiling systems and roof/ceiling systems.
- (c) Section 5—Columns.
- (d) Section 6—Beams, girders and trusses.

- (e) Section 7—Doorsets, shutter assemblies and damper assemblies.
- (f) Section 8—Glazing.
- (g) Section 9—Air ducts.
- (h) Section 10—Elements penetrated by services.

The requirements in Sections 3 to 10 shall take precedence over the general requirements of Section 2.

NOTE: The test methods follow the basic principles and procedures contained in ISO 834, *Fire-resistance tests—Elements of building construction*, with minor modifications applicable to particular Australian situations.

1.4 REFERENCED DOCUMENTS. The documents below are referred to in this Standard.

AS	
1080	Methods of test for timber
1080.1	Part 1: Moisture content
1530	Methods for fire tests on building materials, components and structures
1530.1	Part 1: Combustibility test for materials
1668	SAA Mechanical Ventilation and Air-conditioning Code
1668.1	Part 1: Fire precautions in buildings with air-handling systems
1682	Fire dampers
1735	SAA Lift Code
1905	SAA Fire Door Code
1905.1	Part 1: Fire-resistant doorsets
1905.2	Part 2: Fire-resistant roller shutters
2484	Fire-Glossary of terms relating to fire tests
2484.2	Part 2: Fire—Glossary of terms—Fire protection and firefighting equipment
ANSI	
MC96	Temperature measurement thermocouples (ANSI/MC96.1)
BS	
4937	International thermocouple reference tables Part 4: Nickel-chromium/nickel-aluminium thermocouples. Type K
DIN	
43710	Measurement and control, electrical temperature sensors, reference tables and materials of thermocouples

1.5 DEFINITIONS. For the purpose of this Standard, the definitions provided in AS 2484 and those below apply.