



A1 | **Classification of external walls of
buildings based on reaction-to-fire
performance**



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- Australasian Fire and Emergency Service Authorities Council
 - Australian Building Codes Board
 - Australian Industry Group
 - Australian Institute of Building
 - AWTATextile Testing
 - Building Research Association of New Zealand
 - Bureau of Steel Manufacturers of Australia
 - CSIRO
 - Engineers Australia
 - Fire Protection Association Australia
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 - Insurance Council of Australia
 - Plastics and Chemicals Industries Association
 - Property Council of Australia
 - Society of Fire Protection Engineers
-

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Australian Standard[®]

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Classification of external walls of buildings based on reaction-to-fire performance

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PREFACE

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee FP-018, Fire Safety.

This Standard incorporates Amendment No. 1 (September 2018). 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.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

A1 | The objective of this Standard is to provide procedures and criteria for the classification of external walls of buildings according to their tendency to limit the spread of fire via the external wall and between adjacent buildings and limit falling debris that could be hazardous to evacuating occupants and fire fighters.

Further information on the relationship of this standard with the National Construction Code is provided in Appendix A.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard

A1 | **Classification of external walls of buildings based on reaction-to-fire performance**

1 SCOPE

A1 | This Standard sets out the procedures and criteria for the classification of external walls of buildings according to their tendency to spread fire—

(a) via the external wall;

(b) between adjacent buildings;

and production of falling debris that could be hazardous to evacuating occupants and fire fighters.

This Standard is applicable to all external vertical or near vertical surfaces and covers all types of external wall systems, including façades, outer skins, core materials, cavities and attachments.

A1 | This Standard does not address the fire resistance and load bearing capacity of external walls, the fire hazard properties of internal surfaces or the impact of construction on the fire severity of a fire occurring within a building.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: The Bibliography in Appendix D provides details of documents that may be referred to for additional information.

AS

1530 Methods for fire tests on building materials, components and structures

1530.4 Part 4: Fire-resistance test of elements of construction

2484 Fire—Glossary of terms

2484.1 Part 1: Fire tests

ISO

13785 Reaction-to-fire tests for façades

13785-2 Part 2: Large-scale test

13943 Fire safety—Vocabulary

BS

8414 Fire performance of external cladding systems

8414-1 Part 1: Test method for non-loadbearing external cladding systems applied to the masonry face of a building

8414-2 Part 2: Test method for non-loadbearing external cladding systems fixed to and supported by a structural steel frame

Australian Building Codes Board

NCC National Construction Code

3 DEFINITIONS

For the purpose of this Standard, the definitions in ISO 13943, AS 2484.1 and those below apply.

3.1 External wall

The external vertical or near vertical wall system of a building, either structural or non-structural, including the façade, skin and all substrates along with finishes, attachments and cavities.

NOTE: Details such as balconies, windows, window shutters and curtains are not considered in the classification.

3.2 Façade

The external visible face of a building.

3.3 Near vertical

Having an angle of more than 70° from the horizontal.

3.4 Debris

Any material that has fallen from the specimen.

4 CLASSIFICATION TESTING

4.1 General

The fire tests shall be selected in accordance with Clauses 4.2 and 4.3.

4.2 External wall fire tests

External wall fire tests shall be performed according to ISO 13785-2 or BS 8414. When performed to ISO 13785-2, the timber crib described in Annex B Clause B2 of ISO 13785-2:2002 shall be used as the ignition source.

When performed to BS 8414:2015, the timber crib described in Annex A of BS 8414:2015 shall be used as the ignition source and the timber species shall be *pinus silvestris* or *pinus radiata*.

NOTE: Alternative cribs may be used if it can be shown that they have a similar rate of heat release and that they cause a similar level of radiation to fall on the specimen.

4.3 Building-to-building fire tests

Building-to-building fire tests shall be performed in accordance with Appendix C.

5 CLASSIFICATION PROCEDURE

5.1 General

This Clause specifies the fire test methods and criteria for classification of external wall systems.

5.2 Classification of the fire performance of external walls

The reaction-to-fire performance of external walls shall be classified in terms of the following parameters:

(a) External wall (see Table 1):

EW: Meets the external wall classification criteria specified in Clause 5.4.

(b) Building-to-building (see Table 2):

(i) BB80: Meets the building-to-building classification criteria when exposed to 80 kW/m² incident radiant heat.

- (ii) BB40: Meets the building-to-building classification criteria when exposed to 40 kW/m² incident radiant heat.
- (iii) BB20: Meets the building-to-building classification criteria when exposed to 20 kW/m² incident radiant heat.
- (iv) BB10: Meets the building-to-building classification criteria when exposed to 10 kW/m² incident radiant heat.

The fire performance of an external wall system shall be classified in the following format:

FP: [External wall performance]/[Building-to-building performance].

Example: FP: EW/BB40 indicates that the external wall system satisfied the requirements of this Standard when tested to ISO 13785-2 or BS 8414 and when tested in accordance with Appendix C with an imposed incident heat flux of 40 kW/m².

5.3 Test requirements

Test methods, classification criteria and modifications to the procedures or criteria provided in the standard test methods shall be as set out in Tables 1 and 2, and Clause 5.4. Fixing methods for tested assemblies shall replicate proposed on-site fixing methods.

TABLE 1

REQUIREMENTS FOR EXTERNAL WALL PERFORMANCE

Provision	External Wall Performance (EW)
Applicable test methods	ISO 13785-2 or BS 8414
Classification	EW—External wall system shall satisfy classification criteria in Clause 5.4.3 or Clause 5.4.5 as appropriate for the test method
Modification to procedures	Yes. Refer to Clauses 5.4.2 to 5.4.5.

TABLE 2

REQUIREMENTS FOR BUILDING-TO-BUILDING PERFORMANCE

Provision	Building-to-building performance (BB)
Applicable test methods	Appendix C
Classification	BBnn—External wall system shall satisfy classification criteria in Clause 5.4.6 when exposed to nn kW/m ² incident flux for 30 minutes
Modification to procedures	No

5.4 Requirements for classification tests

5.4.1 General

Clauses 5.4.2 to 5.4.6 set out classification criteria and requirements that are in addition to or are variations to the requirements in the nominated standards used for the classification of external walls.

Temperature measurement locations for both ISO 13785-2 and BS 8414-2 tests are shown in Figures 1 to 6.

5.4.2 Specimen configuration for ISO 13785-2 tests

The overall height of the specimen shall be at least 4.3 m above the opening to allow for reliable internal measurements at a height of 4 m above the opening.

The specimen configuration shall contain a wing wall as specified in ISO 13785-2.

The form of construction shall be representative of intended installation including cavities, substrates, fixings and cavity barriers.

Where cavity barriers are part of the external wall system, the specimen shall include cavity barriers installed in accordance with the design specification. Floor levels shall be assumed to occur 0.3 m and 3 m above the opening to establish the position of cavity barriers if the design specification defines the cavity barrier position relative to floor levels. Framing of the opening shall be representative of the intended installation.

If the external wall system to be classified comprises an inner leaf having the fire resistance levels specified by the National Construction Code (NCC) (but not less than $-/30/30$) and satisfying all other NCC fire related criteria for external walls and the external cladding is either directly fixed or fixed by means of a supporting framework, the test shall be performed with the cladding fixed to a representative wall system.

NOTE: A lightweight partition system faced with two 13 mm fire-rated plasterboard sheets may be used to represent the non-combustible inner leaf.

Where the external wall relies on the cladding system to contribute to the performance of the wall system, the entire wall system shall be subject to test.

NOTE: In these circumstances the impact of combustible construction on internal fires and the structural elements lie outside the scope of this Standard.

5.4.3 Classification criteria for ISO 13785-2 tests

All of the following performance criteria shall be satisfied:

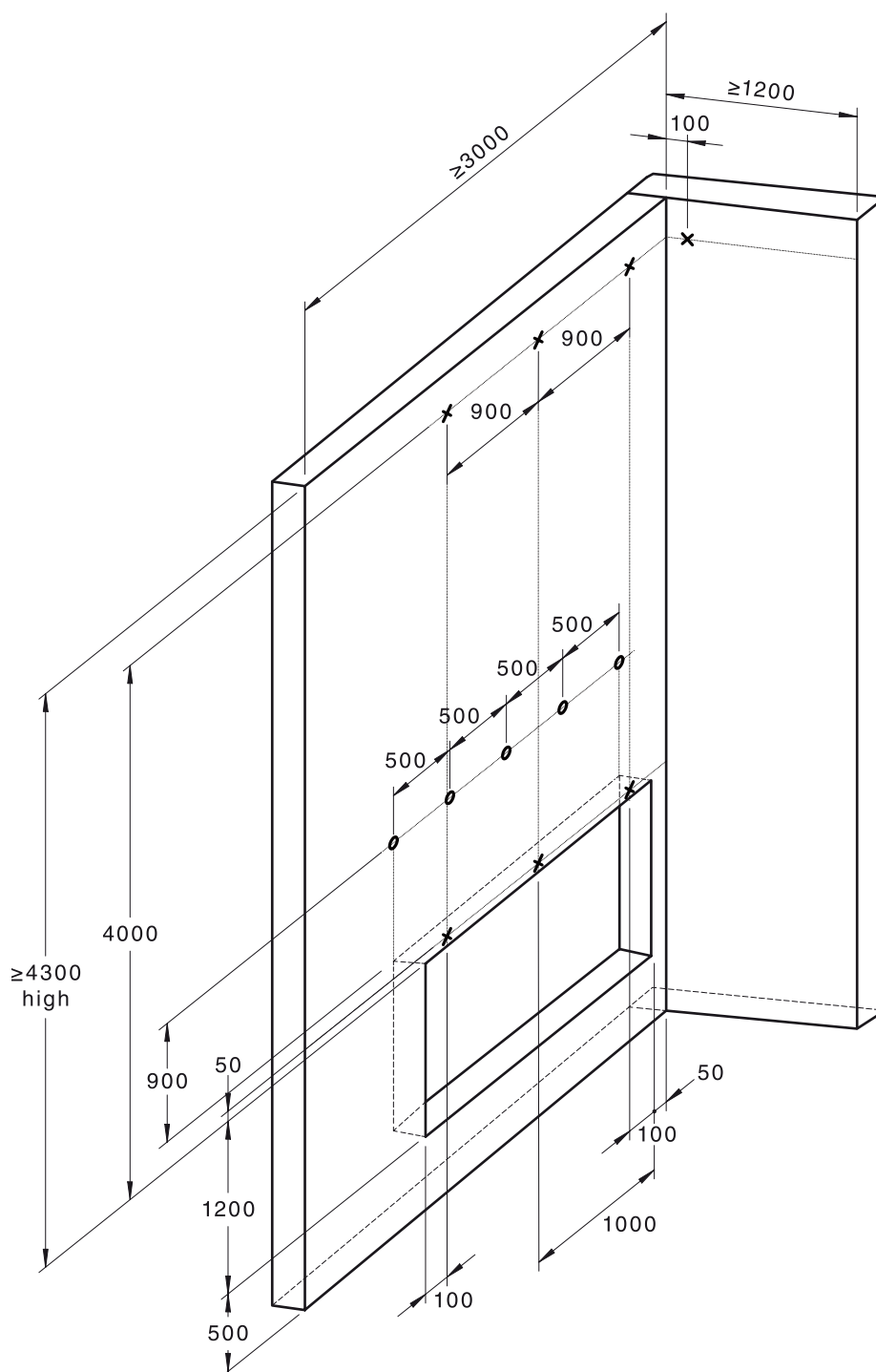
- (a) Temperatures 4 m above the opening measured 10 mm from the exposed specimen face shall not exceed 600°C for a continuous period greater than 30 s.
- (b) Temperatures at the mid-depth of each combustible layer or any cavity 4 m above the opening shall not exceed 250°C for a continuous period greater than 30 s.
- (c) Where the system is attached to a wall that is not required to have an FRL of $-/30/30$ or 30/30/30 or more, the temperature on the unexposed face of the specimen 900 mm above the opening shall not exceed a 180 K rise. Five thermocouples equally spaced at 500 mm centres with insulating pads, fitted in accordance with the requirements of AS 1530.4 for the measurement of surface temperatures shall be used.
- (d) Where the system is attached to wall that is not required to have an FRL of $-/30/30$ or 30/30/30 or more, flaming or the occurrence of openings in the unexposed face of the specimen above the opening shall not occur.
- (e) Flame spread beyond the confines of the specimen in any direction, as determined during the post-test examination, shall not occur. The examination shall include flame damage such as melting, charring but not smoke discolouration or staining of the surface, any intermediate layers and the cavity.

A1 | NOTE: The confines of the specimen is the minimum specimen size specified in the 'Test specimen' clause in ISO 13785-2 except that the height should be in accordance with Clause 5.4.2 in this Standard. The specimen may be constructed larger than the minimum size in which case spread is determined at the positions associated with the minimum specimen size specified by the above-mentioned clauses.

- (f) Continuous flaming on the ground for more than 20 seconds from any debris or molten material from the specimen shall not occur.

A1 | (g) The total mass of debris falling in front of the specimen shall not exceed 2 kg. The mass shall be measured after the end of the test.

The thermocouple locations shall be in accordance with Clause 5.4.3, Items (a) to (c) and Figures 1, 2 or 3, as appropriate.



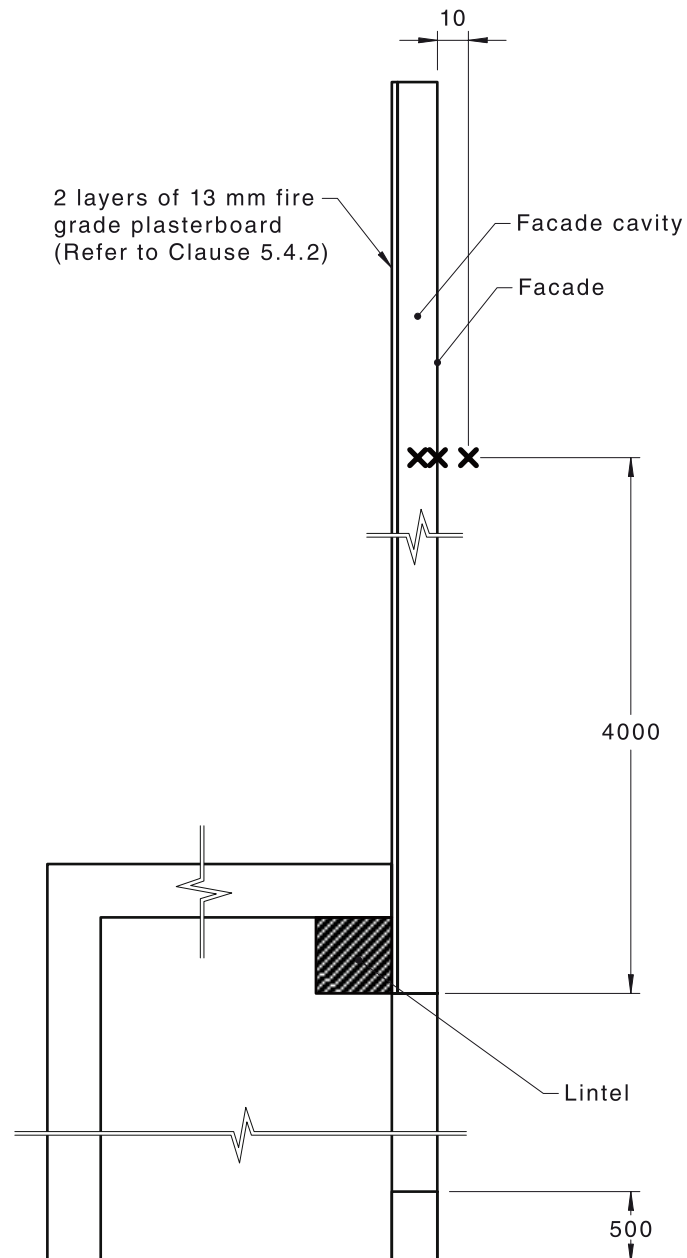
LEGEND:

- ✕ ISO 13785-2 temperature measurement position
- Temperature measurement positions if required by Clause 5.4.3(c)

DIMENSIONS IN MILLIMETRES

This image is reproduced and adapted from ISO 13785-2:2012, Figure 2 Instrumentation in test apparatus. The original version can be found in ISO 13785-2:2012. Copyright in this image remains with ISO.

FIGURE 1 TEMPERATURE MEASUREMENT LOCATIONS FOR TESTS TO ISO 13782-2

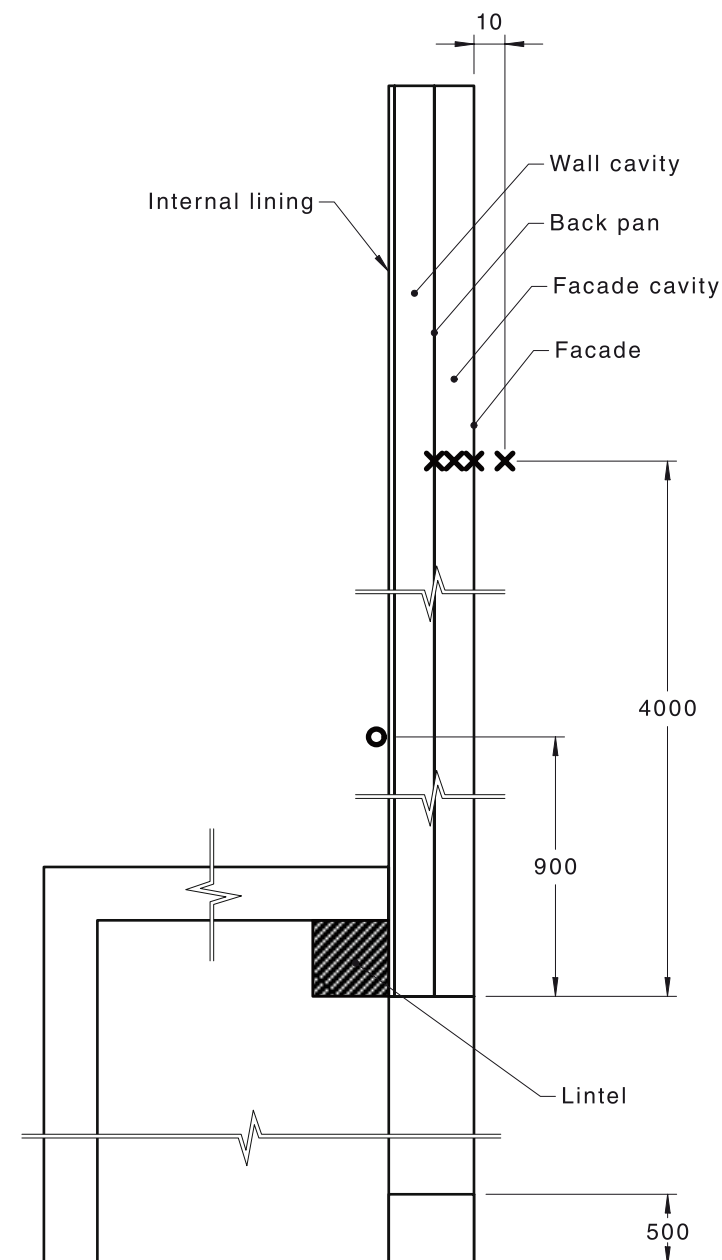


LEGEND:

- ✕ Thermocouples in accordance with ISO 13785-2
 Tolerance on thermocouple locations ± 10
 Dimensions not to scale

DIMENSIONS IN MILLIMETRES

FIGURE 2 EXAMPLE OF TEMPERATURE MEASUREMENT LOCATIONS FOR TESTS TO ISO 13782-2 FOR SPECIMENS OF SYSTEMS REQUIRED TO HAVE AN FRL OF -/30/30, 30/30/30 OR GREATER



LEGEND:

- ✕ Thermocouples in accordance with ISO 13785-2
 - Thermocouples in accordance with Clause 5.4.3(c) if appropriate
- Tolerance on thermocouple locations ± 10
- Dimensions not to scale

DIMENSIONS IN MILLIMETRES

FIGURE 3 EXAMPLE OF TEMPERATURE MEASUREMENT LOCATIONS FOR TESTS TO ISO 13782-2 FOR SPECIMENS OF SYSTEMS NOT REQUIRED TO HAVE AN FRL OF -/30/30, 30/30/30 OR GREATER