BS 8414-2:2020

BSI Standards Publication

Fire performance of external cladding systems

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

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Contents

Summary of pages
This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 16, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 8414 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 April 2020. It was prepared by Technical Committee FSH/21, *Reaction to fire tests*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

BS 8414-2:2020 supersedes BS 8414-2:2015+A1:2017, which is withdrawn.

Relationship with other publications

BS 8414 is published in two parts:

- Part 1: *Test method for non-loadbearing external cladding systems fixed to, and supported by, a masonry substrate*; and
- Part 2: *Test method for non-loadbearing external cladding systems fixed to, and supported by, a structural steel frame*.

Information about this document

This part of BS 8414 was developed from BRE Fire Note 9 [1].

This is a full revision of the standard, and introduces the following principal changes:

- clarification of the scope;
- amendments to Clause **6**; and
- expansion and clarification of Clause **9** and Clause **10**.

This publication can be withdrawn, revised, partially superseded or superseded. Information regarding the status of this publication can be found in the Standards Catalogue on the BSI website at bsigroup.com/standards, or by contacting the Customer Services team.

Where websites and webpages have been cited, they are provided for ease of reference and are correct at the time of publication. The location of a webpage or website, or its contents, cannot be guaranteed.

Hazard warnings

WARNING. This part of BS 8414 calls for the use of substances and/or procedures that might be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Use of this document

It has been assumed in the preparation of this part of BS 8414 that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its methods are expressed as a set of instructions, a description, or in sentences in which the principal auxiliary verb is "shall".

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

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1 Scope

This part of BS 8414 provides a test method for determining the fire performance characteristics of non-loadbearing external cladding systems when fixed to, and supported by, a structural steel frame and exposed to an external fire under controlled conditions. The peak fire exposure is intended to be representative of an external fire source or a fully developed (post-flashover) fire in a room venting from an aperture that exposes the cladding to the effects of external flames.

This part of BS 8414 is solely intended to give an indication of fire spread across or within an external cladding system. The purpose of the test is to provide data to enable evaluation of the fire performance of the components when combined to form a complete cladding system.

This part of BS 8414 does not apply to non-loadbearing external rainscreen overcladding systems or external wall insulation systems applied to the face of a building, the fire testing of which is covered in BS 8414-1.

This part of BS 8414 does not cover the performance of glass or its supporting frame intended for glazed window openings.

This part of BS 8414 does not apply to glazed curtain walling systems.

This part of BS 8414 does not test the total configuration of a construction incorporating additional windows, doors, balconies or ancillary penetrations.

This part of BS 8414 does not cover exposure to radiant heat from a fire in an adjacent building.

NOTE 1 Performance criteria and classification methodology for the external fire performance can be found in references such as Report BR 135 [2].

NOTE 2 Further information on the application of results from BS 8414-2 is given in BS 9414.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes provisions of this document.[1)] For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 60584-1:2013, *Thermocouples – Part 1:EMF specifications and tolerances*

BS EN ISO 13943, *Fire safety – Vocabulary*[2)]

3 Terms and definitions

For the purposes of this part of BS 8414, the terms and definitions given in BS EN ISO 13943 and the following apply.

3.1 cavity barrier

any construction provided to seal a cavity against the penetration of fire and smoke or to restrict its movement within the cavity

3.2 collapse

any part of the cladding system which falls away and becomes detached

1) Documents that are referred to solely in an informative manner are listed in the Bibliography.
2) This standard also gives an informative reference to BS EN ISO 13943:2017.

3.3 damaged area

total of those surface areas which have been affected permanently by fire under specified conditions

[SOURCE: BS EN ISO 13943:2017, **3.72**]

NOTE 1 Area is expressed as a percentage.

NOTE 2 Users of this term should specify the types of damage to be considered. This could include loss of material, deformation, softening, melting, charring, combustion, pyrolysis or chemical attack.

3.4 external cladding system

complete cladding assembly

NOTE 1 This includes sheeting rails, brackets, fixings, cavities, insulation, cladding panels membranes, vapour control layers, coatings, flashings, cavity barriers/firebreaks, cavity trays, weep/drainage holes, joints, sealants, thermal breaks, etc.

NOTE 2 The limits of the cladding system are taken to be from the external weathering surface to the internal finished face of the structural frame.

3.5 firebreak

non-loadbearing vertically or horizontally oriented element designed to restrict fire spread within one or more layers of an external cladding system

3.6 level 1

2 500 mm above the top of the combustion chamber opening in the test apparatus

3.7 level 2

5 000 mm above the top of the combustion chamber opening in the test apparatus

3.8 level 3

7 500 mm above the top of the combustion chamber opening in the test apparatus

3.9 start temperature, T_s

mean temperature of the thermocouples at level 1 during the 5 min prior to ignition of the heat source

3.10 start time, t_s

time when the temperature recorded by any external thermocouple at level 1 equals or exceeds a 200 °C temperature rise above T_s and remains above this value for at least 30 s

4 Principle

In this test, the external cladding system is fixed to, and supported by, a structural steel frame in the form of a main face together with a perpendicular side wing, with the cladding system attached in the manner specified by the test sponsor. At the base of the vertical system, an opening is provided through which the fire can vent.

The test method is designed to provide benchmarking data to enable the classification of the non-loadbearing external cladding system. The extent of damage caused to the external cladding system is recorded, particularly the ability of the external cladding system to resist the propagation of the fire upwards or penetration through the system. Any falling debris and fire penetration are recorded.

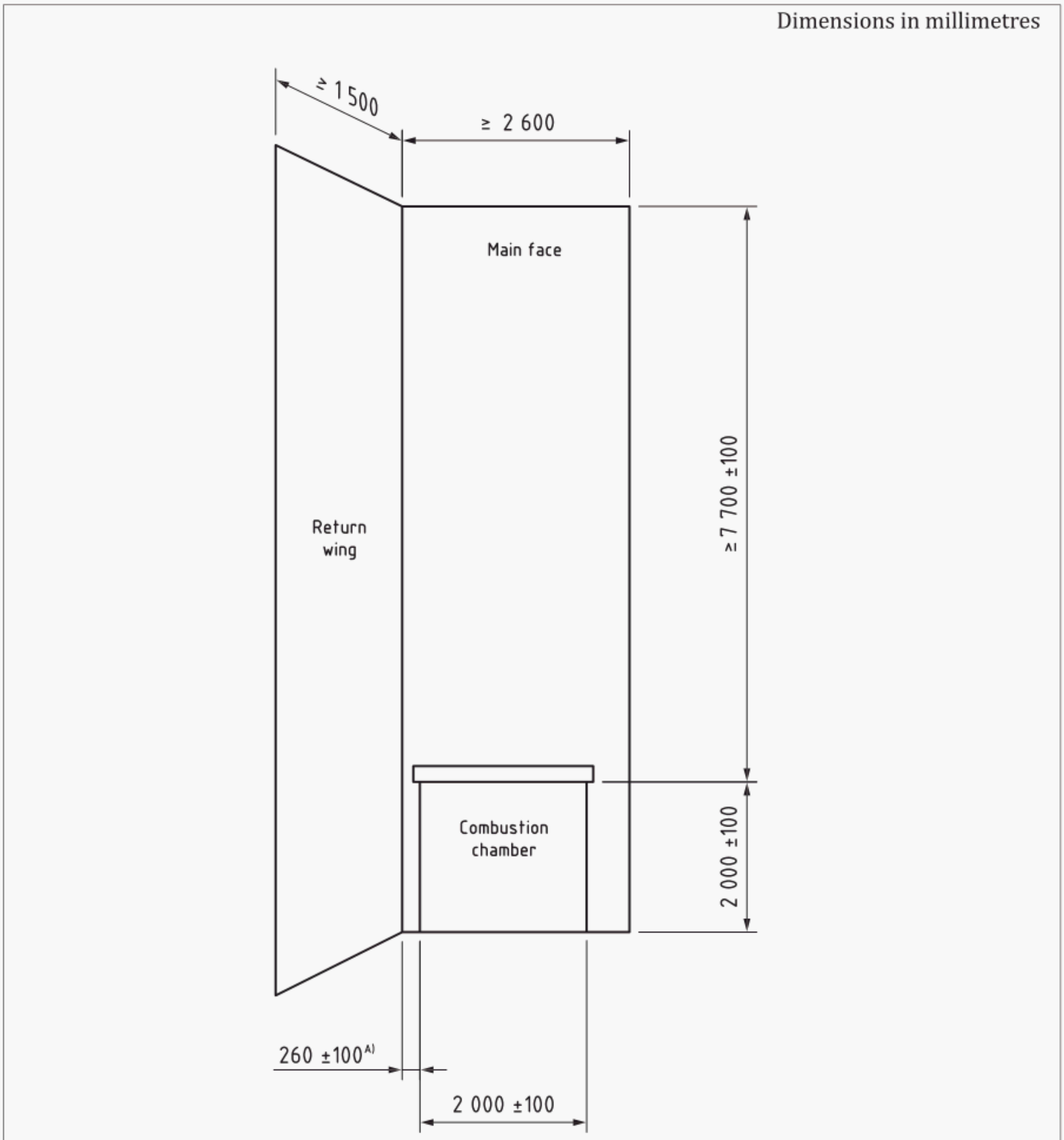
5 Test apparatus

5.1 General

The test apparatus shall utilize a vertical structural steel test frame (5.2), representative of a structural steel-framed building, with a vertical main test apparatus wall (5.3) and a vertical return wall (wing) (5.4) at a 90° angle to, and at one side of, the main test wall. The main wall shall be provided with a combustion chamber (5.5). In addition to supporting the weight of the test specimen, the test apparatus shall be capable of enduring the effects of the test procedure without itself suffering undue damage or distortion.

NOTE An example of a typical test apparatus is shown in Figure 1.

Figure 1 — *Schematic of test apparatus*



A) From the finished face of the specimen under test applied to the return wing.

5.2 Structural steel test frame

The structural steel test frame shall be designed and constructed to withstand the expected loading imposed by the system under test and any subsequent distortions that can occur during the test programme. All details shall be recorded.

NOTE Annex B shows a typical structural steel test frame (see Figure B.1). The test specimen installation might need modification of, or additions to, an existing base test frame.

5.3 Main test apparatus wall (main face)

The main test apparatus wall onto which the test specimen is applied shall be:

a) vertical, extending (7 700 ±100) mm above the top of the combustion chamber opening; and

b) at least 2 600 mm wide.

5.4 Return wall (wing)

The return test apparatus (wing) wall onto which the test specimen is applied shall be:

a) vertical, of the same height as the main test wall;

b) at least 1 500 mm wide; and

c) perpendicular to the main test apparatus wall.

5.5 Combustion chamber

The combustion chamber shall be constructed in accordance with the dimensions shown in Figure 1, including the provision of a robust lintel across the head of the chamber opening and a solid platform able to support the heat source. The combustion chamber shall be capable of enduring the effects of the test procedure without itself suffering undue damage or distortion.

NOTE A nominal cross-section of 200 mm × 200 mm produced from C25/30 grade concrete has been found to produce a suitable lintel.

The combustion chamber shall be positioned at the base of the vertical main test apparatus wall and fully sealed to prevent air ingress, except for an opening such that the fire can project through the opening at the base of the vertical main test apparatus wall.

The top of the chamber opening shall be (2 000 ±100) mm above the base of the test facility and shall be (2 000 ±100) mm wide.

A distance of (260 ±100) mm shall be allowed from the side of the opening of the combustion chamber to the finished face of the test specimen under test (see Figure 1). A timber crib heat source (**5.6**) shall be installed within the combustion chamber.

5.6 Timber crib heat source

The timber crib heat source shall be as specified in Annex A.

5.7 Thermocouples

5.7.1 General

All thermocouples shall conform to BS EN 60584-1:2013, Type K (Chromel/Alumel). The thermocouples shall be mineral insulated and have a 1.5 mm (nominal) diameter with insulated junctions. At each specified level, temperatures shall be monitored using thermocouples positioned in accordance with **5.7.2** and **5.7.3**.

5.7.2 External thermocouples

5.7.2.1 General

External thermocouples shall be positioned to a tolerance of ±10 mm with the hot junction positioned (50 ±5) mm in front of the face of the test specimen.

5.7.2.2 External thermocouples at levels 1, 2 and 3

External thermocouples shall be located at levels 1, 2 and 3 on the test specimen as follows (see Figure 2).

a) Thermocouples shall be positioned in front of the main test wall face on the centre line and at 500 mm and 1 000 mm each side of the centre line of the combustion chamber (five locations).

b) Thermocouples shall be positioned in front of the wing test wall face, at 150 mm, 600 mm and 1 050 mm from the finished face of the main test wall face (three locations).

NOTE Levels 1, 2 and 3 are meant to represent floor spacing in a building. The results obtained from levels at the distances above the combustion chamber opening stipulated in Figure 2 are valid for greater floor separation distances.

5.7.3 Internal thermocouples

5.7.3.1 General

Internal thermocouples shall be positioned at level 2 and level 3 only to a tolerance of ±10 mm in accordance with **5.7.3.2** and Figure 2 and clear of any cavity barrier.

NOTE For cases where the cavity barrier coincides with thermocouples at level 3 (i.e. 7 500 mm above the top of the combustion chamber), the edge of the slab should be moved downwards to allow the cavity barrier to be fixed at least 50 mm below the thermocouples.

They shall be positioned at the mid-point of each layer and cavity with a depth ≥10 mm.

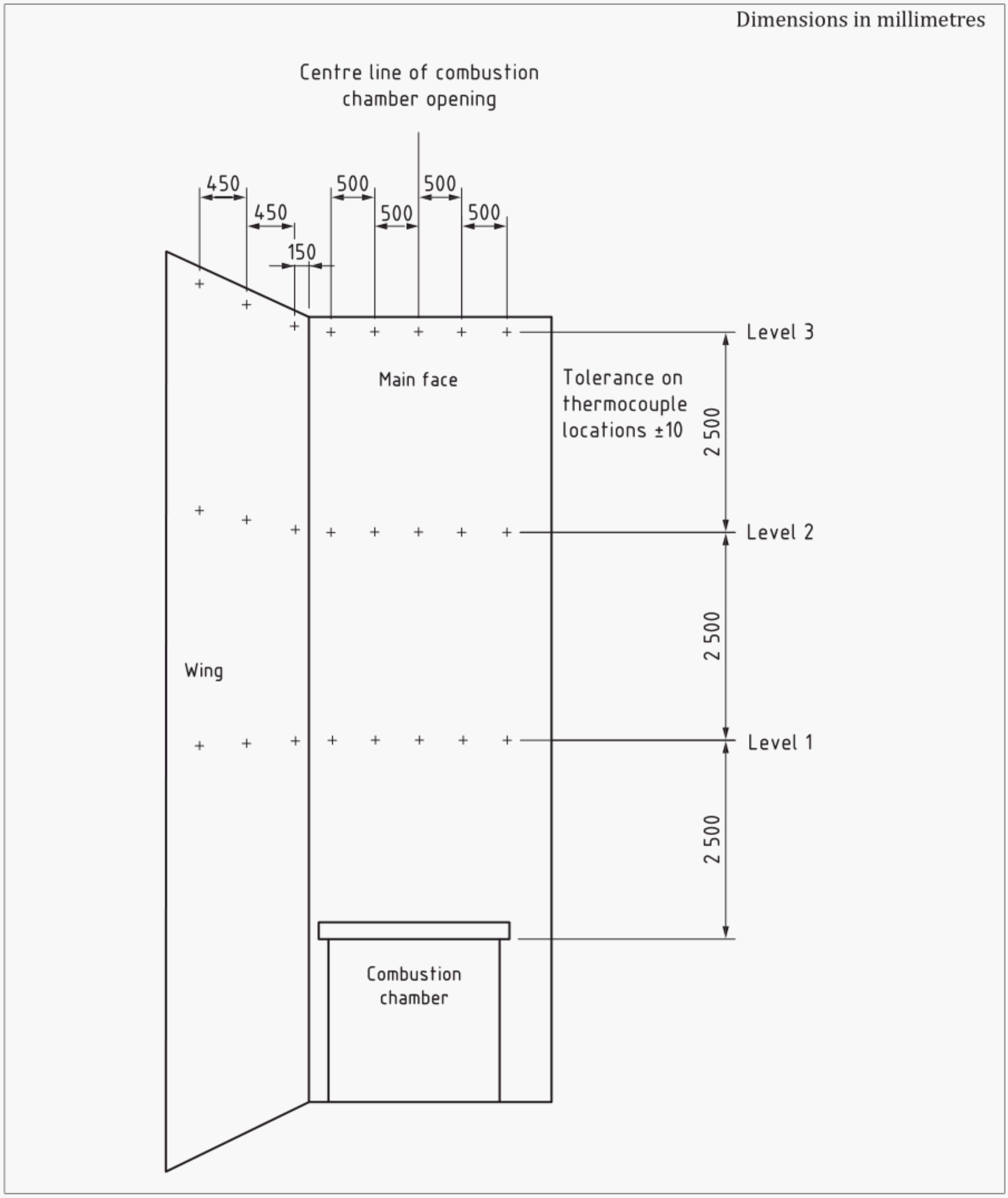
5.7.3.2 Internal thermocouples location

Internal thermocouples at level 2 and level 3 of the test specimen shall be located as follows (see Figure 2).

a) Thermocouples shall be positioned within each layer of the main test wall face on the centre line and at 500 mm and 1 000 mm each side of the centre line of the combustion chamber (five locations).

b) Thermocouples shall be positioned within each layer of the wing test wall face, at 150 mm, 600 mm and 1 050 mm from the finished face of the main test wall face (three locations).

Figure 2 — *Location of thermocouples for a cladding test*



5.8 Early test termination reference line

A reference line shall be drawn horizontally across the main face and wing at level 3 to aid in observation of the vertical flame spread for the purposes of early test termination criteria (see **8.6**).

5.9 Data acquisition system

A data acquisition system capable of recording data at 10 s intervals shall be connected to the instruments.

5.10 Audio-visual equipment

A continuous audio-visual record of the full height of both external test faces shall be taken throughout the period of the test. The recording shall capture the full duration of the test and record full details of fire spread and mechanical performance in such detail that a full evaluation of the system performance is possible. The quality of the recording shall be such that it enables the extraction of clear still images.

Both the external and innermost faces of the test specimen shall be monitored.

5.11 Environmental test condition monitoring equipment

Equipment for monitoring wind speed, such as an anemometer, shall have an accuracy of ±0.1 m/s for measuring the ambient air velocity.

5.12 Timing device

The timing device used, such as a clock, shall have an accuracy of greater than 5 s/h.

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6 Test specimen

6.1 General

A test specimen shall be obtained from the test sponsor which:

a) is representative of the intended end use design and consists of all relevant components of the intended specification;

b) references the associated component manufacturer's design specification and installation details; and

c) is assembled and installed in accordance with the test sponsor's instructions, as would be expected in practice.

NOTE 1 All components provided by the test sponsor are considered part of the test specimen.

NOTE 2 It is the responsibility of the test sponsor to inform the test laboratory of any variations to the manufacturer's design specification and installation details. It is expected that any deviation from a manufacturer's design specification and installation details would be highlighted by the test sponsor and recorded in the test report.

6.2 Dimensions and details of the test specimen

NOTE 1 The maximum thickness of the system is effectively limited only by the relevant steel test frame design (see Annex B).

The test specimen shall extend horizontally from the finished internal corner between the main face and the wing for a distance of at least 2 400 mm on the main face and a distance of at least 1 200 mm on the wing. The test specimen shall extend from the base of the test apparatus to a height of (7 700 ±100) mm above the top of the combustion chamber opening on both the main face and the wing. The test specimen shall not obstruct the combustion chamber opening.

The perimeter of the cladding system around the combustion chamber shall incorporate products, details and components that are as intended for the closure of the aperture and associated cavities in the end use design.

NOTE 2 Examples of components include membranes, window frames [including batons, fixings, polyurethane (builder's) foam] and cavity barriers/firebreaks.

If the external cladding system is not intended to offer any protection to openings in practice, the interface between the test specimen and the combustion chamber shall remain unprotected.

Edge detailing and terminations shall be as intended for the end use design, and shall be recorded.

If horizontal joints (including expansion and movement joints) are incorporated into the external wall cladding system, the test specimen shall incorporate horizontal joints at intervals specified by the test sponsor, which are as intended for the end use application. Where horizontal joints are incorporated into the external wall cladding system, at least one joint shall be placed (2 400 ±100) mm above the combustion chamber opening.

If vertical joints (including expansion and movement joints) are incorporated into the external wall cladding system, the test specimen shall incorporate vertical joints at intervals specified by the test sponsor, which are as intended for the end use application. Where vertical joints are incorporated into the external wall cladding system, at least one joint shall extend upwards within a tolerance of ±100 mm on the centre line of the combustion chamber opening.

If horizontal cavity barriers/firebreaks are incorporated into the external cladding system, the test specimen shall be constructed such that the vertical distance between the cavity barriers/firebreaks and the horizontal joints in the cladding system is as intended for the end use design.

If horizontal cavity barriers/firebreaks are incorporated into the external cladding system, the test specimen shall be constructed such that vertical distance between the cavity barriers/firebreaks within the cladding system below the thermocouples is as intended for the vertical distance between the cavity barriers/firebreaks and the floor levels in the end use design.

If vertical cavity barriers/firebreaks form a part of the intended system design, they shall be included in the test specimen at the separation distances recommended by the test sponsor reflecting the end use design.

If vertical cavity barriers/firebreaks do not form a part of the intended system design, they shall not be incorporated in the test specimen. In such cases, the only vertical fire stopping shall be that around the combustion chamber opening.

Details and performance characteristics of products and components used in the test specimen shall be recorded and kept on file by the test laboratory for future reference.

Where it is impracticable to measure a particular characteristic performance, the information shall be sought from the test sponsor.

7 Conditioning

After application of the test specimen to the test apparatus, it shall be left for a period of time to allow all components to cure in accordance with the test sponsor's installation specifications.

The test apparatus shall be protected from adverse environmental conditions such as water, windload and ambient temperatures outside the range −5 °C to +40 °C during the application, curing and test period.

8 Procedure

8.1 Environmental test conditions

The following conditions shall be met, at least 5 min prior to the intended ignition of the fuel source, before the test can commence.

a) The ambient temperature shall be within the range (20±15) °C taken from the mean values of thermocouples at level 1.

b) The air velocity in any direction at level 2 when measured (1 000 ±10) mm forward from the centre line of the combustion chamber opening shall not exceed 2 m/s.

c) For tests conducted outdoors, no fog or precipitation shall be present.

8.2 Data acquisition

The data acquisition and audio-visual records shall commence at least 5 min prior to ignition of the fuel source.

8.3 Fuel source

At least 5 min after the start of the data acquisition, the fuel source shall be ignited, as described in Annex A.

8.4 Test observations

The times of significant events such as the change of flaming conditions and any change in the mechanical behaviour of the cladding system shall be recorded throughout the duration of the test, especially the detachment of any part of the cladding system (whether flaming or otherwise) or any penetrations of fire through the cladding system.

The cladding system shall be examined and the following recorded.

a) Mechanical damage: extent of damage (both vertically and horizontally):

   1) flaming debris; and

   2) non-flaming debris.

The quantity of debris on floor shall be recorded by a photograph(s) taken at 29 min 50 s after ignition (see **A.2.5**), immediately before the heat source is extinguished.

b) Observed combustion: extent of flame spread over the surface of the cladding system (both vertically and horizontally, on both faces of the test rig):

   1) during the test; and

   2) after the crib has been extinguished.

8.5 Test duration

The test duration shall be 60 min. The heat source shall be extinguished 30 min after ignition (see **A.2.5**). Data and audio-visual records shall continue to be recorded throughout the duration of the test.

8.6 Early test termination criteria

The test shall be terminated and the details recorded if:

a) flame spread extends above the reference line at level 3 (see **5.8**) at any time during the test duration (see **8.5**); or

b) there is a risk to the safety of personnel or impending damage to equipment, including flame penetration.

9 Post-test examination

Visual inspection shall be undertaken as soon after the test as practicable but within a maximum of 24 h of the test. The cladding system shall be stripped, and intermediate layers inspected and photographed. The visual inspection shall address damage, such as field of debris, spalling, melting,

deformation and delamination, but not smoke staining or discolouration. The following features shall be included and recorded in the examination (some dismantling of the system might be necessary):

a) system damage (% area): extent of damage (both vertically and horizontally):
   1) external rainscreen/façade face;
   2) combustion chamber surround; and
   3) collapse of any part of the system.

b) extent of flame spread or damage within the cavity, if present (both vertically and horizontally):
   1) cavity barriers/firebreaks (including activation of any intumescent element);
   2) vertical;
   3) horizontal; and
   4) charred insulation layer.

c) for all elements and individual components of the system, observations intended to quantify the extent of flame spread (both vertically and horizontally) within intermediate layers of the system and damage to any part of the system, including:
   1) rainscreen/façade;
   2) sheathing board;
   3) support rails;
   4) membrane;
   5) SFS (structural framing system) frame; and
   6) SFS frame insulation.

10 Test report

The test report shall include the following information:

a) the name and address of the test laboratory and its accreditation and/or Notified Body number where appropriate;

b) the date and identification number of the test report;

c) the name and address of the sponsor;

d) the unique reference number of the test;

e) the name of the manufacturer (if applicable or where it is not the test sponsor) of the system under test;

f) a statement concerning the test laboratory's involvement in the selection of the test specimen;

g) all products and components used in the construction of the test specimen, together with identification marks and trade names. The test report shall include the details of any variations to the manufacturer's design specification and installation details that have been notified to the test laboratory. Where applicable, the component description shall include refence to data sheets and/or information regarding material type, fire performance classifications;

h) details of the structural steel test frame;

i) the construction details of the test specimen (including description, drawings and components) and position and frequency of use (including details such as size of gaps between panels, location and spacing of cavity barriers/firebreaks, location of supports, brackets and fixings). The floor

level heights and corresponding cavity barriers/firebreaks shall be clearly documented. The description and drawings which are included in the test report shall, as far as practicable, be based on information provided by the sponsor and verified by a survey (including photographs and/or video) of the test specimen conducted by the test laboratory. When full and detailed drawings are not produced by the test laboratory to be included in the test report, then the sponsor's drawing(s) of the test specimen shall be authenticated by the test laboratory and at least one copy of the authenticated drawing(s) shall be included in the report, together with a statement that the drawings are those provided by the sponsor;

j) the date of and method of assembly and installation of the test specimen, together with a record of the relationship between the test sponsor and the installation team(s);

k) details of pre-test conditioning of the test specimen;

l) identification of the measurement instrumentation and locations on or within the test specimen;

m) the environmental test conditions at the commencement of the test;

n) the times of all significant events (reported in minutes and seconds following ignition) such as changes of flaming conditions and mechanical response (behaviour) of the cladding system;

o) a record of visual observations made during the test (supplemented by photographic records), including vertical and lateral flame spread on all visible faces of, and where practicable within, the test specimen and any mechanical response (behaviour) of components of the system;

NOTE 1 Flame spread includes:

- *extent of flames over the surface of the cladding system (both vertically and horizontally);*
- *extent of flame spread and damage within any intermediate layers (both vertically and horizontally) and;*
- *estimate of flame spread and damage within the cavity, if present (both vertically and horizontally).*

NOTE 2 Mechanical response (behaviour) includes: the extent to which the external face of the cladding system has burnt away, detachment (collapse or partial collapse) of any part of the cladding system (whether flaming or otherwise) and any penetrations of fire through the cladding system.

*NOTE 3 Collapse or partial collapse of the cladding system is defined in **3.2**.*

n) post-test examination details. Following extinguishment and cooling of the ignition source, any damage to the test specimen such as spalling, melting, deformation and delamination, but excluding smoke staining or discolouration, shall be examined and recorded;

NOTE 4 Some dismantling of the system may be necessary for this purpose.

*NOTE 5 The extent of damaged area is defined in **3.3**.*

o) tabular and/or graphical depiction of the output from all thermocouples; and

NOTE 6 When plotting the temperature profiles, the origin of the time axis should be the start time, t_s.

p) any deviations from the procedure or any operations regarded as optional.

Annex A (normative)
Timber crib source

A.1 Apparatus

A.1.1 *Softwood sticks*, of *Pinus silvestris*. They shall be sawn and of square section of side (50 ±2) mm and lengths of (1 500 ±5) mm and (1 000 ±5) mm. The density of the wood shall be in the range of 400 kg/m^3 to 650 kg/m^3. At the time of test, the softwood shall have a moisture content in the range of 10% to 15% by mass.

NOTE The use of a moisture meter is deemed acceptable where the calibration of the unit includes comparing the accuracy of the unit with a sample of wood that has had the moisture content determined in accordance with BS EN 13183-1.

A.1.2 *16 strips of low-density fibreboard*, having nominal dimensions of (25 × 12 × 1 000) mm.

A.2 Procedure

A.2.1 Construct a timber crib nominally 1 500 mm × 1 000 mm in plane and 1 000 mm high of softwood sticks. Construct the crib of alternate layers of long and short sticks, with the first layer consisting of 10 long sticks of 1 500 mm. The next layer shall consist of 15 short sticks evenly distributed to cover an area of 1 500 mm × 1 000 mm.

A.2.2 Repeat this process to give a total of 20 layers of sticks, giving the crib a nominal height of 1 000 mm. In total, use 150 short sticks and 100 long sticks.

A.2.3 Construct the crib on a solid platform positioned (400 ±50) mm above the floor of the combustion chamber. Locate the crib centrally in the combustion chamber and displaced (100 ±10) mm from the back wall of the chamber (see Figure A.1).

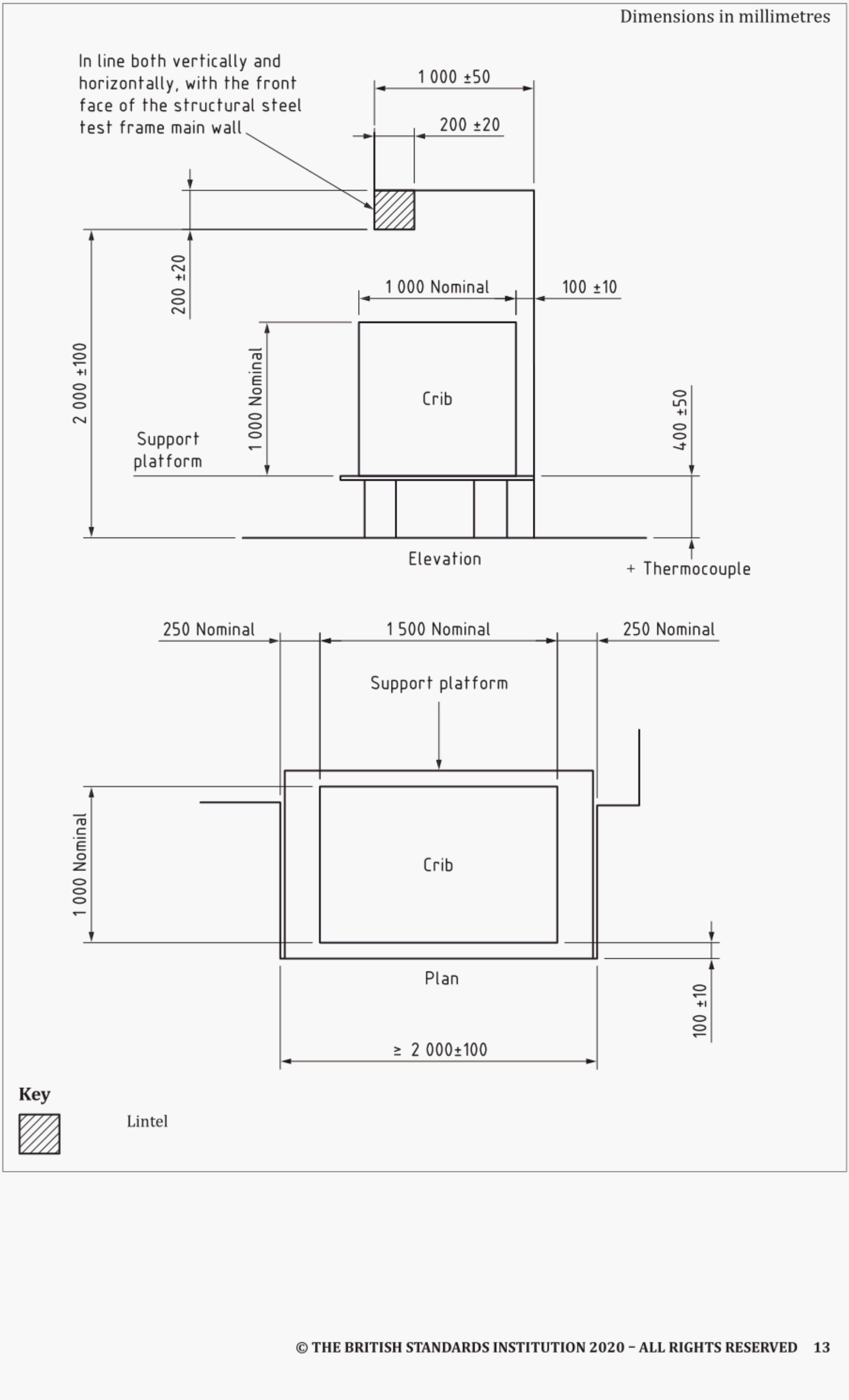
A.2.4 Ignite the crib using 16 strips of low-density fibreboard. Soak the strips uniformly for a minimum of 5 min with 5 L of white spirit. Not more than 5 min before ignition, insert 14 strips into the spaces between the timber sticks in the second layer of the crib (i.e. 50 mm above the platform) allowing approximately 30 mm to project from the front of the crib. Place the remaining two strips horizontally across the 14 projected strip ends. Ignite only these two horizontal strips across their full length.

NOTE This heat source releases a nominal total heat output of 4 500 MJ over 30 min at a peak rate of (3 ±0.5) MW.

A.2.5 When the crib is extinguished 30 min after ignition, the minimum practicable quantity of extinguishing agent shall be used, to reduce the impact of any residual burning of the test specimen.

NOTE It has been found that dispersion and damping of the heat source is suitable.

Figure A.1 — *Side elevation and plan of the combustion chamber and position of crib (fire load)*



Annex B (informative)
An example of a structural steel test frame

Table B.1 gives details of a typical structural steel test frame.

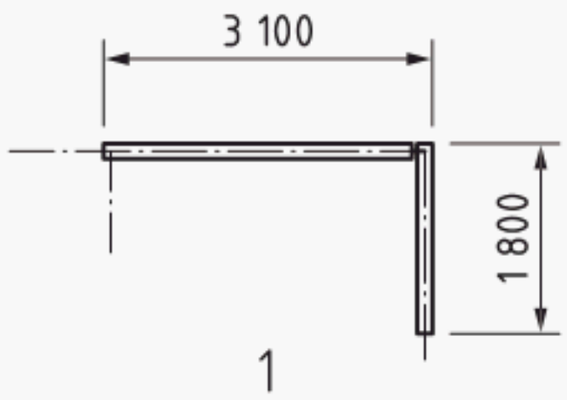
Figure B.1 shows a typical test frame design (see **5.2**).

Table B.1 — *Section details*

Section in Figure B.1	Nominal detail	Mass per unit length
		Kg/m
A	254 × 146 × 11 universal beam	37.0
B	150 × 150 × 6.3 steel hollow section	28.3
C	127 × 64 × 9 pre-formed channel	14.9
D	80 × 80 × 6 rolled steel angle	9.63

Figure B.1 — *Example of a steel test frame*

All dimensions are nominal



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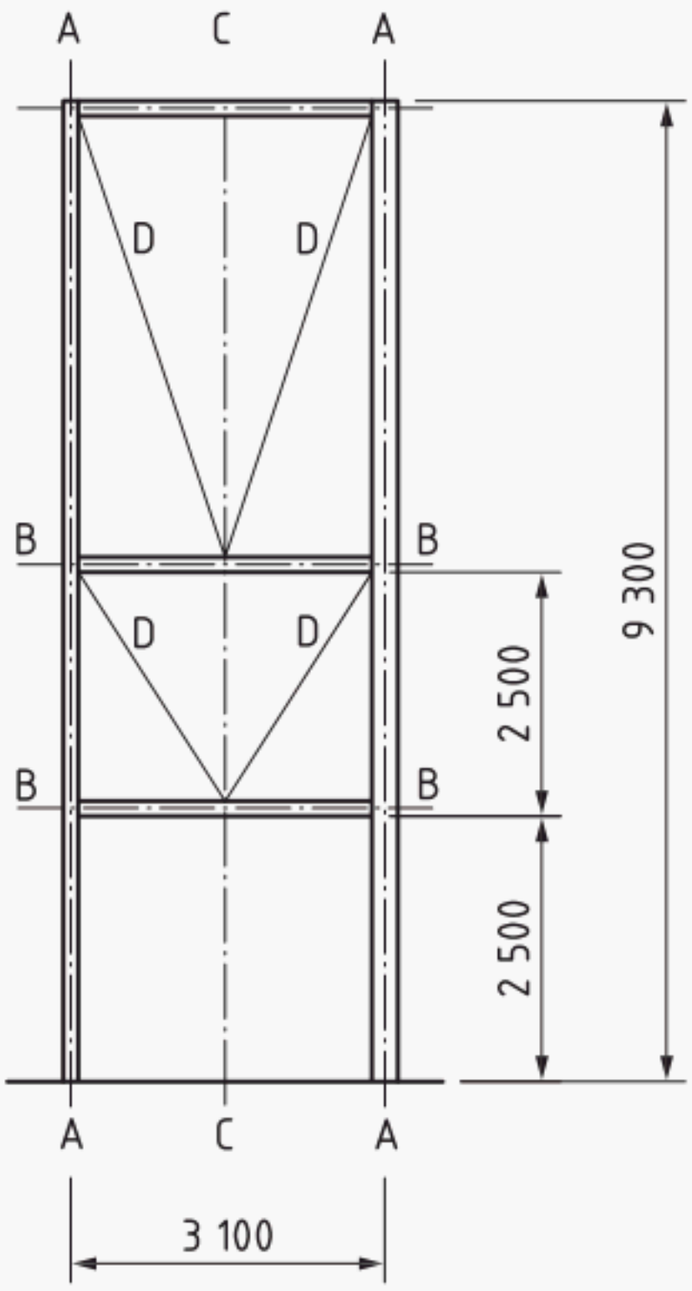

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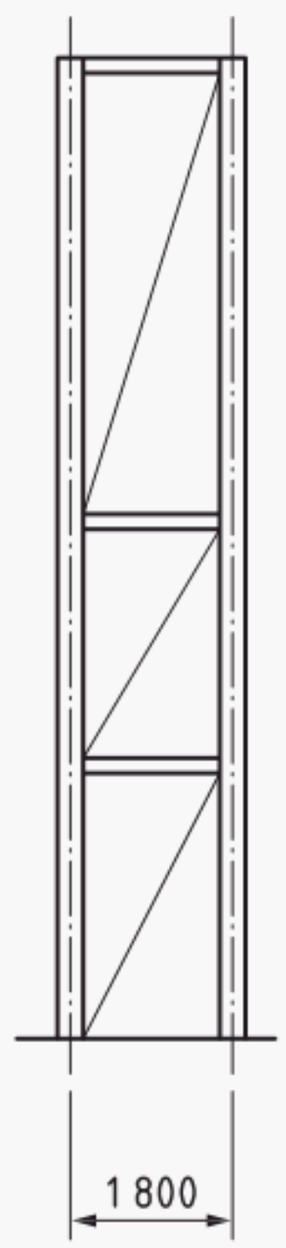

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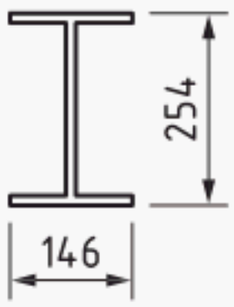
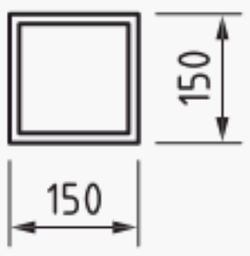


Section A



Section B

Section C

Section D

Key

1 Plan
2 Front elevation
3 Side elevation

NOTE Details of the steel sections are given in Table B.1.

Bibliography

Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 8414-1, *Fire performance of external cladding systems – Part 1: Test method for non-loadbearing external cladding systems fixed to, and supported by, a masonry substrate*

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