

Loss Prevention Standard

LPS 1181 Part 1: Issue 1.2

Series of fire growth tests for LPCB approval and listing of construction product systems

Part one: Requirements and tests for built up cladding and sandwich panel systems for use as the external envelope of buildings

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PARTICIPATING ORGANISATIONS

This standard was prepared by Expert Group D and approved by the LPC Fire and Security Board of BRE Global Ltd. The following organisations participated in the preparation of this standard:-

Association of British Insurers
 Association of Chief Police Officers
 Association for Specialist Fire Protection
 British Fire Protection Systems Association
 British Rigid Urethane Foam Manufacturer's Association
 British Security Industry Association
 Chief & Assistant Chief Fire Officers Association
 Confederation of British Industry
 Department of the Environment
 Door & Shutter Manufacturers Association
 Electrical Contractors Association
 EURISOL UK Mineral Wool Association
 Glass & Glazing Federation
 Health & Safety Executive
 Heating Ventilating & Air Conditioning Manufacturers Association
 Intumescent Fire Seals Association
 National Council for Building Material Producers
 National Prefabricated Building Association
 Office of the Deputy Prime Minister
 Risk Engineering Data Exchange Group
 Royal Institution of Chartered Surveyors
 Smoke Ventilation Association

REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 25)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

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FOREWORD

This standard identifies the evaluation and testing practices for the LPCB approval and listing of products. LPCB Listing of life safety and security products for inclusion in the “Red Book” is based on the following

- i. Satisfactory product performance during testing and audit testing
- ii. Satisfactory product construction
- iii. Satisfactory manufacturing processes
- iv. Satisfactory product service experience.

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to “the Technical Director” at enquiries@breglobal.co.uk.

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Listed products and services appear in the LPCB “List of Approved Products and Services” which may be viewed on our website: www.redbooklive.com or by downloading the LPCB Red Book App from the App Store (for iPhone and iPad), from Google Play (for Android devices) or from the Windows Store (for Windows 8 Phones and Tablets from 2014).

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1 SCOPE

This document stipulates the test, performance and installation/set-up requirements for composite cladding products including sandwich panels and built-up systems for compliance with the LPC Design Guide for the Fire Protection of Buildings. It is appropriate for the claddings (built up systems or sandwich panels) used for the external envelope of all types of industrial buildings.

Sandwich panels or wall and ceiling lining systems used internally in a building (i.e. systems that are not part of the external cladding), that are self-supporting or supported externally, are covered in LPS 1181: Part 2.

The LPS1181 test is a determination of the fire growth performance of the cladding products used. The performance relates only to the combination tested, i.e. the wall and roof panels, including the composition of the panels, the joint details and the detailing at eaves, corners etc.

If a test is required to determine the performance of only a wall panel or a roof panel, the panel not being assessed shall be an LPCB approved product of similar insulation level (i.e. similar U-values) and shall have the same type of core material. Alternatively, another arrangement for the non-test panels may be agreed by LPCB. Limiting conditions applicable to the listing of the panel being tested may be set because of the combination being tested. The test arrangement and any limiting conditions shall be agreed in writing by LPCB and the panel manufacturer before testing commences. Details of test arrangements must be provided and approved by LPCB prior to the provision of the LPCB quotation for product approval.

Note:- This document does not address requirements for the quality of how these products are to be installed in buildings. Quality of Installation requirements will be addressed in a separate standard.

2 DEFINITIONS

2.1 Built-up Cladding Systems

Composite cladding systems comprise a combination of materials fixed to the outside of industrial type buildings to provide the external finish, vapour barriers, thermal insulation and internal lining which are assembled on site from individual components.

2.2 Sandwich panels

Factory produced building product consisting of two metal faces positioned on either side of a core that is a thermally insulating material, which is firmly bonded to both faces so that the three components act compositely when under load.

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2.3 Surface linings

For the purposes of this standard, the surface lining may either be the interior metal facing on a sandwich panel or the interior lining of a built-up cladding product.

2.4 Surface finish

Painted or coating applied to outer metal face of a sandwich panel or to the interior lining of the external wall.

2.5 Burning

For the purposes of this standard, this covers both flaming and smouldering.

2.6 Crib fire area

This is the area of the walls and ceiling which is in the perimeter shown in appendix D and in which area the criterion for internal surface flaming, concealed burning, burning brands and extent of damage do not apply.

2.7 Reaction to fire

The response of a product in contributing by its own decomposition to a fire to which it is exposed, under specified conditions. This property shall be defined by the results of LPS testing such as to LPS1181.

2.8 Fire resistance

The ability of an element of a construction to withstand exposure to a standard temperature/time and pressure regime without loss of its fire separating function (integrity and insulation) or loadbearing capacity or both for a given time. Requirements are as defined in LPS1208.

3 PRODUCT SPECIFICATION

The manufacturer of the system shall supply the following information in English in their application for approval:

- 3.1** Details of the range of heights, widths and thicknesses in which the panels or built-up cladding are supplied for normal use.
- 3.2** Details of the type of insulation and lining (built-up systems) or insulating core (sandwich panels) used and its important physical characteristics, including precise details of the composition of the insulation.

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In order to characterise the insulation material, the requirements given in 4.2.2.11 shall be met. This test data is required for quality control purposes to allow checking of the consistency of the insulation material.

Relevant reaction to fire data to provide well-documented evidence on the materials behaviour under fire conditions may also be supplied.

Slight variations in the insulating material from what is tested are covered in appendix A.

- 3.3** Details of the surface finishing material, including thickness and coating specification.
- 3.4** Fully dimensioned details of the joint system and recommended supporting system, including a full specification of the individual components. Where alternative joint systems are available, these should be separately detailed.
- 3.5** Details of all other components used to assemble the panels or built-up cladding and details of the spacing of the rails and purlins for both walls and roofs.

4 REQUIREMENTS

This revised standard provides for two main grades of products:

Grade EXT-A: A product that satisfies the requirements for both ‘fire resistance’ (e.g. LPS1208) and ‘reaction to fire’ test (i.e. LPS1181 Part 1). This is further sub-divided as shown in appendix B.

Grade EXT-B: A product that satisfies the ‘reaction to fire’ requirements (LPS1181 Part1) only.

4.1 Fire resistance

4.1.1 General

Composite cladding constructions that require to be graded EXT-A shall be subjected to the requirements described in LPS 1208, “LPCB Fire resistance requirements for elements of construction used to provide compartmentation”. For life safety they shall achieve a fire resistance of at least 30 minutes with respect to integrity and 15 minutes with respect to insulation for building regulations (any part 1000mm or more from the relevant boundary, exposure from inside building). For insurance requirements, see appendix B for further details.

To ensure that the maximum field of application can be allowed, it is recommended that the fire resistance test be first agreed by the LPCB, to ensure that the correct configuration of elements is tested and additional measurements such as deflection are recorded. The tests shall be carried out by a laboratory accredited by UKAS for this test.

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4.1.2 Historical data

Historical data may be assessed by the LPCB and at their discretion be considered as supporting data to 4.1.1 only

4.1.3 Test sample

For the fire resistance test only, the smallest thickness of insulation (or thinnest sandwich panel) capable of satisfying the insulation requirements shall be tested.

4.2 Reaction to fire (wall and ceiling lining test)

4.2.1 General

Unless the product can meet all the tests described in Appendix C, it shall be subjected to the Wall and Ceiling test and shall meet the requirements described in 4.2.2.9. The product as normally installed shall be tested using the specified crib as fire loading.

The approval will be limited to the material type and system installation tested and shall be agreed prior to the provision of the LPCB quotation for product approval. Further information is given in the Field of Application of test results, clause 5. Products not installed in accordance with the agreed specification shall not be considered as approved.

Because the test is of the combination of wall panels and roof panels, the combination of the insulation materials used in the wall and roof panels will affect the overall performance. Therefore certificates and listings will identify the type of core material used in both the wall panel and the roof panel. Panels that meet the test requirements for one combination of type of core material may not pass with another combination, i.e. for example, PIR cored wall panels achieving a pass test result with mineral wool or non-combustible cored roof panels may achieve a fail result if tested in combination with PIR cored roof panels.

4.2.2 Wall and ceiling lining test

4.2.2.1 Test sample

Test samples shall be representative of manufacturing practice.

- (1) The maximum thickness of material shall be tested. Additionally, the thermal insulation level of both wall and roof panels should be similar and individually should not be less than the minimum that would be used in practice.
- (2) The material shall be installed by the client or his authorised agent in accordance with the instructions supplied to the LPCB.

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- (3) A joint shall be arranged in the wall and ceiling respectively directly in line with the crib. This is designed to ensure that both a wall panel and ceiling panel joint are directly exposed to the heating condition.
- (4) Where wall panels are available for fixing either with their longer edges vertically or horizontally, then they should be tested horizontally, as this tends to be more onerous.
- (5) The maximum un-supported roof span required for approval shall be tested.

If a test is required to determine the performance of only a wall panel or a roof panel, the panel not being assessed shall be an LPCB approved product of similar insulation level (i.e. similar U-values) and shall have the same type of core material. Alternatively, another arrangement for the non-test panels may be agreed by LPCB. Limiting conditions applicable to the listing of the panel being tested may be set because of the combination being tested. The test arrangement and any limiting conditions shall be agreed in writing by LPCB and the panel manufacturer before testing commences. Details of test arrangements must be provided and approved by LPCB prior to the provision of the LPCB quotation for product approval.

4.2.2.2 General arrangement for the test

For cladding systems used for the external fabric of a building, the system shall be constructed for test to form an open fronted building, comprising two side walls, an end wall and a ceiling/roof, and have overall dimensions nominally 10m long by 4.5m wide by 3m high. A ventilation opening and observation window shall be provided. The building should be built onto a solid concrete, or similar floor/base. At the open end, a 750mm downstand shall be provided to give an opening height of 2250mm. Purlins may be incorporated at the manufacturers specified centres. The first purlin shall be located $1.665\text{m} \pm 0.1\text{m}$ from the end wall. The depth of this purlin, including any applied fire protection, shall be 180mm. Centres of other purlins shall be selected as being representative of normal practice and within the range specified by the manufacturer.

To assist in observations of performance, individual panels shall be suitably labelled. Also, horizontal lines shall be marked on walls at 1/2 and 3/4 heights, to help judge depth of smoke layer, and the limit for the burn area of the crib shall be marked on walls A and C.

4.2.2.3 Test conditions

Where possible, all tests should be undertaken indoors in a suitable large test building. The following conditions are to be met during the test period:

Ambient temperature:

Minimum ambient air temperature 5°C

Maximum ambient air temperature 25°C

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Maximum wind speed:

The horizontal wind speed, measured at a horizontal distance of 1m from the centre of the inlet opening shall not exceed 1.75m/s. This requirement shall be met 5 minutes before the crib is ignited.

For tests undertaken out of doors, it is essential that suitable wind-breaks are located to ensure that the burning of the crib is not effected or can influence the fire performance of the cladding system. The minimum specification for a suitable system are given in appendix D, clause D4.

In addition, for tests carried outdoors, the weather conditions shall be dry.

4.2.2.4 Ventilation opening

The ventilation opening shall be located at the left-hand corner of the test building. It shall have dimensions 1000mm wide by 1000mm high.

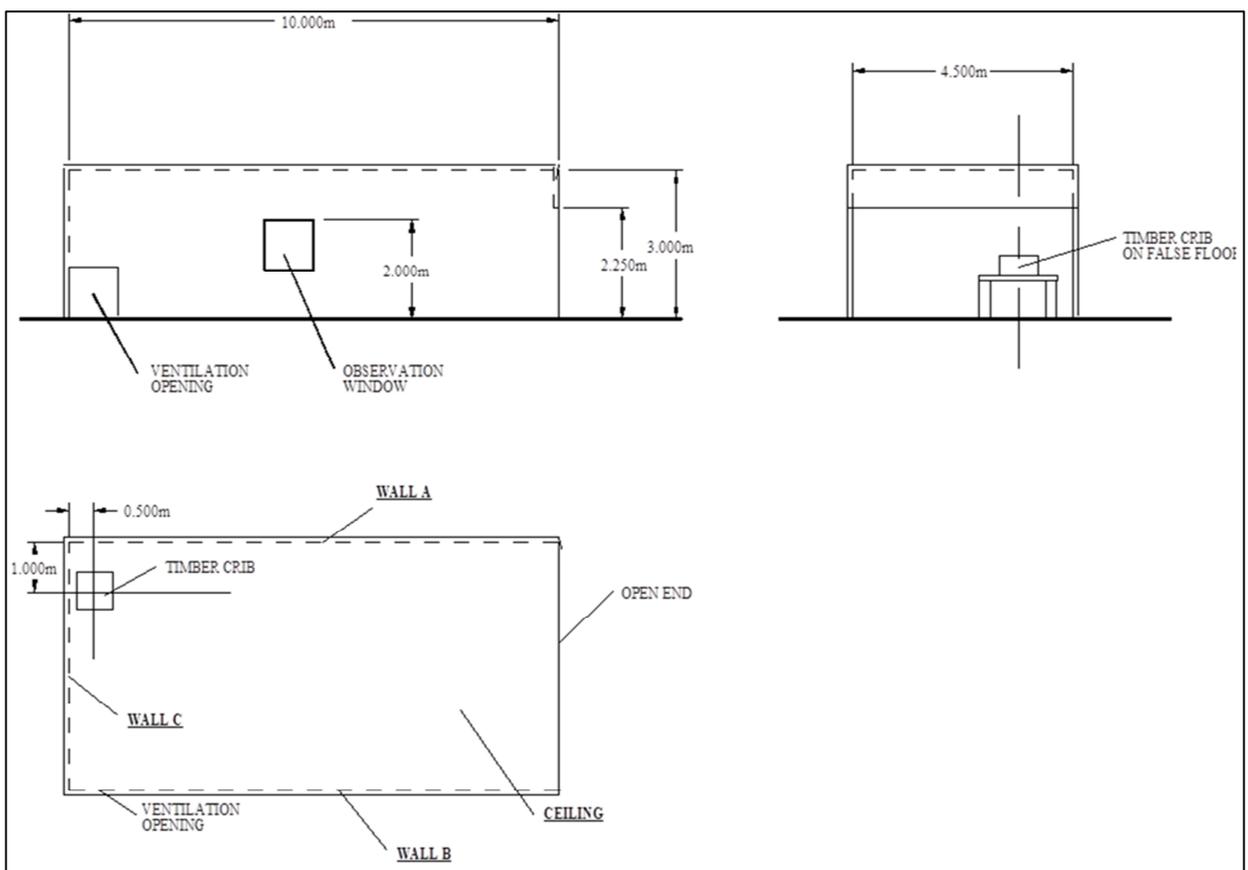


Figure 1 Wall and ceiling test arrangement

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4.2.2.5 Observation window

The observation window shall be located in the same wall as the ventilation opening and have overall dimensions approximately 1m by 1m. Fire resisting glass should be used.

4.2.2.6 Instrumentation

1. Gas temperature

Four chromel/alumel mineral-insulated thermocouples, 1.0mm diameter shall be suspended 100mm below the ceiling and located at the positions shown in figure 2

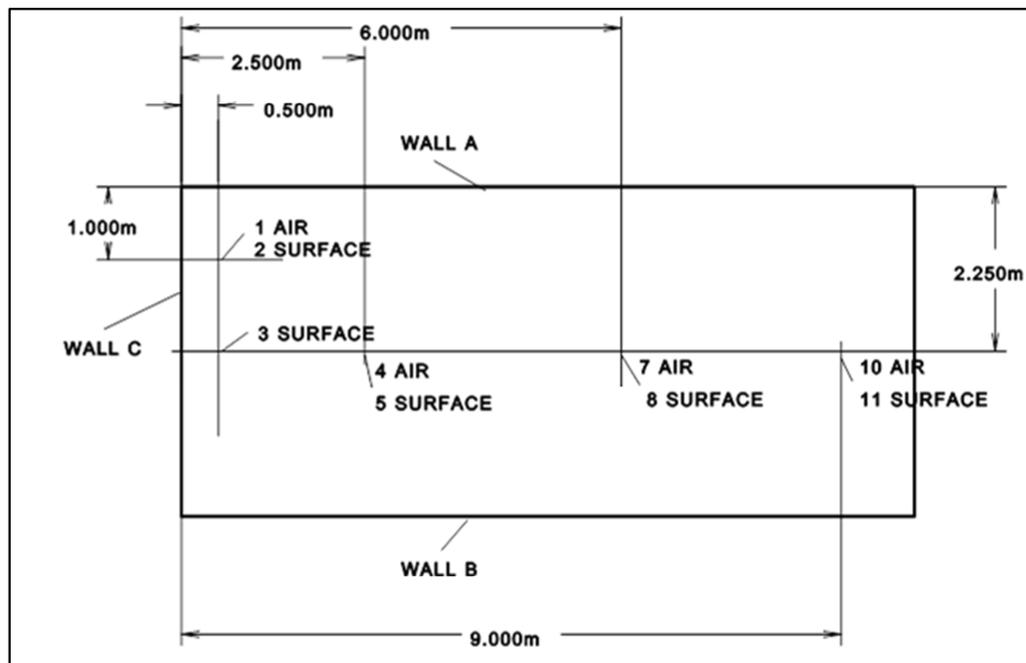


Figure 2. Position of air and surface thermocouples on ceiling

2. Surface temperatures

Eighteen chromel/alumel thermocouples, comprising twisted wire thermocouples, shall be located and suitably fixed at the positions shown in figure 2-5. The leads to pass through the cladding/lining via a 2.5mm diameter hole drilled at a distance of approximately 12 mm from the thermocouple junction and mechanically fixed to the inner skin.

These thermocouples are to be used by the LPCB to compare the recorded temperatures with existing data but are not part of the criteria.

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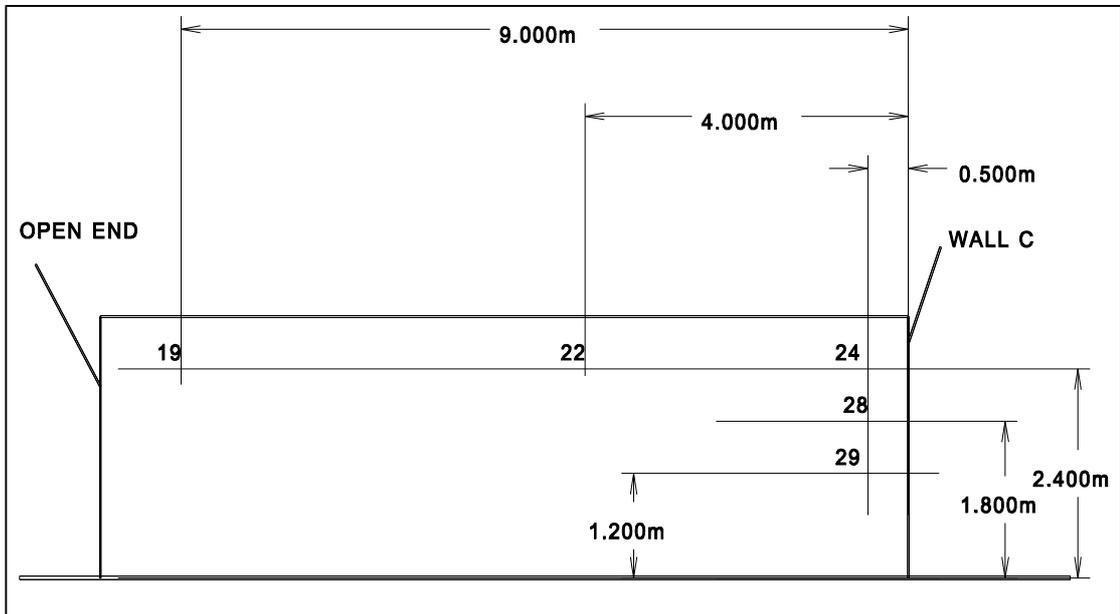


Figure 3. Position of surface thermocouples on wall A

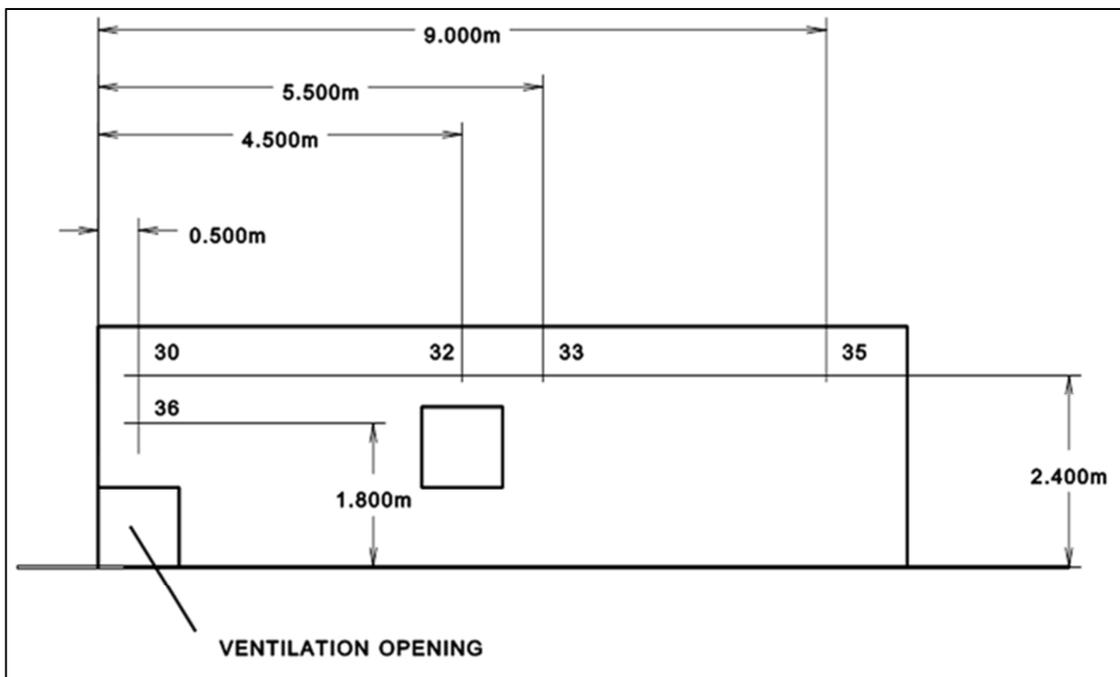


Figure 4. Position of surface thermocouples on wall B

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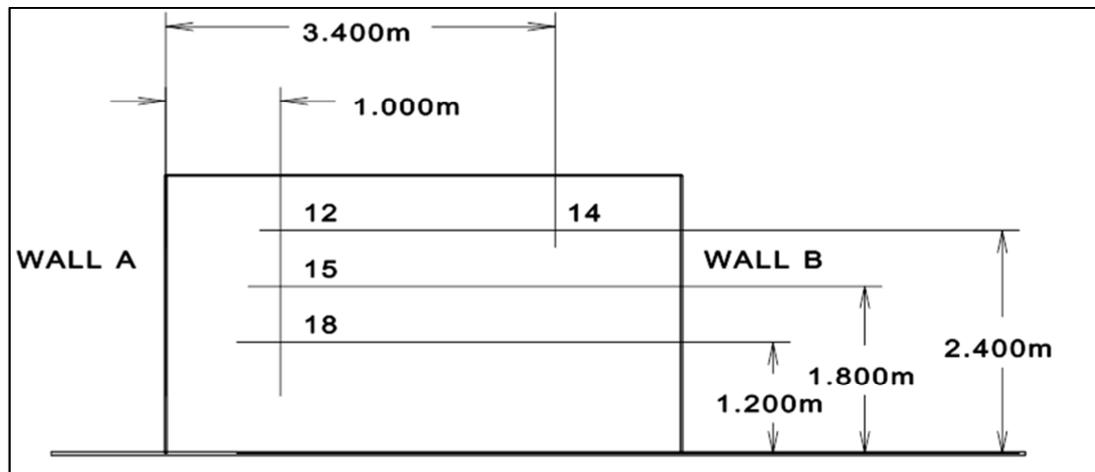


Figure 5. Position of surface thermocouples on wall C (end wall)

4.2.2.7 Timber crib

The crib used for this test is the fast crib.

Note: Crib design is critical, as it will affect rate of burn. Other types of crib design are unacceptable.

The timber crib shall be constructed from lengths of kiln dried rough-sawn timber Type V Redwood/Scots Pine, comprising seventy sections of nominal dimension 50mm x 25mm x 750mm. The acceptance criteria for use of the timber crib shall be assessed primarily by measurement of the moisture content followed by density and weight. Prior to the crib being sealed and sent off site, all of the following parameters must be met.

The moisture content of the crib shall be measured and recorded using a deep probe Protimeter, type Digital Timbermaster with Hammer Electrode. A series of random measurements shall be taken using a minimum of 15 separate samples, providing an average reading of between 7-9%. Measurements should be taken at the centre of the sample to a mid-depth point. Cribs outside this limit shall be rejected. The moisture content shall be measured prior to packaging for shipment and again not more than 15 minutes before the start of the test. As a further guide of acceptance, the density and weight of the test crib shall also be recorded. The samples taken for assessment of moisture content shall be weighed separately and a typical density calculated. The crib density shall be in the range $525\text{kg/m}^3 \pm 5\%$ with the total weight of $34\text{kg} \pm 1\text{kg}$.

The crib shall be located asymmetrically at the right hand corner of the test building opposite the air inlet opening, with one centreline 500mm from the short wall and the other 1000mm from the long wall. The crib shall be constructed such that the first row is laid parallel with the shorter wall. The distance between the timber lengths shall be

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55mm. The crib shall be built on top of a false floor so that the base of the crib is 760mm above the concrete floor. The false floor shall be constructed from 12mm±2mm-thick calcium-silicate board, 1600mm x 1600mm, with a layer of sand laid on top with a second layer of 12mm calcium-silicate board, 1000mm x 1000mm laid on top of the sand, central to the crib.

Just prior to the start of the test, place nine paraffin-soaked fibreboard strips, 750mm x 12mm x 12mm, in the spaces between the sticks in the bottom layer.

4.2.2.8 Test procedure

Ignite the paraffin-soaked fibreboard, and simultaneously start the timing device and all temperature recording instruments. Take detailed observations during the test about the general behaviour of the cladding, including start and duration of any flaming and its location, deformation of panels, delamination of any facings. Also, a video and photographic record for the test shall be made of the entire test duration. After the crib has burnt out completely, continue the test until all flaming of the panels, particularly in respect to flaming of the insulation, has ceased completely. However, after 30 minutes, it is permissible to extinguish any areas still flaming and cease recording.

4.2.2.9 Test Criteria.

The wall and ceiling lining test shown in figure 1 shall be of 30 minutes duration in respect to all recordings of data and observation. The following criteria will be used to judge the performance:

1. *Flashover*: There shall be no flashover at the ceiling. Flashover shall be deemed to have occurred if the average temperature of the hot gas layer below the ceiling exceeds 600 °C at any time (or for any duration) throughout the test. Thermocouples 4,7 and 10 shall be used to determine compliance.
2. *Internal Surface Flaming*: There shall be no sustained surface flaming* beyond 1.5m from the perimeter of the crib in both horizontal directions (e.g. outside crib fire area). There shall be no sustained flaming* through any of the joints on any of the walls or ceiling outside the burn area of the crib. Further guidance is given in Appendix D.
3. *External Surface Flaming*: There shall be no flame spread* at any location on the external surface of the test building. There shall be no fire/flame penetration to the exterior from any joints, around the fascias etc.

* Note to 2 and 3 above – defined as any visible flaming for more than 60 seconds duration (i.e. not intermittent) at any time during the test.

4. *Concealed Burning*: Compliance with this requirement can be determined during the post test survey and be judged on the extent of damage described in 6

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5. *Burning Brands*: There shall be no fall of burning brands from the ceiling outside the vicinity of the crib fire area which is defined in 2.6 and appendix D.
6. *Damage*: Compliance with this criterion shall be reported by the laboratory and verified by LPCB with account being taken of existing data.
- No part of the insulation or core shall be completely destroyed so that the external skin could be directly exposed to heat transfer from the fire, unless the total aggregate area is not more than 0.5m².
 - The area of damage, outside the crib fire area (see 2.6 and appendix D) indicative of contribution to the fire, e.g. charring, shall not exceed the following:

Limitations on damage for built-up systems				
Note reference	Part that is damaged	Wall	Ceiling	Total
1	Surface finishes	No requirement		
2	Surface lining	2.5 m ²	1.5 m ²	4.0 m ²
3	Damage to core	2.5 m ²	6.5 m ²	9 m ²
Total permitted Damage Area		5 m ²	8 m ²	13 m ²

Limitations on damage for sandwich panels				
Note reference	Part that is damaged	Wall	Ceiling	Total
1	Surface finishes	No requirement		
2	Surface lining	No requirement		
3	Damage to core	5 m ²	8 m ²	13 m ²
Total permitted Damage Area		5 m ²	8 m ²	13 m ²

The requirement of this standard is that the sample tested should not exceed the total damage area or any category of damage area as stated above.

The main purpose of this requirement is to ensure that burning of the insulating core/material beyond the crib fire area is restricted.

Note 1 Coated/painted surface finishes to metal facings covering insulating cores shall not be judged under this criterion, neither shall paper lined plasterboard and consequently there is no requirement. However, the surface must meet the internal flaming criterion.

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Note 2 Discolouration, scorching or soot deposits to the surface lining shall be ignored. Record areas where burn-through or significant damage has occurred to the lining. This requirement may be ignored for steel faced sandwich panels, but the limits to the damage to the insulating core in note 3 in the above table cannot be exceeded.

Note 3 Details of measurement are given in appendix D. If the damaged area is close to the limits given above (i.e. within 20% of the specified limit), compliance with the damage criterion may be judged, as being met if the amount of charred material is less than 35 % of the thickness of core material present based on the core samples taken from the charred areas of the walls and ceiling. Where only surface char exists, the unaffected core depth shall be recorded as being the total core depth at that measuring point. The charred areas shall be separately tabulated for the wall areas and the ceiling areas and the criterion being also separately applied.

4.2.2.10 Post-test examination

As soon as it is safe to do so and not later than 24 hours after the end of the fire test, measure and record extent of damage to the facings both internally and externally. Then remove all internal facings on the walls and ceiling and measure and record the extent of damage to the insulation. Also measure the extent of char in all fire-damaged areas. Sufficient measurements shall be taken of the depth of char at each fire-damaged area.

4.2.2.11 Sampling of core material

To assist in quality control during factory inspections, the core/insulating material shall be subjected to the test method described in BS 476:Part 15/ISO 5660-1. The samples shall be exposed to irradiances of 25 and 35 or 35 and 50 kW/m² (see standard for guidance). There is no pass or fail criterion attached to this, as the results will be compared to samples taken from the manufacturer during surveillance. It is important that the core sample is removed from a spare panel supplied from the same batch supplied by the manufacturer for the Wall and Ceiling test. The results from this test will be reported separately to the LPCB.

Note:- Other material identification methods may be used at the discretion of the LPCB.

In every instance, where the core/insulation material in the wall panels and the roof panels is different, samples from both shall be subjected to BS476: Part 15/ISO5660-1 testing.

4.2.2.12 Test report

The test report shall include a detailed description of the panel construction, graphs and/or tabulations of all recorded temperatures and all observations recorded. Scaled

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drawings showing the extent of damage of the facings or linings and insulation outside the burn area of the crib on all walls and the ceiling shall be included. Damage to surface coatings need not be included in the report.

The report shall include a clear statement on the compliance with the criteria given in 4.2.2.9; this shall be presented as shown below:

CRITERIA See 4.2.2.9	COMPLIANCE Pass/Fail
1. Flashover	
2. Internal surface flaming	
3. External surface flaming	
4. Concealed burning	
5. Burning brands	
6. Damage, e.g. charring	

4.2.2.13 LPCB assessment

Based on the measurements, photographs and video taken by the laboratory, LPCB (or their assessor) will check compliance with the criteria. They shall examine the temperature recorded during the test above the crib and also surface temperature readings to ensure similar conditions to other tests. They will also consider the field of application using the guidance given in clause 5.

5 FIELD OF APPLICATION OF TEST RESULTS

5.1 Type of product

The test results can only apply to the specific product tested.

5.2 Product thickness

In relation to grade EXT-A panels, the range of thickness allowed are those from the thickness tested in the fire resistance test up to the thickness tested in the wall and ceiling test. In respect to grade EXT-B panels, the thickness tested will be the maximum thickness that is allowed.

5.3 Product height

In relation to grade EXT-A products, the maximum allowable spacings between supports (mid-rails and purlins) are given below:

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Fire resistance levels can be applied when the installed products are equal to or less in height than that tested. Extrapolation to increased support centres is permitted, subject to the grading period being exceeded by at least 10% and there not being any indication of a potential integrity failure and also to the following, which are intended for guidance:

Extrapolation for fire resistance relating to external claddings	
Maximum deflection (towards or away from furnace) of cladding during fire resistance test	Maximum distance between supports
Tested with no mid-rails or purlins	
< 75 mm	4.5m
> 75 mm or no deflection measured	3m
Tested with a mid-rail or central purlin	
< 50 mm	2m for wall 2.5m for roof
> 50 mm or no deflection measured	Centres restricted to what was tested e.g. 1.5m for wall 2m for roof

These limits relate only to integrity performance in relation to the fire resistance.

For grade EXT-B products, purlin and sheeting rail spacing shall be within the range specified by the manufacturer and what was tested must be within that range.

The above does not cover structural stability and this aspect shall be made by a suitably qualified engineer in each case, but is outside the scope of certification to LPS 1181. Any restrictions shall be stated in the LPCB list of approved fire and security products and services

5.4 Orientation of longer edge of wall panels

If the wall panels are tested with their longer edge laid horizontally, the result can be applied to when they are laid vertically. However, when they are tested with their longer edges vertical, the test result cannot be applied to horizontal orientation.

5.5 Depth of profile of external skin

Unless the manufacturer has adequate evidence to show which type of profile gives the worse result, both shallow and deep profiles shall be tested if they are available in the product range.

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5.6 Application to internal applications

The test result to this part of LPS 1181 cannot be applied to internal applications such as food factory or cold stores, as the support conditions are different and this may effect their fire performance. Further testing is required to LPS 1181:Part 2.

6 PUBLICATIONS REFERRED TO

LPC Design Guide for the Fire Protection of Buildings: 2000: Fire Protection Association.

LPS 1208, LPCB Fire resistance requirements for elements of construction used to provide compartmentation.

Approved Document B (Fire Safety), Volume 2, Buildings other than dwelling houses (2006 edition incorporating 2010 and 2013 amendments).

The Environmental Protection regulations 2002.

Red Book: List of Approved Fire and Security Products and Services. The Loss Prevention Certification Board.

LPS 1181:2003: Part 2 - Requirements and tests for wall and ceiling lining systems for use as internal systems in buildings.

BS 476-4: 1970 "Fire Tests on Building Materials and Structures. Non-combustibility test for Materials".

BS 476-11: 1982 "Fire Tests on Building Materials and Structures. Method for assessing the heat emission from building materials".

BS 476-15:1993 Part 15: Method for measuring the rate of heat release of products (ISO 5660-1:1993)

BS 476-22: 1987 "Fire Tests on Building Materials and Structures. Method for the Determination of the Fire Resistance of Non-loadbearing Elements of Construction".

EN 13501-1:2002 "Fire classification of construction products and building elements- Part 1: Classification using data from reaction to fire tests"

EN 13823:2002 "Reaction to fire tests for building products excluding floorings- thermal attack by single burning item"

EN ISO 1182: 2002 "Reaction to fire tests for building products-Non-combustibility test"

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APPENDIX A – Changes to specification of external cladding system from that tested and approved to LPCB to LPS 1181:Part 1

A1 Change of chemical supplier or grade

If an alternative supplier of a chemical, or grade of chemical, which is deemed to be equivalent, the following procedure shall be adopted by LPCB:

Raw material data sheets to be supplied by approved company. These will be examined to verify no difference, e.g. chemical functionality of polyols, molecular weight of polyisocyanates, pH and viscosity. If these are deemed to be equivalent, test core samples to BS 476:Part 15/ISO 5660-1 at irradiances of 25 and 35 or 35 and 50 kW/m². Compare to existing data. If little or no difference in peak or total heat release, then change in supplier or grade will be allowed. If data shows different levels of peak or total heat release, then a full test to LPS 1181:Part 1 shall be undertaken.

Note:- Other material identification methods may be used at the discretion of the LPCB.

A2 Any change in formulation or physical panel change

Unless supporting test data is available, such as from corner tests with full calorimeter data, full test to LPS 1181:Part 1 to be undertaken.

A3 Any major change

Full test to LPS 1181:Part 1 to be undertaken

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APPENDIX B – Additional requirements for the protected zone defined in the LPC Design Guide For The Fire Protection of Buildings

Grade EXT-A15 defined in LPS 1181: Part 1 relates to the part of an external wall that is not within the unprotected area defined in Approved Document B of the Building Regulations.

It is a condition within the LPC Design Guide that both the external wall and the roof on each side of a compartment wall is fire resisting. To meet the risk based assessment concept of the Design Guide, Appendix B allows for three levels of fire resistance depending on the outcome of the risk assessment.

To ensure compliance with the recommendations of the Design Guide, all external cladding systems containing combustible materials shall meet the requirements of the wall and ceiling test defined in LPS 1181. In addition, all external walls located in the protected zone, when tested to method 5 of BS 476:Part 22:1987 (both sides to be tested in separate tests) and roofs, when tested to method 9 of BS 476:Part 22:1987 (fire from underneath) shall meet the fire resistance requirements given below in order to fully comply with the provisions in the Design Guide:

Grade	INTEGRITY (minutes)	INSULATION (minutes)	TYPICAL APPLICATION (see Table 2.2 of Design Guide)
EXT-A60	60	60*	4b Retail warehouse and superstore 6b Industrial and 7a Storage
EXT-A30	30	30*	4a Shop and Commercial and 6a Industrial
EXT-A15	30	15	Fully sprinklered buildings

* Systems that achieve an insulation time within 90% of this figure can be deemed to satisfy the requirements for this grade.

The appropriate grade shall be suitably listed in the List of Approved Fire and Security Products and Services.

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APPENDIX C – Screening Tests

The purpose of these tests is to identify the products which can be excluded from the wall and ceiling lining test described in this part of the standard.

C1 Coated steel

Coated steel shall have a class 0 surface as described in building regulations, and this shall be verified by tests to BS 476:Part 6 and 7. (Steel can be deemed to be non-combustible). Alternatively, products deemed to be classified as Euroclass B to BS EN 13501-1:2002 will also be acceptable.

C2 Insulating material/lining materials (excluding coated steel)

Samples of insulating core shall be taken during factory surveillance visits and submitted to either the non-combustibility test (BS 476:Part 4:1970) or BS EN ISO 1182: 2002 or BS 476: Part 11: 1982. Any facing materials shall be removed for this test.

The materials shall either be classified as being non-combustible, Euroclass A1 or A2 or of limited combustibility. Any facing materials bonded to these materials should be subjected to the tests described in C1 above (complete with their substrates) and achieve the class 0 rating (or Euroclass B).

Where the steel is bonded to the insulant by adhesive, the manufacturer shall state the minimum and maximum coverage rates. Samples of the insulation shall be coated with the adhesive to the maximum specified coverage rate and with that face exposed to the tests described in C1 above, shall achieve the class 0 rating.

C3 Fire resistance

The product shall be tested to clause 5 and clause 9 of BS 476:Part 22:1987 and achieve an integrity and insulation rating of not less than 30 minutes.

If a wall and ceiling lining product or composite cladding product meet all the above requirements then the system can be deemed to satisfy the requirements of clause 2.2 of the LPC Design Guide for the Fire Protection of Buildings without the need to meet the requirements of the wall and ceiling lining test described in this standard.

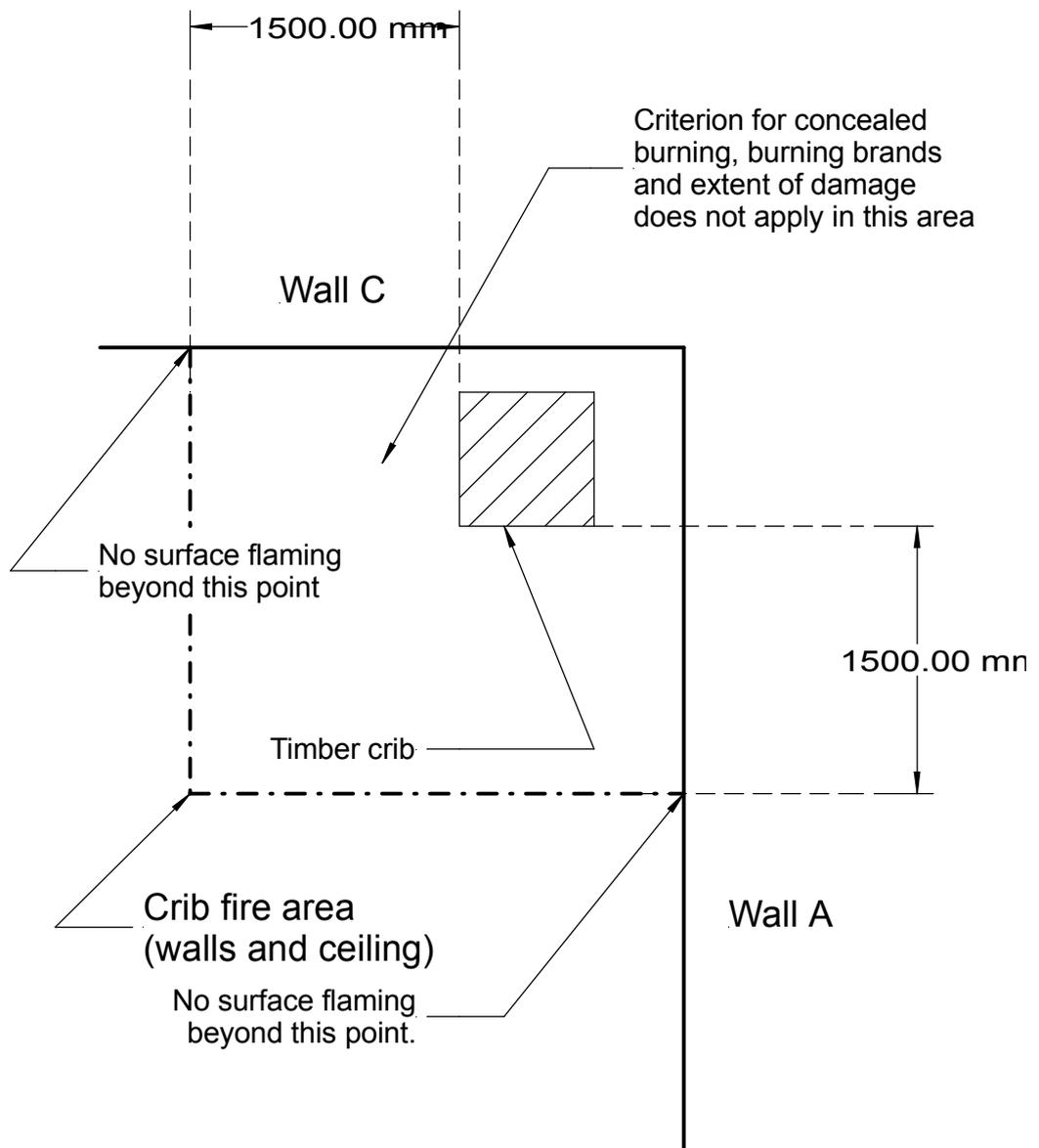
Any system which cannot completely meet these requirements shall be tested to the wall and ceiling test described in 4.2 and 5 of this standard.

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APPENDIX D – Additional guidance

D1 Internal surface flaming, concealed burning and extent of damage.

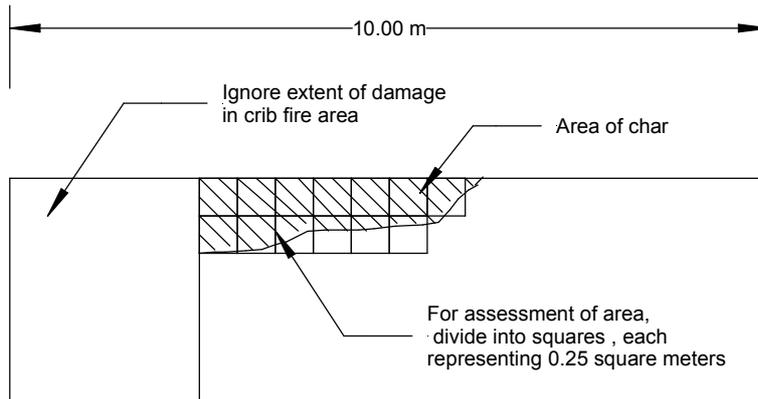
The diagram below interprets the requirements for internal surface flaming, concealed burning and extent of damage. All these relate to the area of the walls and ceiling outside the defined crib fire area.



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D2 Measurement of area of extent of damage

Only the areas that are clearly charred shall be used by LPCB to determine compliance with extent of damage. Measurements may be made on the basis shown in the diagram shown below:



Wall A used as example of measurement of charred area

Typically, for PUR or PIR foam cores, char is defined as material that has turned black through the effects of burning or heating. Areas with a char depth of less than 6mm should be ignored in determining the extent of damage. For measurement areas (ie 0.25m x 0.25m squares) that are not 100% black char, the 6mm char depth boundary shall be determined.

D3 Locations for taking off-cuts to determine depth of char

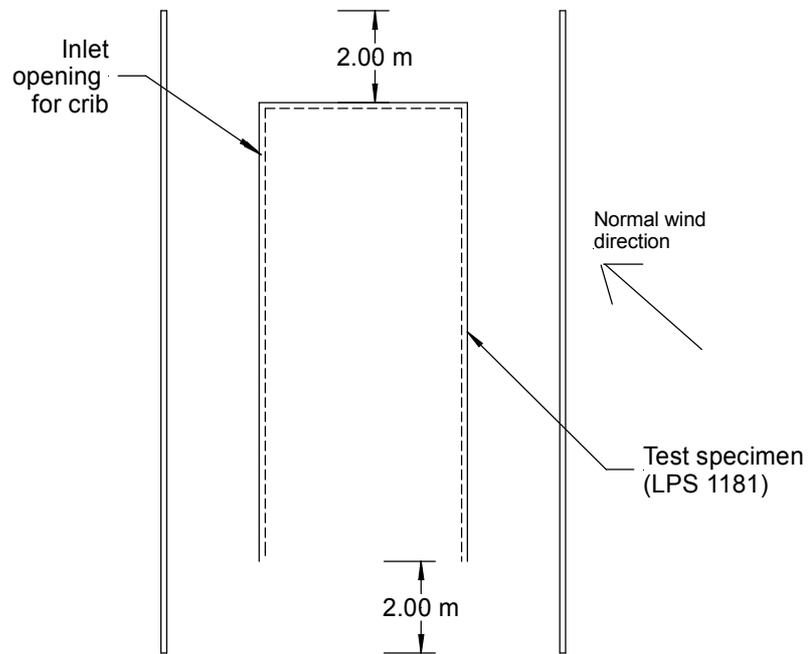
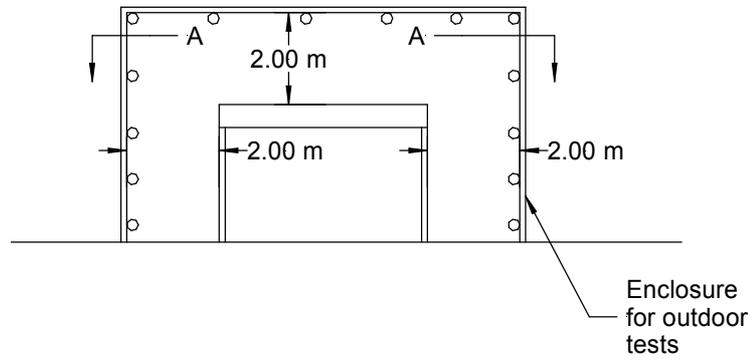
Take a core sample from each area of char. Record the location, which it was taken from. The charred area will dictate number of core samples taken. At least one sample shall be taken from each charred area and for large areas a core shall be removed per 1m² of char.

Measure and record depths of char from each core sample. Do not take any samples or measurements from the area of the crib fire area.

D4 Method for providing protection to LPS 1181 test outdoors

Where the wall and ceiling lining test has to be carried out outdoors, adequate protection against wind and rain shall be provided. The minimum specification for a suitable system is shown below.

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Section AA
 Design of protective enclosure for outdoor tests

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Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1181-Part 1-1.1	Change to copyright information	CJA	16/09/05
LPS 1181-Part 1-1.2	<ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. Contents page moved to Page 1 and sub-clause numbering removed. 4. Web address updated on Page 2 5. Notes added on Page 4 6. Updated Reference to Approved Document B in Clause 6 7. Repagination 8. Update to copyright information 	DC	Jan. 2014