BRITISH STANDARD

BS 476-12: 1991
Incorporating Corrigendum No. 1

Fire tests on building materials and structures —

Part 12: Method of test for ignitability of products by direct flame impingement

ICS 13.220.50

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Fire Standards Policy Committee (FSM/-) to Technical Committee FSM/1, upon which the following bodies were represented:

Association of British Roofing Felt Manufacturers
Association of Building Component Manufacturers
Association of Structural Fire Protection Contractors and Manufacturers
British Cement Association
British Fire Services' Association
British Floor Covering Manufacturers' Association
British Plastics Federation
British Railways Board
British Rigid Urethane Foam Manufacturers' Association
British Wood Preserving and Damp-proofing Association
Chemical Industries' Association
Chief and Assistant Chief Fire Officers' Association
Concrete Society
Department of Education and Science
Department of the Environment (Building Research Establishment)
Department of the Environment (Construction Directorate)
Department of the Environment (Property Services Agency)
Department of the Environment for Northern Ireland
Department of Transport (Marine Directorate)
Engineering Equipment and Materials Users' Association
Eurisol (UK) Mineral Wool Association
Fibre Building Board Organisation (FIDOR)
Fibre Cement Manufacturers' Association Limited
Flat Glass Manufacturers' Association
Flat Roofing Contractors' Advisory Board
Gypsum Products Development Association
Home Office
Institution of Fire Engineers
London Fire and Civil Defence Authority
Loss Prevention Council
Mastic Asphalt Council and Employers' Federation
National Council of Building Material Producers
National GRP Construction Federation
National House-building Council
RAPRA Technology Ltd.
Royal Institute of British Architects
Steel Construction Institute
Timber Research and Development Association
United Kingdom Atomic Energy Authority
Warrrington Fire Research Centre
Wood Wool Slab Manufacturers' Association

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

Autoclaved Aerated Concrete Products Association
British Carpet Manufacturers' Association Ltd.
British Steel Industry
GAMBICA (BEAMA Ltd.)
Phenolic Foam Manufacturers' Association
Polyethylene Foam Insulation Association
Queen Mary College
Suspended Ceilings Association
Thermal Insulation Manufacturers' and Suppliers' Association (TIMSA)
Yarsley Technical Centre Ltd.

This British Standard, having been prepared under the direction of the Fire Standards Committee, was published under the authority of the Standards Board and comes into effect on
30 August 1991

The following BSI references relate to the work on this standard:
Committee reference FSM/1
Draft for comment 90/36346 DC

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Amendments/corrigenda issued since publication

Amd. No.	Date	Comments
C1	March 2014	Information added to Foreword

Contents

Foreword

This part of BS 476 is published by BSI Standards Limited, under licence from The British Standards Institution.

This standard has been superseded by the current BS EN ISO 11925-2, but it has been retained based on legitimate need for the standards within non-EU markets.

This Part of BS 476 has been prepared under the direction of the Fire Standards Policy Committee.

Whilst this test has been designed to give information on the performance of a product in the early stages of a fire, it should not be considered or used by itself for describing or appraising the fire hazard of a material, composite or assembly under actual fire conditions. Neither should it be used as the sole source on which a valid assessment of hazard pertaining to ignitability can be based. A series of second generation "reaction to fire" tests are under preparation in ISO/TC 92, Fire tests on building materials, components and structures. The United Kingdom is participating in this work, and it is intended to offer this test for consideration.

This Part of BS 476 has been produced in response to the perceived need for tests which will assess the response of building materials and products to any of a range of primary sources. The test regime does not involve the imposition on the test specimen of any irradiation other than that from the ignition source. Although the sources specified in the test have been chosen to represent the heating characteristics of a number of statistically important real-life ignition sources, such as a match flame or electrical sources, they are all flame sources, some diffusion, some pre-mixed. These flame sources are matched, as far as practicable, in terms of intensity and area of heating and together represent a range of both characteristics. In the long term, specifiers may lay down requirements related to particular levels rather than requiring all tests to be carried out. This may require the provision of rules for re-testing if the results of testing differ for each specimen. An example of such rules is given in appendix B.

The method has been subjected to a wide ranging interlaboratory trial involving six laboratories and 26 different materials.

Attention is drawn to the Health and Safety at Work etc. Act 1974, and the need to ensure that the method of test specified in this standard is carried out under suitable environmental conditions to provide adequate protection to personnel against the risk of fire and inhalation of smoke and/or toxic products of combustion.

Appendix A gives a recommended form of result sheet.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 476 describes a method of test for the determination of the ignitability of materials, composites and assemblies subjected to direct impingement of flames of different size and intensity but without impressed irradiance.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this Part of BS 476, the following definitions apply.

2.1
sustained ignition

after withdrawal of the ignition source, the presence of a flame on the surface of the specimen that persists for at least 10 s

2.2
transient ignition

after withdrawal of the ignition source, the appearance of flashes, or flames, which are not sustained for a continuous 10 s

2.3
progressive smouldering

an exothermic oxidation not accompanied by flaming which is self-propagating, i.e. independent of the ignition source, and may be accompanied by incandescence

2.4
flaming debris

matter flowing or separating from the specimen during the test procedure and falling below the initial lower edge of the specimen and continuing to flame as it falls

2.5
afterflame

persistence of flaming of a specimen, under specified test conditions, after the ignition source has been removed

2.6
afterglow

persistence of glowing of a specimen, under specified test conditions, after cessation of flaming or, if no flaming occurs, after removal of the ignition source

2.7
flame application time

the time (in seconds) for which the burner is in its final testing position

2.8
constant mass

the state of a test specimen when two successive weighing operations, carried out at an interval of 24 h, do not differ by more than 0.1 % of the mass of the specimen or 0.1 g, whichever is the greater

3 Principle

Vertically held specimens are exposed to specified flames of different sizes and intensities and their ignition behaviour is observed. The flame is applied to the surface and/or a bottom edge on different specimens.

4 Safety considerations

There are hazards with these tests and it is essential that adequate precautions are taken. Particular attention should be paid to: the handling of flammable gases; the evolution of potentially toxic gases; and the fact that extensive flaming of specimens may occur.

Between tests, the atmosphere of the testing room (see **5.1**) should be cleared of smoke and toxic gases by an extractor fan or other means of ventilation. The required atmosphere for testing should be restored.

Adequate means of extinguishing the specimen should be provided, bearing in mind that some specimens may produce severe flaming during the test. A hand and/or fixed water spray which can be directed over the burning area should be available with other means, such as fire extinguishers (see BS 5423) and fire blankets (see BS 6575).

NOTE In some cases, smouldering may be difficult to extinguish completely and immersion in water may be necessary.

5 Apparatus

5.1 *Testing room*. A room equipped with an extractor fan or other means of ventilation and capable of providing a substantially drought-free environment at between 10 °C and 30 °C and a relative humidity of 50 ± 20 %.

NOTE 1 It is recommended that the testing room be divided into two parts, the inner part for carrying out the tests and easily viewed from the outer part in which control equipment would be situated.

NOTE 2 It has been found that a partially darkened room assists with the perception of small surface flames.

For ignition sources D, E, F and G, either a testing room with a minimum volume of 20 m^3 is required, or alternatively, a smaller enclosure with a through flow of air. If the latter is used it shall be equipped with inlet and extraction systems with air flow rates between 0.02 m/s and 0.2 m/s in the locality of the test specimen.

These limits provide adequate oxygen without disturbing the burning behaviour.

NOTE 3 Testing with ignition sources A, B and C may be carried out in either of these environments, or in a suitably ventilated fume cupboard.

5.2 *Propane supply and regulation.* A supply of commercial propane complying with BS 4250-1 connected to the ignition sources by the following.

a) A cylinder regulator complying with BS 3016 with an outlet pressure of 1 bar[1)] absolute.

b) An appropriate length of 5 mm internal diameter high pressure hose to BS 3212.

c) Two flowmeters with integral needle valves and accuracies of ± 0.25 %, with flow ranges covering 25 mL/min to 160 mL/min and 1 L/min to 10 L/min, connected to a common manifold top and bottom to allow measurement with either meter.

d) A length of 5 mm internal diameter hose not greater than 3.0 m in length to connect the flowmeters to the burner carriage via a gas cock mounted on the carriage.

e) A burner carriage consisting of a movable column which incorporates a 10 mm OD × 1 mm wall stainless steel tube terminated by a threaded boss to which the various burners can be fixed (see Figure 1).

NOTE Some difficulties have been reported with the supply and measurement of the propane particularly where the propane cylinder has, of necessity, to be stored in an environment cooler than the defined test conditions and/or some distance from the test rig. In these cases, and other situations where difficulties occur, it is important that there is a sufficient length of tubing inside the controlled environment (10 °C to 30 °C) to ensure that the propane equilibrates to the required temperature before flow measurement. One way to assist this is to pass the propane (before flow measurement) through a metal tube immersed in water maintained at 25 °C.

Great care also needs to be exercised with the measurement and setting of the flow rate of the propane. Direct reading flow meters, even those obtained with a direct propane calibration, need to be checked when initially installed, and also at regular intervals during testing, with a method capable of measuring accurately the absolute propane flow at the burner tube. One way of doing this is to connect the burner tube with a short length of tubing (about 7 mm internal diameter) to a soap bubble flowmeter, such that the upward passage of a soap film meniscus in a glass tube of calibrated volume (e.g. a burette) over a known period of time gives an absolute measurement of the flow. Fine control valves which can each be preset to one of the desired propane flow rates, with simple switching means from one to the other, have also proved helpful.

5.3 *Ignition sources*

5.3.1 *Ignition source A.* A burner consisting of a stainless steel tube with a bore of 0.5 ± 0.1 mm and with a minimum length of 35 mm.

NOTE 1 A hypodermic syringe, with the tapered end cut off square and cleanly, has been found suitable.

The flowmeter shall be calibrated to supply a propane gas flow rate at 25 °C of 25 ± 2 mL/min.

NOTE 2 Under these conditions the flame height is approximately 12 mm. The ignition source is similar to those specified in BS 415 and BS 6458-2.2.

5.3.2 *Ignition source B.* A burner tube consisting of a length of stainless steel tube (8.0 ± 0.1 mm outside diameter, 6.5 ± 0.1 mm internal diameter and 200 ± 5 mm in length). The flowmeter shall be calibrated to supply a propane gas flow rate at 25 °C of 45 ± 2 mL/min.

NOTE Under these conditions the flame height is approximately 35 mm. This ignition source corresponds approximately to that specified as butane flame ignition source 1 in BS 5852.

5.3.3 *Ignition source C.* A burner tube consisting of a length of stainless steel tube (8.0 ± 0.1 mm outside diameter, 6.5 ± 0.1 mm internal diameter and 200 ± 5 mm in length). The flowmeter shall be calibrated to supply a propane gas flow rate at 25 °C of 160 ± 5 mL/min.

NOTE Under these conditions the flame height is approximately 120 mm. This ignition source corresponds approximately to that specified as butane flame ignition source 2 in BS 5852.

5.3.4 *Ignition source D.* A gas burner comprising a 185 mm long horizontal stainless steel tube (12.0 mm outside diameter, 9.0 mm inside diameter) closed at each end and fitted with a central gas supply pipe. The burner tube shall have a row of 14 holes of 1.5 mm diameter at 12.5 mm centres arranged so that the gas jets issue at an angle of 45° below the horizontal (see Figure 2). The flowmeter shall be calibrated to supply a propane gas flow rate at 25 °C of 2 L/min.

NOTE Under these conditions the flame height is approximately 240 mm. This burner corresponds approximately to the manifold specified in BS 476-6.

5.3.5 *Ignition source E.* A gas burner comprising a 185 mm long horizontal stainless steel tube (12.0 mm outside diameter, 9.0 mm inside diameter) closed at each end and fitted with a central gas supply pipe. The burner tube shall have a row of 14 holes of 1.5 mm diameter at 12.5 mm centres arranged so that the gas jets issue at an angle of 45° below the horizontal (see Figure 2). The flowmeter shall be calibrated to supply a propane gas flow rate at 25 °C of 10 L/min.

NOTE Under these conditions the flame height is approximately 780 mm. This burner corresponds approximately to the manifold specified in BS 476-6.

[1)] 1 bar = 10^5 N/m^2 = 10^5 Pa.

5.3.6 *Ignition source F.* A mild steel nickel plated burner (nominally 15.75 mm outside diameter, 13.5 mm internal diameter and 66.6 mm in length) with four pre-mixing air holes each nominally 20 mm × 3 mm and each nominally 40 mm from the burner end, and spaced equidistant from each other.

NOTE Information on a commercially available burner complying with this description is available from Customer Information, BSI, Linford Wood, MK14 6LE. No flowmeter is required and the flame height will be approximately 110 mm.

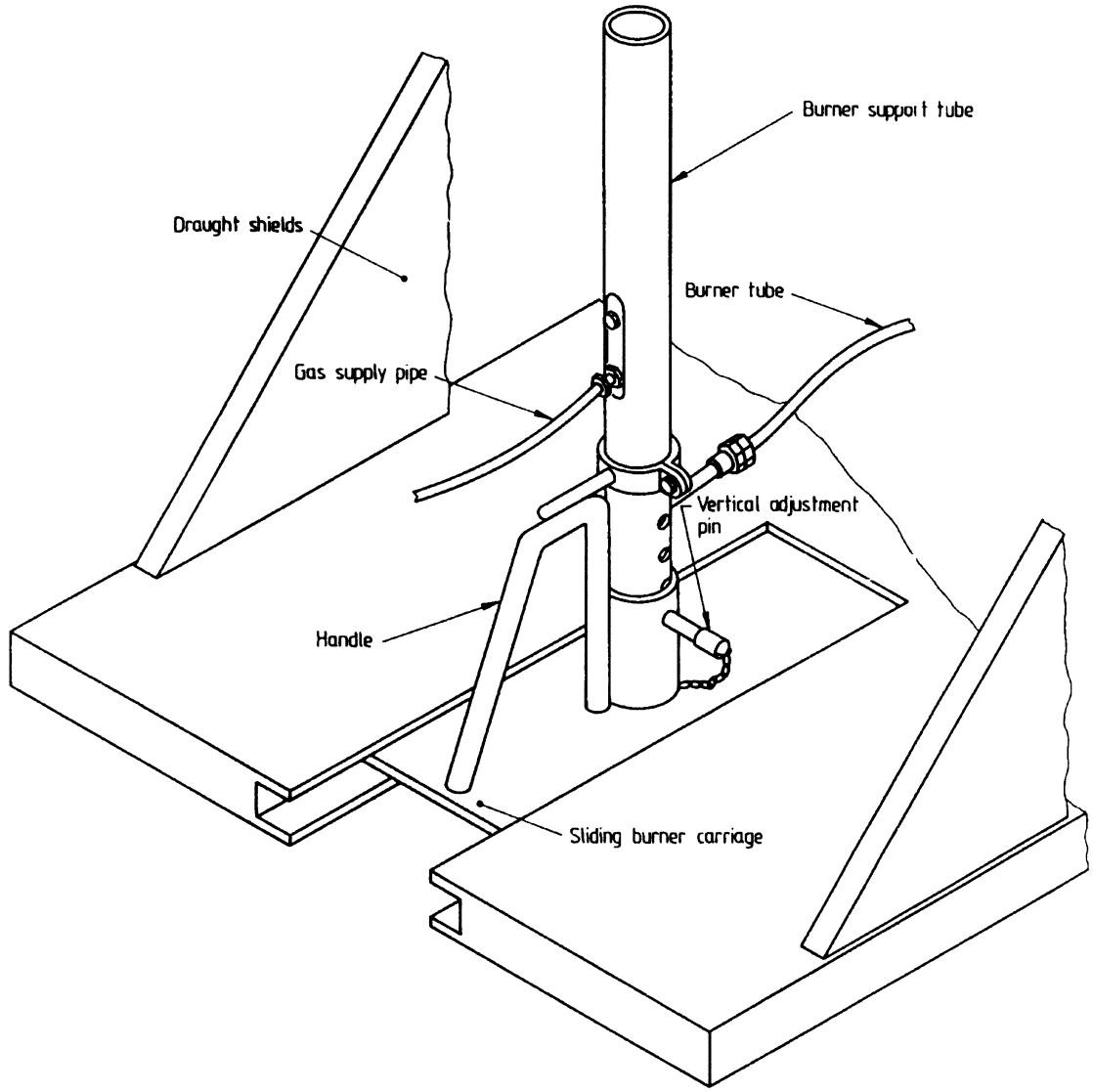
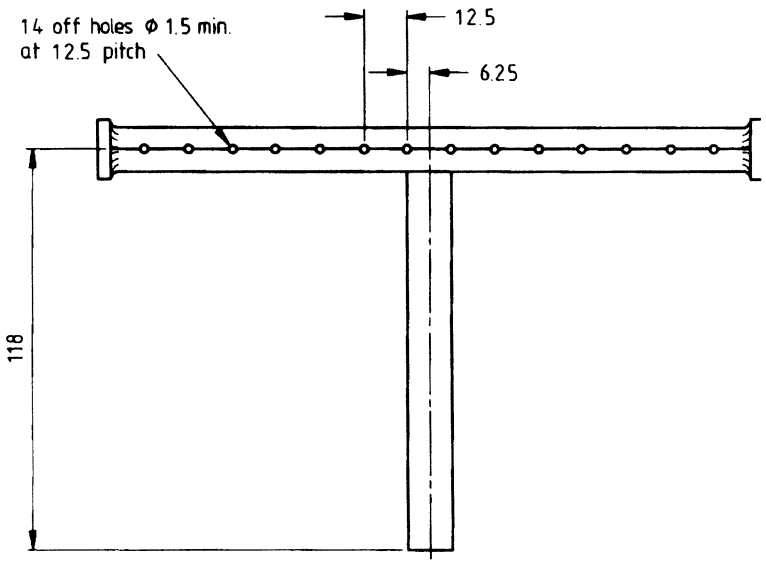


Figure 1 — Burner carriage



All dimensions are in millimetres.

Figure 2 — Burner for ignition sources D and E

5.3.7 *Ignition source G.* A mild steel nickel plated burner (nominally 38.1 mm outside diameter, 34 mm internal diameter and 98.3 mm in length) with 10 pre-mixing air holes each nominally 30 mm × 5 mm and each nominally 63 mm from the burner end, and spaced equidistant from each other.

NOTE Information on a commercially available burner complying with this description is available from Customer Information, BSI, Linford Wood, MK14 6LE. No flowmeter is required and the flame height will be approximately 230 mm.

5.4 *Test frame.* A horizontal steel platform to which a sliding burner carriage and burner tube are attached. At one end of the platform, means shall be provided to maintain the specimen holder in a vertical position (see Figure 3).

NOTE Because of the corrosive conditions of testing and extinguishing, it is suggested that the frame be constructed of stainless steel.

5.5 *Specimen holder.* The vertical specimen holder shall be capable of accommodating the largest size of specimen. Specimens shall be gripped at intervals along both vertical edges.

For narrower specimens, holders may be designed to fit within the widest holder in order to provide a common position for testing.

5.6 *Burner carriage and tube.* The ignition source (see **5.3**) shall be mounted on a burner support tube fitted to the burner carriage (see Figure 1). The tube shall be equipped with means to allow vertical adjustment of the ignition source position as required by the various tests. The burner carriage shall be designed in such a way that the distance between the burner and the specimen is obtained accurately, reproducibly and automatically, and manufactured so that the ignition source can be brought into the prescribed position smoothly and within 1 s.

5.7 *Timer.* Capable of being read to 0.1 s and preferably with a suitable audible warning device.

5.8 *Restraining combs.* Two restraining combs (see Figure 4), consisting of mild steel flat bars, 4 mm thick and 20 mm deep, through which prongs of mild steel, 2.5 mm thick and 300 mm long, are passed. One comb may be attached to the test frame via bolts and using wing nuts at a distance at least 75 mm below the specimen; the prongs on this comb shall be positioned at 100 mm centres. The back comb shall be capable of being attached to the front comb using nuts and 60 mm long bolts; this comb shall have 5 prongs at 100 mm centres and 50 mm from each end.

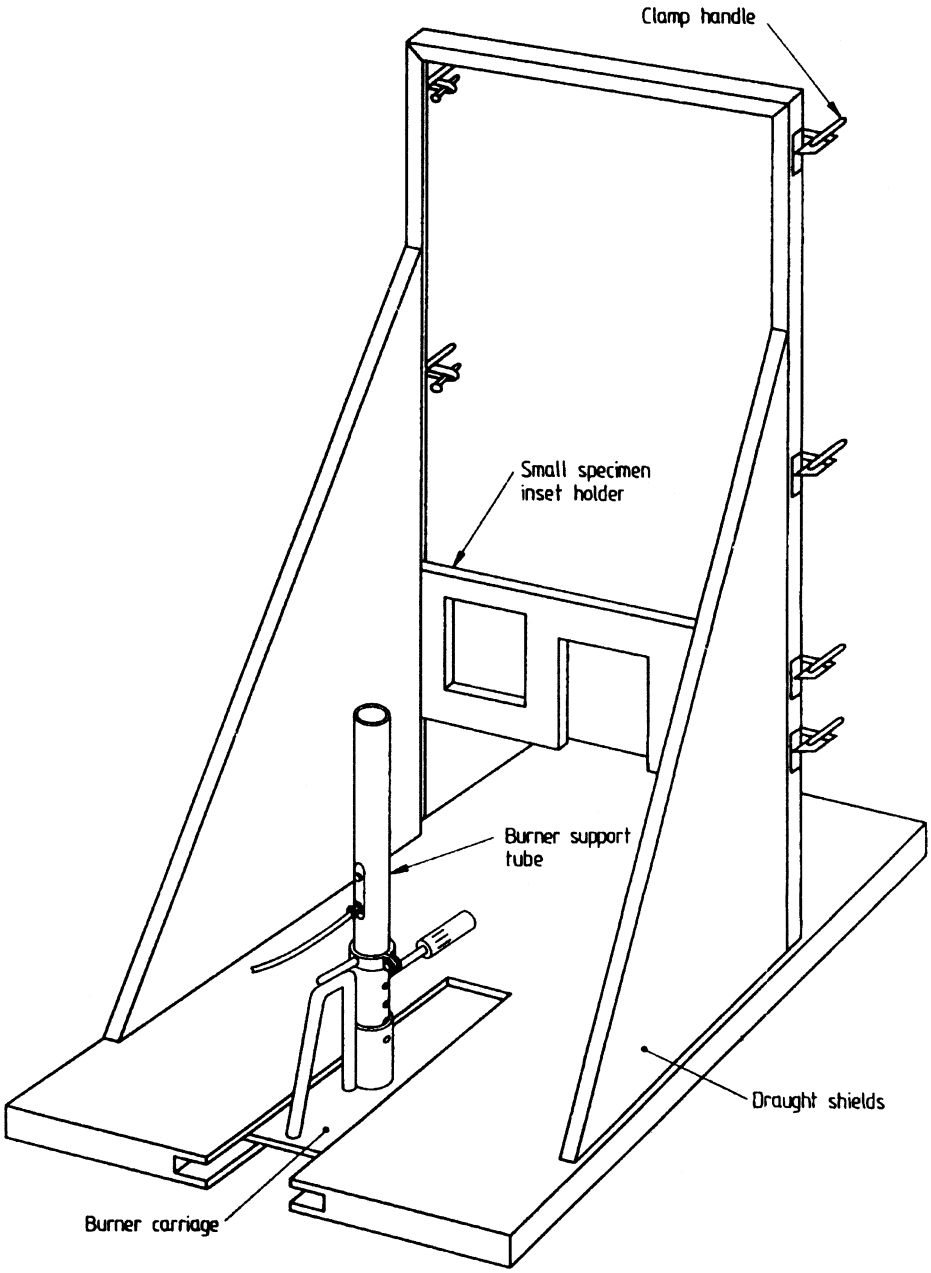
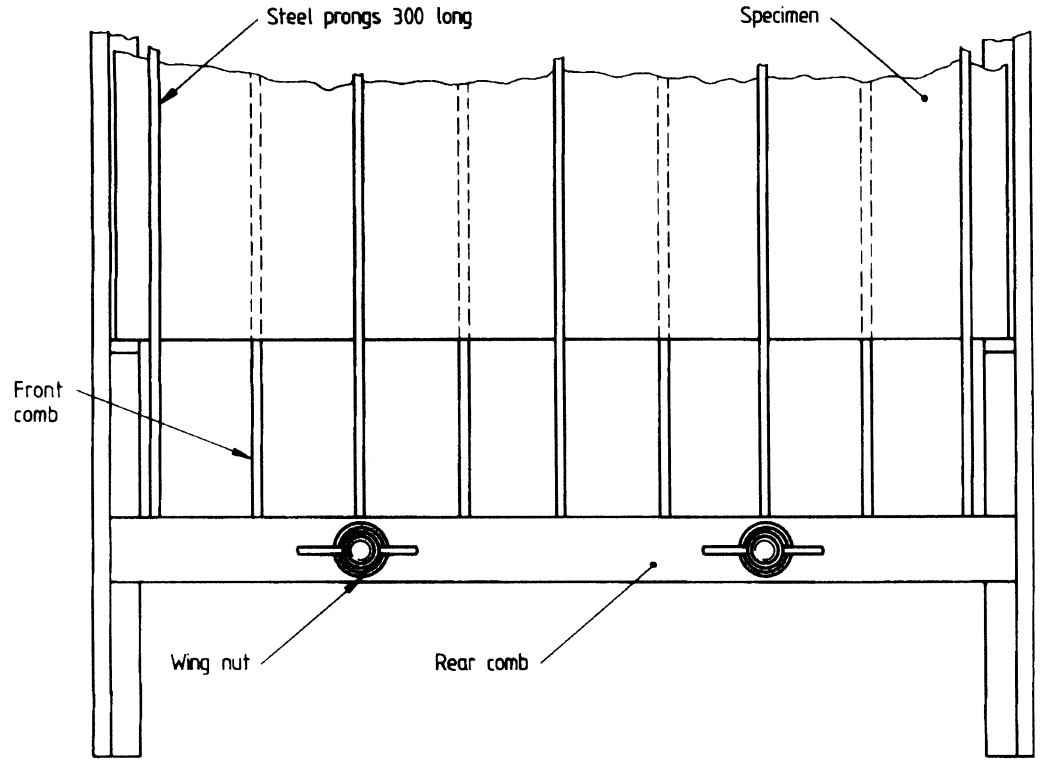
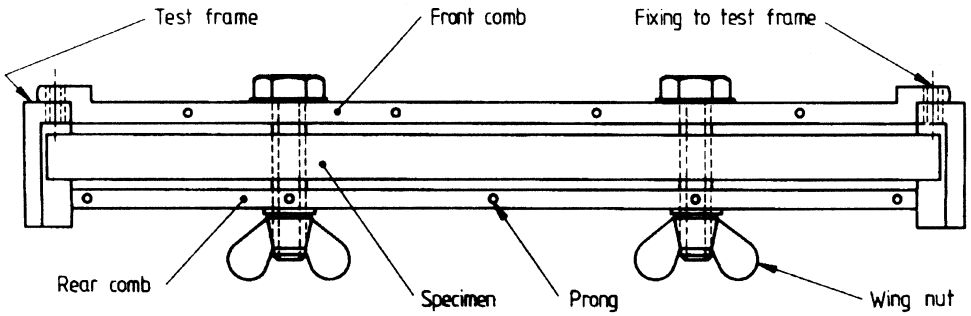


Figure 3 — Test frame with draught shields



Front view

Plan



Top view

The dimension is in millimetres.

Figure 4 — Restraining comb for thermoplastic and flexible materials

5.9 *Draught shields.* Draught shields of 9 mm thick non-combustible board, triangular in shape, with a base of approximately 500 mm and approximately 750 mm in height shall be provided for use with ignition sources A, B and C. One shield shall be positioned on each side of the test frame and adjacent to it (see Figure 3).

6 Conditioning and testing atmospheres

Before testing, the specimens shall be conditioned to constant mass at a temperature of 23 ± 2 °C and a relative humidity of 50 ± 5 %.

Testing shall be carried out in an atmosphere with a temperature of 20 ± 10 °C.

7 Ignition source application times

The flame application times to be used for each ignition source shall be as shown in Table 1.

Table 1 — Specimen size and flame application times

Ignition source	Specimen size	Flame application times (see **2.7**)			
	mm	s	s	s	s
A	100 × 150	1	5	20	120
B	100 × 150	1	5	20	40
C	300 × 300	1	5	20	40
D	500 × 750	—	5	60	180
E	500 × 1 200	—	5	60	180
F	300 × 300	1	5	20	40
G	500 × 750	—	5	60	180

NOTE Whilst it is possible to test a product against the complete matrix of sources and times it is recognized that a more economic approach would be to select a limited number of combinations. Such an approach is likely in any performance specification using this method.

8 Specimens

8.1 Size

The specimen size shall be as shown in Table 1, with a tolerance of + 0, – 5 mm. In its usual form, the apparatus is able to accommodate specimens up to a maximum thickness of 50 mm. If thicker specimens are required to be tested, appropriate modifications to the specimen holder and rest position of the burner carriage shall be made.

8.2 Number and cutting

Take a minimum of six full thickness representative specimens for each ignition source to be applied and each flame application time (three for surface ignition and three for bottom edge ignition). If the material under test is asymmetric through its thickness, and in practice either face may be exposed to a source of ignition, test a separate series of specimens on each face. Similarly, for materials which are chemically or physically not uniform in any other plane, test by as many series of specimens as needed to represent the actual behaviour of the material when exposed to the various ignition sources.

Most composite materials and many homogeneous ones are installed with covered edges, and edge ignition tests shall be carried out on specimens of this form. If such materials may be used with unprotected edges they shall be tested in this form.

NOTE 1 To take an extreme sample, a composite material with a grain/material direction and asymmetrical through its thickness, which could be installed with edges protected or otherwise, would require 8 sets of 3 specimens for bottom edge ignition and 4 sets of 3 specimens for face ignition, for each chosen ignition exposure in order to characterize its ignition behaviour.

Where materials will be fixed to substrates in practice, analogous procedures shall be used to prepare test specimens.

NOTE 2 Care is needed when preparing specimens for bottom edge exposure of materials applied to substrates since in practice the substrate may extend beyond the bottom of the material to be tested and not itself be subject to edge exposure. The configuration of the test specimen should reflect the practical aspects of such factors as type of substrate, fixing to substrate and presence and form of joints.

8.3 Suitability of a product for testing

8.3.1 An essentially flat product having one of the following characteristics is suitable for evaluation by this method:

a) an essentially flat exposed surface;

b) a surface irregularity that is evenly distributed over the exposed surface provided that:

1) at least 50 % of the surface of a representative square area of 250 mm × 250 mm lies within a depth of 6 mm from a plane taken across the highest points on the exposed surface; or

2) for a surface containing cracks, fissures or holes which do not exceed 6.5 mm in width nor 10 mm in depth, the total area of such cracks, fissures or holes at the surface does not exceed 30 % of a representative square area of 250 mm × 250 mm of the exposed surface.

8.3.2 Where a product has areas of its surface which are distinctly different, but each of these separate areas can satisfy the surface characteristics described in **8.3.1**, then more than one test shall be conducted to fully evaluate the product.

8.3.3 When an exposed surface does not comply with the conditions of either item a) or b) of **8.3.1**, the product may be tested in a modified form with an essentially flat exposed surface and this shall be stated in the report.

9 Room ventilation

Before any specimen is tested, ventilate the testing room or fume cupboard to ensure removal of combustion gases from previous tests and allow adequate time for air movement to cease or to reduce to the limits given in **5.1**.

10 Procedure

10.1 Specimen mounting

Mount a specimen in the specimen holder (**5.5**).

10.2 Restraint system

With some materials, particularly those which are flexible at ambient temperature or which flex under the action of heat, it is necessary to restrain the larger specimens in order to maintain their surface at the specified distance from the burner tube orifice. This can be achieved by use of a restraining comb system as shown in Figure 4. The combs (**5.8**) clamp the specimen between their off-set prongs. The procedure for their use is as follows:

a) clamp the first comb to the test frame (Figure 4);

b) mount the specimen in the test frame;

c) clamp the second comb to the first comb so that the specimen is sandwiched between the prongs of the two combs (Figure 4);

d) apply the ignition sources following the procedure given in **10.3** and **10.4** using a fresh specimen for each ignition source and flame application time.

10.3 Face ignition

10.3.1 *Ignition sources A, B, C, D and E*

Apply the flame from the ignition source to the face of the specimen at an angle of 45° so that the axis of the burner is on the vertical centre line of the specimen, and 30 mm above the bottom edge, and the end of the burner tube is 5 mm from the face of the specimen [see Figure 5(a)]. Simultaneously start the clock. After the specified application time (see Table 1) remove the burner by withdrawing it smoothly from the specimen within 1 s.

Record for each specimen, for each ignition source and for each flame application time:

a) whether a sustained ignition (greater than 10 s, see **2.1**) or transient ignition (less than 10 s, see **2.2**) occurs;

b) whether debris separates and whether it is flaming or glowing;

c) whether flaming (or glowing) reaches any edge within 10 s of the end of the flame application time;

d) whether flaming (or glowing) reaches any edge during application of the ignition source.

10.3.2 *Ignition sources F and G*

Apply the flame from the ignition source to the face of the specimen at an angle of 90° so that the axis of the burner is on the vertical centre line of the specimen, and 150 mm (ignition source F) or 300 mm (ignition source G) above the bottom edge and the end of the burner tube is 90 mm (ignition source F) or 70 mm (ignition source G) from the face of the specimen [see Figure 5(b)]. Simultaneously start the clock. After the specified application time (see Table 1) remove the burner by withdrawing it smoothly from the specimen within 1 s.

Record for each specimen, for each ignition source and for each flame application time:

a) whether a sustained ignition (greater than 10 s, see **2.1**) or transient ignition (less than 10 s, see **2.2**) occurs;

b) whether debris separates and whether it is flaming or glowing;

c) whether flaming (or glowing) reaches any edge with 10 s of the end of the flame application time;

d) whether flaming (or glowing) reaches any edge during application of the ignition source.

10.4 Bottom edge ignition

Apply the flame from ignition sources A, B, C, D and E at an angle of 45° to the bottom edge of the specimen, with the end of the burner tube positioned 5 mm below the bottom edge and 5 mm from the face of the specimen as shown in Figure 6(a).

For ignition sources F and G, apply the flame to the bottom edge of the specimen at an angle of 90° to the specimen face and at a distance of 90 mm and 70 mm for ignition sources F and G respectively as shown in Figure 6(b). Simultaneously start the clock. After the specified application time (see Table 1) remove the burner by withdrawing it smoothly from the specimen within 1 s.

Record for each specimen, for each ignition source and for each flame application time:

a) whether a sustained ignition (greater than 10 s, see **2.1**) or transient ignition (less than 10 s, see **2.2**) occurs;

b) whether debris separates and whether it is flaming or glowing;

c) whether flaming (or glowing) reaches any edge within 10 s of the end of the flame application time;

d) whether flaming (or glowing) reaches any edge during application of the ignition source.

11 Test report

The test report shall include the following:

a) reference to this British Standard, i.e. BS 476-12:1991;

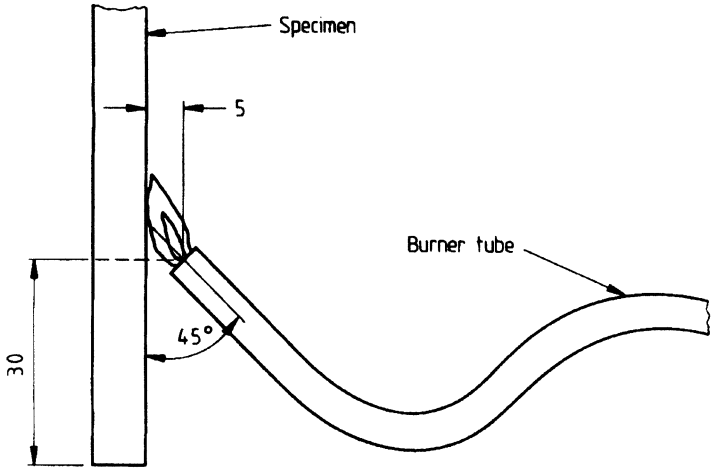
b) identification and description of the product tested including its colour, thickness and density;

c) for each specimen, the information recorded in accordance with clause **10**, separately for face and edge exposure;

d) any special features noted during the test;

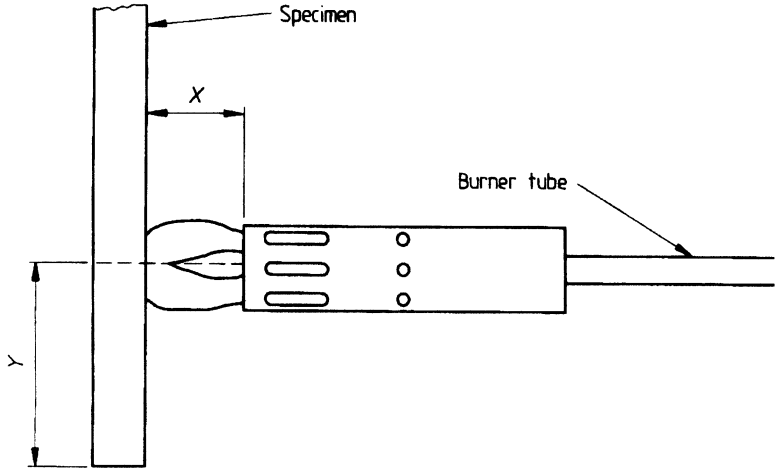
e) the statement: "The test results relate only to the behaviour of the test specimens of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use".

NOTE It is recommended that use be made of the result sheet shown in appendix A.



All linear dimensions are in millimetres.

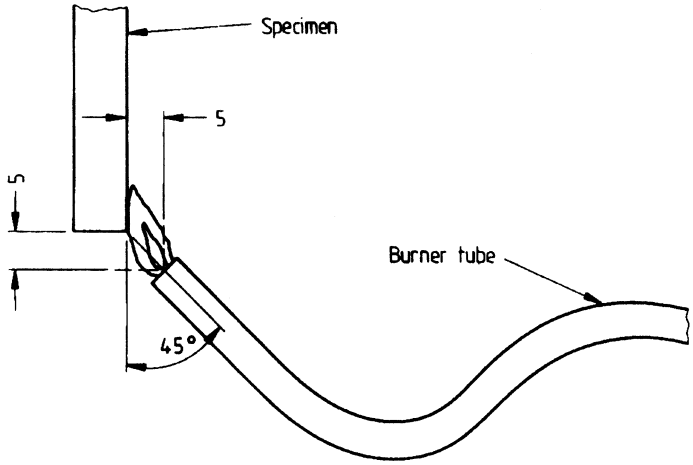
(a) Sources A, B, C, D and E



where X is 90 mm for source F
and 70 mm for source G
and Y is 150 mm for source F
and 300 mm for source G

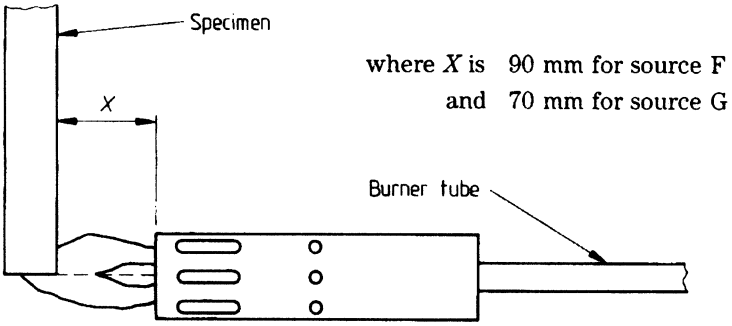
(b) Sources F and G

Figure 5 — Surface ignition



All dimensions are in millimetres.

(a) Sources A, B, C, D and E



(b) Sources F and G

Figure 6 — Bottom edge ignition

Appendix A Result sheet

Name of Laboratory | Laboratory Ref. No.

Address

Tel. No | Date of test

Telex No | Telefax No.

Report of test in accordance with BS 476-12:1991 Ignitability of products by direct flame impingement

Sponsor

Address

Manufacturer/Supplier (if known)

Description of product (including thickness and density)

Results: I = Ignition occurred

T = Transient ignition

N = Ignition did not occur

W = Flaming or glowing to edge during application of ignition source or within 10 s of its removal

Where flaming or glowing occurred, duration recorded in brackets (in seconds)

SURFACE APPLICATION

	Flame application time (s)						
	1	5	20	40	60	120/180	Observations
Specimen	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	
Ignition source A							
B							
C							
D							
E							
F							
G							

Results: I = Ignition occurred
T = Transient ignition
N = Ignition did not occur
W = Flaming or glowing to edge during application of ignition source or within 10 s of its removal

Where flaming or glowing occurred, duration recorded in brackets (in seconds)

BOTTOM EDGE APPLICATION

	Flame application time (s)						
	1	5	20	40	60	120/180	Observations
Specimen	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3	
Ignition source A							
B							
C							
D							
E							
F							
G							

Appendix B Use by specifiers

It is expected that, with experience, specifiers will make use of this Part of BS 476 by requiring that a product does not ignite when tested by a specific ignition source for a specific flame application time.

For example, it may be decided that for a particular end use, the product should not ignite when tested by source G for 60 s by face ignition.

In this case, it would be necessary to specify that the test should be carried out and none of the three specimens should ignite.

Because of the recognized variability of fire performance and fire tests, however, it may be appropriate to consider what action should be taken in the event of a single specimen igniting. This may be considered as an outlier and it may be acceptable to require that an additional three specimens be tested. If none of these additional specimens ignite, then the product could be accepted as complying with the specifier's requirement.

Publication(s) referred to

BS 415, *Specification for safety requirements for mains-operated electronic and related apparatus for household and similar general use.*

BS 476, *Fire tests on building materials and structures.*

BS 476-6, *Method of test for fire propagation for products.*

BS 3016, *Specification for pressure regulators and automatic changeover devices for liquefied petroleum gases.*

BS 3212, *Specification. Flexible rubber tubing and hose (including connections where fitted and safety recommendations) for use in LPG vapour phase and LPG/air installations.*

BS 4250, *Liquefied petroleum gas.*

BS 4250-1, *Specification for commercial butane and propane.*

BS 5423, *Specification for portable fire extinguishers.*

BS 5852, *Methods of test for assessment of the ignitability of upholstered seating by smouldering and flaming ignition sources.*

BS 6458, *Fire hazard testing for electrotechnical products.*

BS 6458-2, *Methods of test.*

BS 6458-2.2, *Needle flame test.*

BS 6575, *Specification for fire blankets.*

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