BRITISH STANDARD

BS 7837 : 1996

Specification for

Flammability performance for textiles used in the construction of marquees and similar textile structures

Product code 00635011

BSI STANDARDS

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee TCI/63, Burning behaviour, upon which the following bodies were represented:

Association of Consulting Scientists
British Apparel and Textile Confederation
British Carpet Manufacturers' Association Ltd.
British Clothing Industry Association
British Interior Textiles Association
British Measurement and Testing Association
British Polyolefin Textiles Association
British Textile Machinery Association
British Textile Technology Group
Chemical Industries Association
Chief and Assistant Chief Fire Officers' Association
Child Accident Prevention Trust
Confederation of British Wool Textiles Limited
Consumer Policy Committee of BSI
Consumers' Association
Department of Health
Department of Trade and Industry (Consumer Safety Unit, CA Division)
Institute of Trading Standards Administration
International Wool Secretariat
Made-Up Textiles Association
Mail Order Traders' Association
Ministry of Defence
National Children's Wear Association
National Fillings Trades Association
National Wool Textile Export Corporation
Soap and Detergent Industry Association
Society of Dyers and Colourists
Textile Finishers' Association
Textile Institute
Warrington Fire Research Centre

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 January 1996

The following BSI references relate to the work on this standard:
Committee reference TCI/63
Draft for comment 94/340360 DC

ISBN 0 580 24953 0

Amendments issued since publication

Amd. No.	Date	Text affected

Contents

Foreword

This British Standard has been prepared by Technical Committee TCI/63.

This standard specifies requirements for flammability for textiles used in the construction of marquees or similar textile structures when subjected to a small igniting flame.

BS 5438 describes the test method most frequently used for flammability testing of textiles and has been modified over the years for use in ISO and CEN versions. BS 5438 : 1989 contains six test methods, of which five have been or are in the process of being replaced by corresponding ISO and CEN methods as these are adopted as British Standards. The one exception is test 2B (edge ignition) for which there is no replacement standard at present.

BS 5438 : 1989 includes an appendix offering advice on choice of test method and acceptance criteria based on interlaboratory trials which did not include the fabric types used for textile structures. Interlaboratory trials have been held on a representative selection of fabrics, both impregnated and coated, commonly used for fabrication of textile structures, over a range of times for the application of flame to the bottom edge and face. The Technical Committee decided the most appropriate method was test 2B (edge ignition) of BS 5438 : 1989 with a flame application of 10 s, defining ignition as an afterflame time of 5 s or more in accordance with ISO and CEN standards. Test 2A (face ignition) was found to be much less severe on impregnated fabrics and comparable with test 2B for coated fabrics, so there was no merit in also including it. In deciding acceptance criteria for this standard, it was recognized: that the fabrics used contain relatively high proportions of an applied finish and unavoidable minor variations in application; and that edge ignition is generally perceived to be a more severe test with a greater propensity for outlier results than face ignition.

BS 5438 : 1989 requires the observation and reporting of flaming debris. Flaming debris is perceived as a potential hazard in a marquee or similar textile structure and is covered by this British Standard.

This British Standard requires pre-treatment by the water soaking procedure described in BS 5651, designed to eliminate fabrics with a water soluble flame resistant treatment. The problem of measuring long term durability performance remains. The only true way is to test the fabric after periods of exposure, but this is clearly impractical, since a sample taken from one section may not be representative of the whole, individual textile structures may have sections fabricated from different textile materials and different sections may not be exposed to the same prevailing weather conditions. Experience of re-testing weathered sections suggests that the flammability treatments used at present can remain effective for up to 8 years or more. An indication of the need for re-testing may well lie in the physical appearance of the fabric.

Decorative textile linings and drapes, usually synthetic in nature, are often a feature of such textile structures. Interlaboratory testing included investigation of possible synergistic effects on the flammability of composites of linings attached to the outer fabrics. No synergistic effects were found, each constituent in a composite behaving in the same manner as when tested by itself.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Specification

1 Scope

This British Standard specifies requirements for flammability of fabrics and fabric assemblies for use in the construction of textile structures such as marquees, large tents, temporary buildings, awnings and other textile structures utilizing large areas of a flexible textile membrane other than air-supported structures, when tested in accordance with test 2B (bottom edge ignition) of BS 5438 : 1989.

Linings and drapes are frequently used in these structures, loose or attached to the outer fabric. In the latter case, the composite fabric assembly is tested to this British Standard.

NOTE. Where the lining or drape is separate from the outer fabric, the standard for curtains and drapes, BS 5867 : Part 2 : 1980 may be appropriate.

These textile structures are normally erected outdoors. Sometimes they are erected in unusual situations, e.g. within buildings, where circumstances may arise where risk assessment is different and other criteria apply.

2 References

2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

2.2 Informative reference

This British Standard refers to another publication that provides information. The edition of this publication current at the time of issue of this standard is given on the inside back cover, but reference should be made to the latest edition.

3 Definitions

For the purposes of this British Standard the definitions given in BS ISO 4880 apply with the following exceptions.

3.1 ignition

Flaming of the test specimen for a period of 5 s or more after removal of the igniting flame.

3.2 flaming debris

Material separating from the specimen during the test procedure, which falls below the initial lower edge of the specimen and ignites a filter paper placed below the test specimen.

4 Sampling

A sample shall be taken of sufficient size to provide the required test specimens from each finishing batch or from at least every 5000 m.

NOTE 1. More frequent testing may be agreed between the purchaser and the supplier.

NOTE 2. In determining the size of the sample recognition should be made of the possible need for re-testing.

5 Durability

The sample shall be subjected to the water soaking procedure described in clause 3 of BS 5651 : 1989.

6 Conditioning and testing atmosphere

6.1 Conditioning

The test specimens shall be conditioned for at least 24 h in an atmosphere having a temperature of (20 ± 2) °C and a relative humidity of (65 ± 5) %. If testing is not carried out immediately after conditioning, the conditioned test specimens shall be placed in a sealed container. Testing of each specimen shall begin within 2 min of removing it from either the conditioning atmosphere or the sealed container.

6.2 Testing atmosphere

The tests shall be performed in an atmosphere having a temperature of 10 °C to 30 °C, relative humidity of 15 % to 80 % and air movement of less than 0.2 m/s at the commencement of the test, which is not influenced by mechanical devices operating during the test, and where the volume of air surrounding the test location is such that the test is unaffected by any reduction of oxygen concentration.

NOTE. Draught shields may be required to restrict air movement in the region of the flame application.

7 Health and safety of operators

NOTE. Burning of materials may produce smoke and toxic gases which can affect the health of operators.

Between tests, the atmosphere of the testing location, which shall be of adequate dimensions to avoid endangering the health of operators, shall be cleared of smoke and fumes by an extractor fan or other means of ventilation.

8 Test procedure and performance

8.1 Test procedure

The fabric shall be tested in accordance with test 2B (bottom edge ignition) of BS 5438 : 1989, together with the procedure given in **8.2**. Three specimens shall be tested in the machine direction and three in the cross direction in accordance with test 2B, using a 10 s flame application time.

8.2 Test for flaming debris

A piece of filter paper of at least 150 mm × 100 mm shall be placed on a horizontal solid surface (50 ± 10) mm below the bottom edge of the specimen, with the centre of the filter paper directly below the centreline of the specimen. If the burner mechanism could touch the filter paper, a suitable slot shall be cut in each piece of filter paper used.

The filter paper[1)] used to detect flaming debris shall have the following characteristics:

- area specific mass: 60 g/m^2 to 100 g/m^2
- thickness: 0.15 mm to 0.25 mm
- alpha cellulose content: >95 %

8.3 Performance

The sample shall be deemed to perform satisfactorily (pass), if, for at least five of the six test specimens:

a) the duration of flaming does not exceed 5 s after removal of the igniting flame; and

b) the lowest boundary of any flame does not reach the upper edge or either vertical edge; and

c) the filter paper does not smoulder or flame.

The sample shall be deemed not to conform to this British Standard (fail) if more than two test specimens show any of the effects listed in items a) to c). If two test specimens show any of the above effects, then a further six specimens shall be tested. In this case, the sample shall be deemed to 'pass' if five of the second set of six specimens perform satisfactorily.

9 Marking

A label bearing the following information shall be attached permanently to each individual piece or roll of each batch:

a) manufacturer's name, address and telephone number;

b) the number and date of this British Standard[2)];

c) date of the test.

[1)] For information on the availability of filter paper suitable for use in the detection of flaming debris write to the information centre, BSI, 389 Chiswick High Road, London W4 4AL.

[2)] Marking BS 7837 : 1996 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim on or on behalf of the manufacturer that the product meets the requirement of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

List of references

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 5438 : 1989	*Methods of test for flammability of textile fabrics when subjected to a small igniting flame applied to the face or bottom edge of vertically oriented specimens*
BS 5651 : 1989	*Method for cleansing and wetting procedures for use in the assessment of the effect of cleansing and wetting on the flammability of textile fabrics and fabric assemblies*
BS ISO 4880 : 1993	*Burning behaviour of textiles and textile products. Vocabulary*

Informative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 5867 : BS 5867 : Part 2 : 1980	*Specification for fabrics for curtains and drapes* *Flammability requirements*

BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

If permission is granted, the terms may include royalty payments or a licensing agreement. Details and advice can be obtained from the Copyright Manager. Tel: 020 8996 7070.

BSI
389 Chiswick High Road
London
W4 4AL