

Methods of test for

The ignitability of bedcovers and pillows by smouldering and flaming ignition sources

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- British Carpet Manufacturers' Association Ltd.
- British Clothing Industry Association
- British Plastics Federation
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Foreword

This British Standard has been prepared under the direction of the Textiles and Clothing Standards Policy Committee and is based on procedures developed by The Crown Suppliers.

It is used for the assessment of resistance to ignition of individual items of bedcovers and composite arrangements of bedcovers in the orientations that would be used in real-life situations, i.e. in both horizontal and vertical planes.

The ignition sources used in this standard are described in BS 5852-1 and BS 5852-2 and are the same as those used in BS 6807, which this standard complements. The two standards can be used in conjunction with each other to establish higher safety levels for bedding.

It can not be assumed that protection against flaming ignition sources will automatically give protection against smouldering ignition. Users of the standard should therefore recognize the need to submit test specimens to both smouldering cigarette and flaming ignition sources. The frequency of testing will usually appear in associated performance specifications.

WARNING. The tests only relate to the ignitability of the materials described in the test report (see clause 21) and are not intended to reproduce the full fire hazards that may be encountered. Particular attention is drawn to the possibility of ignition of lower layers of a bed assembly when using bedcovers which are not themselves ignited but which form a hole on exposure to an ignition source.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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

Summary of pages

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

Section 1. General

1 Scope

This British Standard describes methods of test for the ignitability of bedcovers and pillows when subjected to smouldering and flaming types of ignition sources of differing severities.

It is divided into five sections as follows.

- *Section 1: General;*
- *Section 2: Pillows and continental quilts tested with smouldering and flaming ignition sources;*
- *Section 3: Individual bedcovers (including mattress cases and covers, sheets, pillowslips, blankets, bedspreads and continental quilt covers) tested with smouldering and flaming ignition sources;*
- *Section 4: Composites of known bedcovers and pillows tested with smouldering and flaming ignition sources;*
- *Section 5: Final examination of test specimens and test report.*

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 British Standard the following definitions apply.

2.1 ignition source

a source of energy that is used to ignite combustible materials or products

2.2 primary source

the initial heat supply in a test

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

combustion in the gaseous phase with the emission of light

2.5 flammability

the ability of a material or product to burn with a flame under specified test conditions

2.6 ignitability

a measure of the ease with which a material, product or component can be ignited (see 3.1)

2.7 bed

a mattress placed on top of a bed base with no other bedding items present

2.8 bedcovers

a general term for all items placed on the bed by a user to provide comfort and warmth. It includes sheets, blankets, bedspreads, continental quilts, continental quilt covers and mattress covers

2.9 made-up bed

a bed prepared for use by covering with bedcovers, tucking these between the mattress and bed base, positioning pillows with pillowslips and turning down sheets and blankets at the head end of the bed

NOTE Individual styles vary in detail depending on the user.

2.10 bed assembly

a stack of successive layers of mattress and various bed covers, with or without pillow and pillowslip, representing a section through the centre of a made-up bed

2.11 bed base

a structure that supports the mattress

2.12 hole

a break in the fabric at least 2 mm × 2 mm in size caused by melting, glowing or flaming. If the hole is crossed by any material it is to be described as discontinuous.

2.13 mattress

a product in the form of a resilient material, or padding material in combination with steel springs, enveloped by a mattress case

2.14 mattress case (ticking)

a primary covering material that is not intended to be removed from the mattress

2.15 mattress cover

a secondary covering material that can be removed for laundering purposes, etc.

3 Criteria of ignition

3.1 General

For the purposes of this British Standard, ignition is considered to be initiation of combustion of the test specimen followed by sustained combustion as indicated by one of the following types of behaviour.

- a) *Extensive combustion.* The test specimen is essentially consumed within the specified time (see 3.2), i.e. the length of specimen consumed is greater than 400 mm in any two orthogonal directions.
- b) *Flaming combustion.* Any flaming of the test specimen initiated by the smouldering cigarette (ignition source 0), or any flaming of the test specimen at the specified time (see 3.2) when using flaming ignition sources (1 to 7).
- c) *Progressive smouldering.* Any smouldering of the test specimen producing detectable amounts of glow, heat or smoke at the specified time (see 3.2).
- d) *Concealed smouldering.* Any smouldering which can not be detected externally because of the thickness or structure of the test specimen but which is detected on dismantling the test specimen 60 min after placement of the ignition source (see clause 20).

3.2 Specified times

The specified times for assessment of sustained combustion shall be as follows:

- a) for smouldering cigarette ignition source 0, 60 min after placement of the cigarette;
- b) for butane flame ignition sources 1 to 3, 120 s after removal of the ignition flame;
- c) for crib ignition sources 4 and 5, 10 min after ignition of the crib;
- d) for crib ignition sources 6 and 7, 13 min after ignition of the crib;
- e) for composite test specimens, e.g. pillows, quilts and bedcover assemblies, and for multilayer test specimens, e.g. smouldering cigarette placed between folded layers, if combustion has not been detected the test specimen shall be dismantled and examined for concealed smouldering 60 min after placement of the ignition source (see clause 20).

4 General principle

A test specimen is placed on a mineral wool fibre pad (MWFP) and subjected to smouldering and flaming ignition sources placed on top of and/or below the test specimen.

NOTE The range of intensity of the sources has been selected to imitate that of actual sources that might be encountered in various end use environments.

5 Health and safety of operators

NOTE There is considerable risk with these tests and it is essential that suitable precautions be taken, which may include the provision of breathing apparatus and protective clothing.

5.1 Enclosure

For safety, the tests shall be conducted in a suitable fume cupboard or purpose-built room so that individuals are not exposed to any fumes (see 6.4).

5.2 Extinguishers

Readily accessible means of extinguishing the test specimens shall be provided.

NOTE 1 For preference, water should be provided for smouldering fires and a fire extinguisher should be provided for flaming fires. Carbon dioxide extinguishers are not suitable for extinguishing test specimens.

NOTE 2 Extinction of specimens may be difficult and care should be taken that they are only disposed of when completely inert. It may be necessary to immerse smouldering specimens in water, or place them in a sealed non-combustible enclosure. To ensure complete safety other suitable steps may have to be taken.

6 Apparatus

6.1 Test rig (see Figure 1) consisting of a platform of expanded steel or open mesh supported at least 75 mm above a solid base. When testing with ignition sources below the test specimen the platform shall be 380 ± 50 mm above the solid base.

NOTE When testing a full size bedcover assembly it may be necessary to use an actual bed base for ignition from below.

The rig is sited within the enclosure (see 6.4) and the testing is performed in a draught-free environment permitting an adequate supply of air.

6.2 Stop clock, reading to the nearest second.

6.3 Ignition sources, as described in sections 2 to 4.

6.4 Test enclosure, consisting of either a room with a volume greater than 20 m^3 , which contains adequate oxygen for testing, or a smaller enclosure with a through flow of air equipped with inlet and extraction systems. Air flow rates shall be between 0.02 m/s and 0.2 m/s in the locality of the test specimen position. These limits provide adequate oxygen without disturbing the burning behaviour.

6.5 Mineral wool fibre pad, complying with BS 5803-1, of nominal dimensions $450 \text{ mm} \times 450 \text{ mm} \times 25 \text{ mm}$ thickness (see Figure 2).

6.6 Adjustable support, for locating crib ignition sources 4 to 7 at the specified distances below the test specimen (see 10.2, 14.2 and clause 18)