BRITISH STANDARD

BS 7175:1989

Methods of test for

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

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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.

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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.

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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.

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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 mm × 450 mm × 25 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**)

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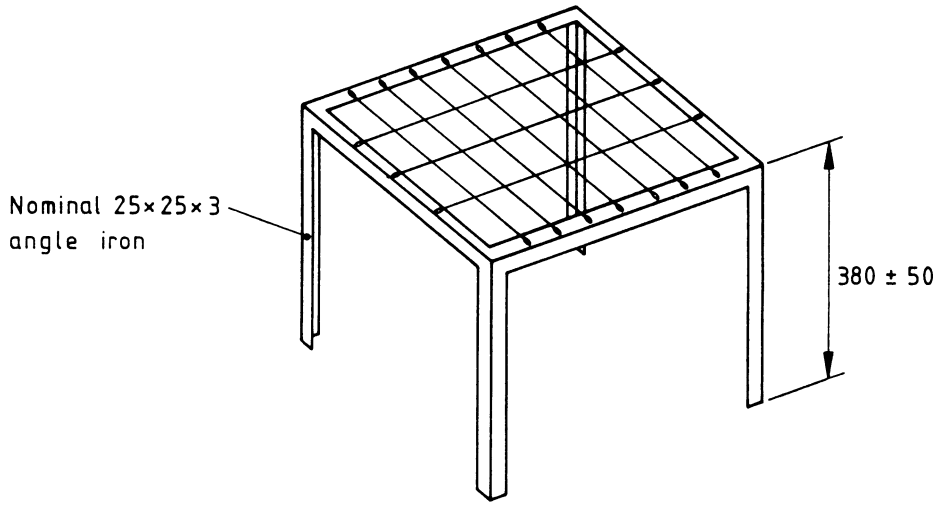
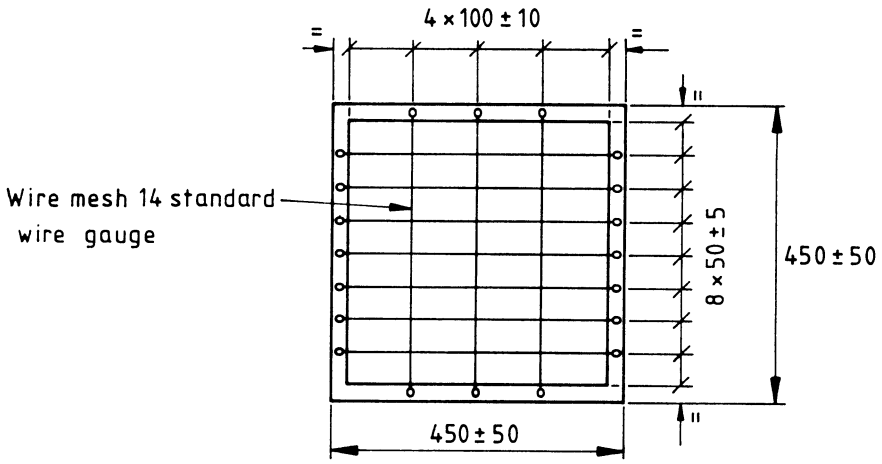


(a) Platform showing extended legs



(b) Spacing of wire mesh platform

All dimensions are in millimetres.

Figure 1 — Test rig

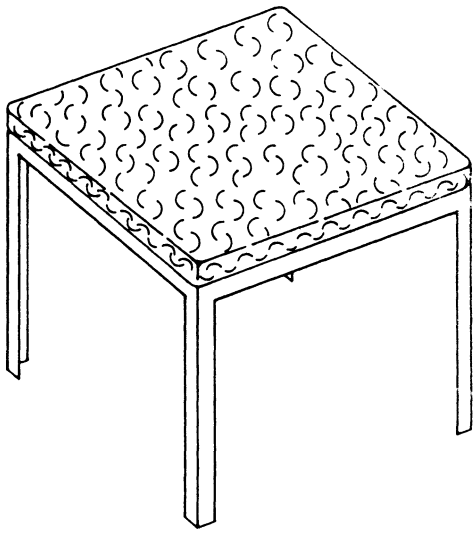
7 Conditioning and testing

7.1 Conditioning

The materials to be tested and the ignition sources shall be conditioned immediately before the test for 72 h in indoor ambient conditions and then for at least 16 h in an atmosphere having a temperature of 20 ± 5 °C and a relative humidity of 65 ± 5 %.

7.2 Testing

For testing, a draught-free environment having a temperature of 15 °C to 30 °C and a relative humidity of 55 ± 20° shall be used. If the test is not carried out immediately after conditioning, place the conditioned specimens in a sealed container until the start of the test. Begin testing each specimen within 10 min of removing it from either the conditioning atmosphere or the sealed container.



Mineral wool fibre pad placed on test rig and used for all tests.

Figure 2 — Test rig and mineral wool fibre pad

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Section 2. Pillows and continental quilts tested with smouldering and flaming ignition sources

8 General

In this section of this standard a pillow or continental quilt or smaller specimen of a quilt is tested. The ignition sources used are the smouldering and/or flaming ignition sources described in BS 5852-1 and BS 5852-2 (see Table 1). The source may be positioned either above or below the test specimen.

NOTE The minimum source required for ignition may be different in the two arrangements.

Table 1 — Tests with smouldering and flaming ignition sources for pillows and continental quilts

Nature of ignition source	Ignition source
Smouldering	0 Cigarette
Flaming	1 Butane gas flame 2 Butane gas flame 3 Butane gas flame 4 Pine wood crib 5 Pine wood crib 6 Pine wood crib 7 Pine wood crib
NOTE See clause **4**.	

9 Test specimens

9.1 The test specimen shall be representative of the components and make-up of the finished item.

9.2 For pillows, the test specimen shall be a full sized item.

9.3 For continental quilts, the test specimen shall be of minimum size 650 mm × 650 mm × nominal thickness of the finished item. The intended quilting, channelling and edge finishing of the proposed item shall be included in the test specimen.

10 Ignition sources

10.1 The ignition sources to be used shall be those described in BS 5852-1 and BS 5852-2.

10.2 When testing below the test specimen the ignition source shall be placed at the distance given in Table 2.

Table 2 — Distance of ignition source below test specimen for pillows and continental quilts

Ignition source number	Distance below test specimen
	mm
1	5 ± 1
2	10 ± 1
3	15 ± 1
4	20 ± 3
5	30 ± 3
6	60 ± 3
7	100 ± 3
NOTE For ignition sources 1 to 3 the distance given is from the upper edge of a horizontal burner tube to the lowest point of the test specimen. For ignition sources 4 to 7 the distance given is from the top of the wooden crib to the lowest point of the test specimen.	

11 Test procedures

11.1 Smouldering cigarette test: ignition source 0

11.1.1 Place the MWFP on the test rig (see Figure 2). Light a cigarette and draw air through it until the tip glows brightly. Not less than 5 mm and not more than 8 mm of the cigarette shall be consumed in this operation.

Place the cigarette and test specimen on the MWFP so that the cigarette lies adjacent to the pillow in position B1 shown in Figure 3(a) or beneath the thickest part of the continental quilt in position B1 shown in Figure 3(b). Light a further cigarette as described in the previous paragraph and place it on the upper surface in position A shown in Figure 3(a) for pillows, or in position A shown in Figure 3(b) for continental quilts, ensuring that the whole of the cigarette is in contact with the specimen. For continental quilts only, light a third cigarette as described in the previous paragraph and place it along the line of stitching in position as shown in Figure 3(b). Start the clock immediately the last cigarette is in position.

11.1.2 Observe the specimen for any evidence of extensive combustion or flaming combustion. Examine the specimen for progressive smouldering or concealed smouldering (see **3.1**) 60 min after placement of the final cigarette.

NOTE The detection of smouldering may be difficult and is eased by watching for smoke emerging at points at a distance from the cigarette. Smoke is most easily viewed by looking down a rising column by means of a mirror.

11.1.3 If ignition of the test specimen is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

11.1.4 If ignition of the test specimen is not observed or if a cigarette fails to smoulder its complete length, repeat the test with new cigarettes placed in new positions as described in **11.1.1** ensuring that the cigarettes are at least 50 mm from any marks left by previous tests or the edge of the test rig.

11.1.5 If ignition of the test specimen is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

11.1.6 If ignition is not observed in this repeat test, or if a cigarette fails to smoulder its complete length, record non-ignition for the smouldering cigarette test.

11.2 Butane flame tests: ignition sources 1 to 3

11.2.1 Light the butane emerging from the burner tube, adjust the gas flow to the rate given in BS 5852-1 or BS 5852-2 as appropriate and allow the flow to stabilize for at least 120 s.

11.2.2 Position flaming ignition sources 1 to 3 as follows:

a) for a test on top of the test specimen, in position A shown in Figure 3(a) for pillows, or in position A shown in Figure 3(b) for continental quilts;

b) for continental quilts only, an additional test is carried out with the ignition source along the line of stitching on top of the specimen in position AS shown in Figure 3(b);

c) for a test below the test specimen, for pillows in position B2 shown in Figure 3(a), or for continental quilts in position B2/3 shown in Figure 3(b), at the distance below the test specimen given in Table 2, with the centreline of the ignition source directly in line with the overhang of the test specimen.

Place the burner tube on top of or below the test specimen as applicable so that the flame is not less than 50 mm from any marks left by any previous test, and simultaneously start the clock.

11.2.3 Allow the gas to burn for the time given in BS 5852-1 or BS 5852-2 as appropriate and then terminate by removing the burner tube from the test specimen.

11.2.4 Observe the specimen for any evidence of extensive or flaming combustion or of progressive smouldering 120 s after removal of the burner tube. If ignition of the test specimen is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

11.2.5 If flaming ignition of the test specimen is not observed, repeat the test at a new position as described in **11.2.2**.

11.2.6 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

11.2.7 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the specimen and record that ignition had occurred for the ignition source used. If concealed smouldering is not observed, record non-ignition for the ignition source used.

11.3 Wooden crib tests: ignition sources 4 to 7

11.3.1 To the assembled crib and after conditioning (see **7.1**), add slowly 1.4 ± 0.1 mL of propan-2-ol to the centre of the lint. Position the crib as follows:

a) for a test on top of the test specimen, in position A shown in Figure 3(a) for pillows, or in position A shown in Figure 3(b) for continental quilts, not less than 170 mm from any edge or marks left by any previous test, the distance being measured from the centre of the crib;

b) for a test below the test specimen, for pillows in position B3 shown in Figure 3(a) and for continental quilts in position B2/3 shown in Figure 3(b) and at the distance below the test specimen given in Table 2, with the centreline of the ignition source directly in line with the overhang of the test specimen.

11.3.2 Within 2 min of adding the propan-2-ol, ignite the lint using a match, small gas flame or hot wire, and simultaneously start the clock.

11.3.3 Observe the test specimen for any evidence of extensive or flaming combustion or progressive smouldering 10 min after ignition of ignition source 4 or 5, or 13 min after ignition of ignition source 6 or 7. If ignition is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

NOTE Apparent extinction should be checked by closer examination, which may entail entering the test enclosure.

11.3.4 If ignition is not observed, repeat the test as described in **11.3.1** and **11.3.2**.

NOTE More than one pillow may be necessary for repeat tests to be carried out in the "top" and "below" test positions.

11.3.5 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

11.3.6 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the specimen and record that ignition had occurred for the ignition source used. If concealed smouldering is not observed, record non-ignition for the ignition source used.

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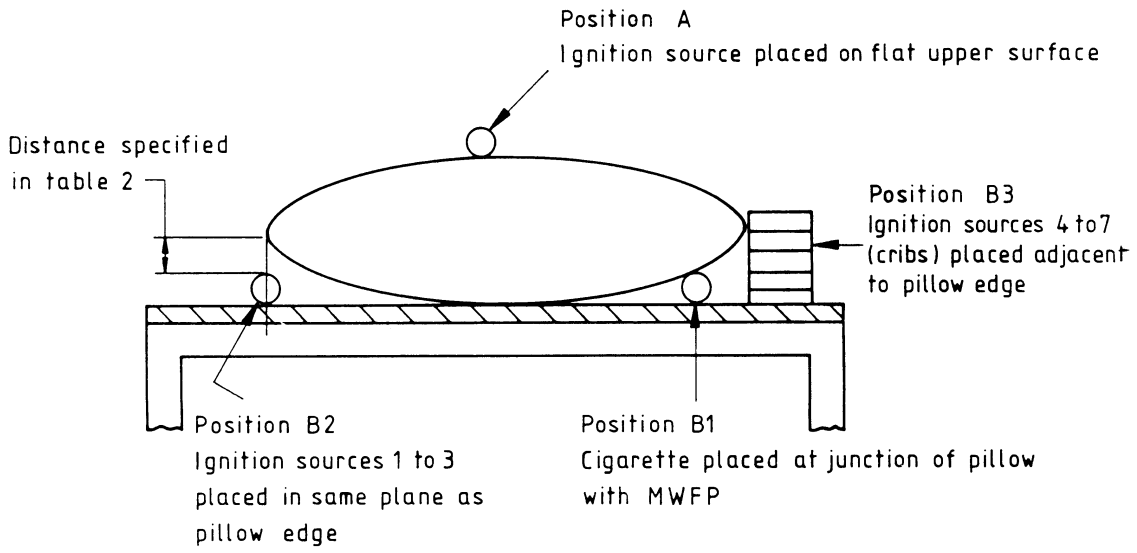
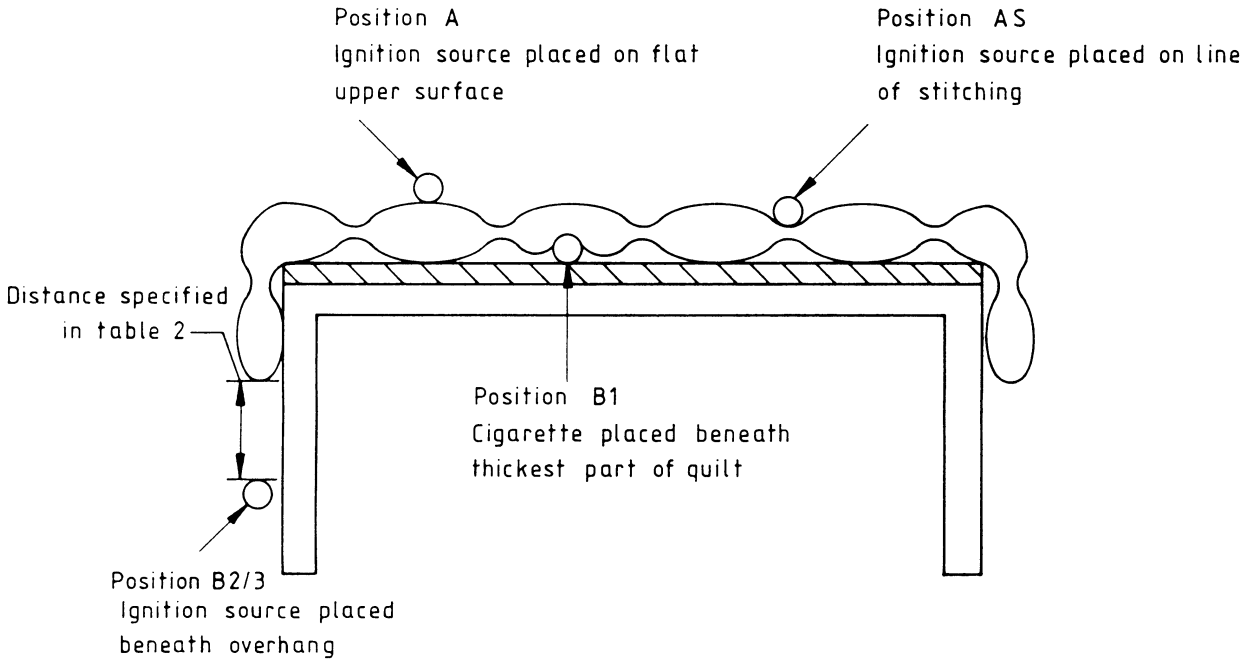


(a) Test specimen pillow : using smouldering and flaming ignition sources.



(b) Test specimen continental quilts : using smouldering and flaming ignition sources.

Figure 3 — Position of ignition source for pillows and continental quilts

Section 3. Individual bedcovers (including mattress cases and covers, sheets, pillowslips, blankets, bedspreads and continental quilt covers) tested with smouldering and flaming ignition sources

12 General

This section of this standard describes a method of assessing the ignitability of individual items of bedcovers. The ignition sources used are the smouldering and/or flaming ignition sources described in BS 5852-1 and BS 5852-2 (see Table 3). The source may be positioned either above or below the test specimen.

NOTE The minimum source required for ignition may be different in the two arrangements.

Table 3 — Tests with smouldering and flaming ignition sources for individual bedcovers

Nature of ignition source	Ignition source
Smouldering	0 Cigarette
Flaming	1 Butane gas flame 2 Butane gas flame 3 Butane gas flame 4 Pine wood crib 5 Pine wood crib 6 Pine wood crib 7 Pine wood crib
NOTE See clause **4**.	

13 Test specimens

13.1 The test specimens shall be representative of the components and make-up of the finished item.

13.2 The size of the test specimens shall be as follows:

a) *for cigarette ignition source 0:* 450 mm × 1 350 mm minimum to allow for folding three times as shown in Figure 4(a);

b) *for flaming ignition sources 1 to 7:* 650 mm × 650 mm minimum to allow for an overhang of 150 mm as shown in Figure 4(b).

14 Ignition sources

14.1 The ignition sources to be used shall be those described in BS 5852-1 and BS 5852-2.

14.2 When testing below the test specimen the ignition source shall be placed at the distance given in Table 4.

Table 4 — Distance of ignition source below test specimen for individual bedcovers

Ignition source number	Distance below test specimen
	mm
1	5 ± 1
2	10 ± 1
3	15 ± 1
4	20 ± 3
5	30 ± 3
6	60 ± 3
7	100 ± 3
NOTE For ignition sources 1 to 3 the distance given is from the upper edge of a horizontal burner tube to the lowest point of the test specimen. For ignition sources 4 to 7 the distance given is from the top of the wooden crib to the lowest point of the test specimen.	

15 Test procedures

15.1 Smouldering cigarette test: ignition source 0

15.1.1 Light two cigarettes and draw air through them until the tips glow brightly. Not less than 5 mm and not more than 8 mm of each cigarette shall be consumed in this operation.

Place the test specimen on the MWFP so that it is folded three times [see Figure 4(a)]. Place one cigarette in position B between the top and second fold as shown in Figure 4(a), at least 50 mm from any side. Immediately place the second cigarette in position A on the top surface so that it is at least 100 mm from the cigarette placed between the fold. Start the clock immediately the last cigarette is in position.

15.1.2 Observe the specimen for any evidence of extensive combustion or flaming combustion. Examine the specimen for progressive smouldering or concealed smouldering (see **3.1**) 60 min after placement of the final cigarette.

NOTE The detection of smouldering may be difficult and is eased by watching for smoke emerging at points at a distance from the cigarette. Smoke is most easily viewed by looking down a rising column by means of a mirror.

15.1.3 If ignition of the test specimen is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

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15.1.4 If ignition is not observed or if either cigarette fails to smoulder its complete length, repeat the test with new cigarettes placed as described in **15.1.1**, not less than 50 mm from any previous test damage.

15.1.5 If ignition of the test specimen is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

15.1.6 If ignition is not observed in this repeat test or if either cigarette fails to smoulder its complete length, record non-ignition for the smouldering cigarette test.

15.2 Butane flame tests: ignition sources 1 to 3

15.2.1 Light the butane emerging from the burner tube, adjust the gas flow to the rate given in BS 5852-1 or BS 5852-2 as appropriate and allow the flow to stabilize for at least 120 s.

15.2.2 Position flaming ignition sources 1 to 3 as follows:

a) for a test on top of the test specimen, in position A shown in Figure 4(b);

b) for a test below the test specimen, in position B shown in Figure 4(b) at the distance below the test specimen given in Table 4, with the centreline of the ignition source directly in line with the overhang of the test specimen.

Place the burner tube on top of or below the test specimen as applicable so that the flame is not less than 50 mm from any marks left by any previous test, and simultaneously start the clock.

15.2.3 Allow the gas to burn for the time given in BS 5852-1 or BS 5852-2 as appropriate and then terminate by removing the burner tube from the test specimen.

15.2.4 Observe the test specimen for any evidence of extensive or flaming combustion or of progressive smouldering 120 s after removal of the burner tube. If ignition of the test specimen is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

15.2.5 If ignition of the test specimen is not observed, repeat the test as described in **15.2.1** and **15.2.2**.

15.2.6 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

15.2.7 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the specimen and record that ignition had occurred for the ignition source used. If concealed smouldering is not observed, record non-ignition for the ignition source used.

15.3 Wooden crib tests: ignition sources 4 to 7

15.3.1 To the assembled crib and after conditioning (see **7.1**), add slowly 1.4 ± 0.1 mL of propan-2-ol to the centre of the lint. Place the crib as follows:

a) for a test on top of the test specimen, in position A shown in Figure 4(b) not less than 170 mm from any edge or marks left by any previous test, the distance being measured from the centre of the crib;

b) for a test below the test specimen, in position B shown in Figure 4(b) at the distance below the test specimen given in Table 4 with the centreline of the ignition source directly in line with the overhang of the test specimen.

15.3.2 Within 2 min of adding the propan-2-ol ignite the lint using a match, small gas flame or hot wire, and simultaneously start the clock.

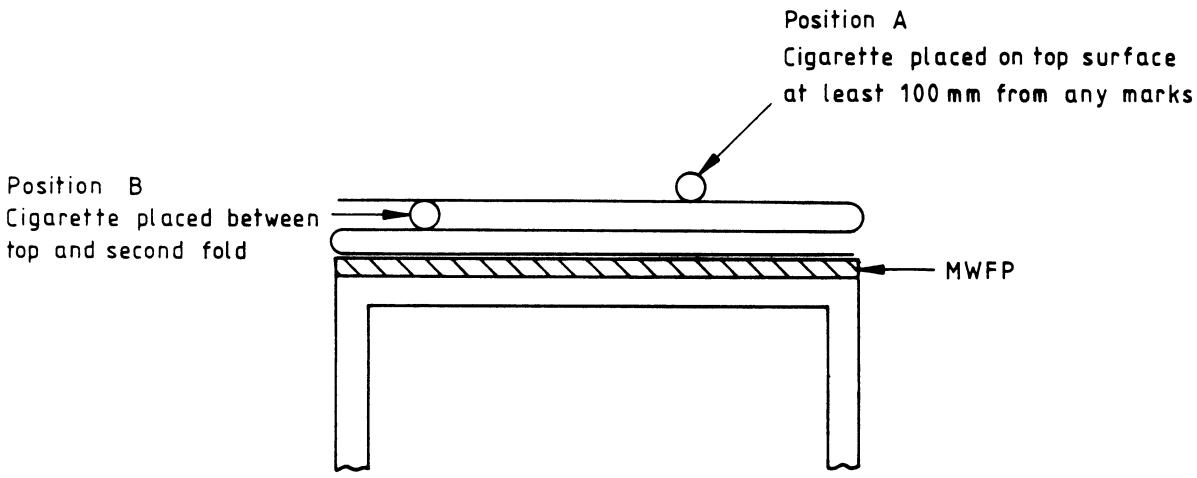
15.3.3 Observe the test specimen for any evidence of extensive or flaming combustion or progressive smouldering 10 min after ignition of crib 4 or 5, or 13 min after ignition of crib 6 or 7. If ignition is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

NOTE Apparent extinction should be checked by closer examination, which may entail entering the test enclosure.

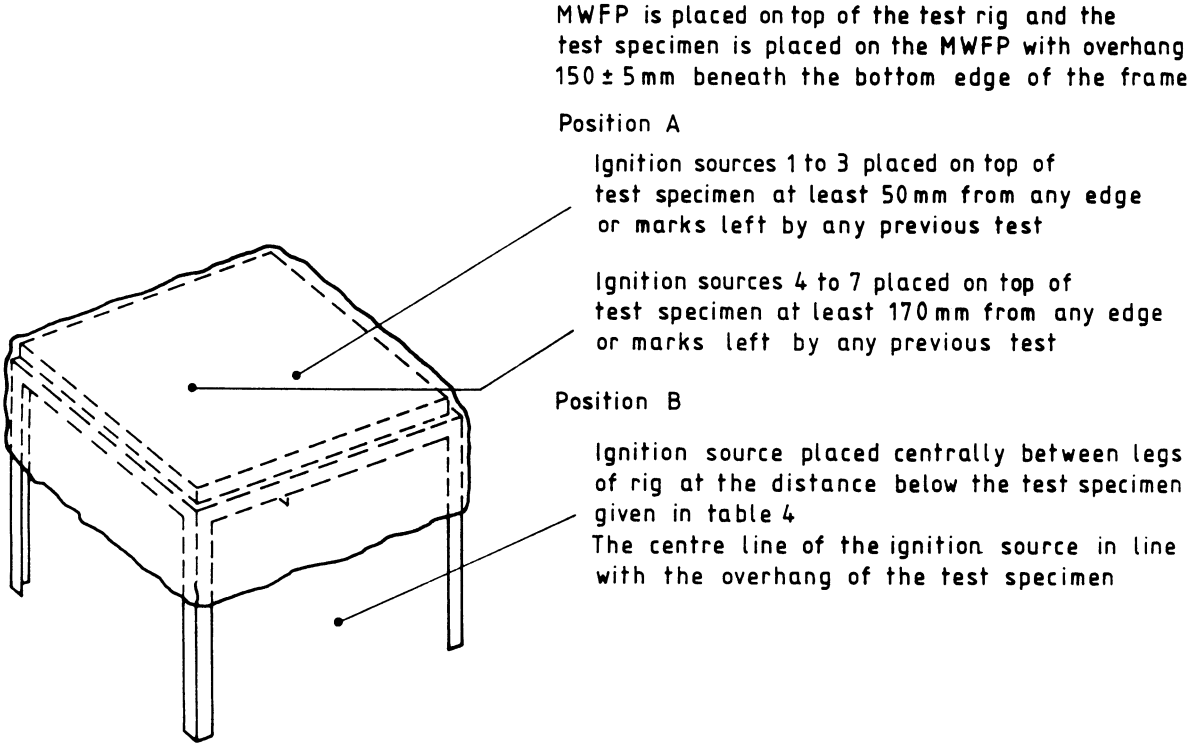
15.3.4 If ignition is not observed, repeat the test as described in **15.3.1** and **15.3.2**.

15.3.5 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

15.3.6 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the specimen and record that ignition had occurred for the ignition source used. If concealed smouldering is not observed, record non-ignition for the ignition source used.



(a) Bedcovers tested using smouldering ignition source



(b) Bedcovers tested using flaming ignition sources

Figure 4 — Position of ignition sources for bedcovers

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Section 4. Composite of known bedcovers and pillows tested with smouldering and flaming ignition sources

16 General

When the composite of bedcovers and pillows is known, the most effective tests will be those that reproduce these details exactly. Therefore, in this section of this standard the bedcovers and pillows can be used as a composite to which the primary smouldering and/or flaming ignition sources as described in BS 5852-1 and BS 5852-2 are applied (see Table 5). The primary source may be positioned either at the junction of the pillow and bedcovers or below the test assembly.

NOTE The minimum source required for ignition may be different in the two positions of the primary source.

Table 5 — Tests with smouldering and flaming ignition sources for composite of known bedcovers and pillows

Nature of ignition source	Ignition source
Smouldering	0 Cigarette
Flaming	1 Butane gas flame 2 Butane gas flame 3 Butane gas flame 4 Pine wood crib 5 Pine wood crib 6 Pine wood crib 7 Pine wood crib
NOTE See clause **4**.	

17 Test specimens

17.1 The test specimens shall be representative of the components and make-up of the finished assembly of bedcovers and pillows and of the order in which the bedcovers and pillows are laid on a mattress.

17.2 The test specimens shall be rectangular in shape and of minimum size 650 mm × 650 mm to allow for overhang of the test specimen as shown in Figure 5. The pillow used in the composite shall be a minimum of half-scale size.

18 Ignition sources

When testing below the test specimen the ignition source shall be placed at the distance given in Table 6.

Table 6 — Distance of ignition source below test specimen for composite of known bedcovers and pillows

Ignition source number	Distance below test specimen
	mm
1	5 ± 1
2	10 ± 1
3	15 ± 1
4	20 ± 3
5	30 ± 3
6	60 ± 3
7	100 ± 3
NOTE For ignition sources 1 to 3 the distance given is from the upper edge of a horizontal burner tube to the lowest point of the test specimen. For ignition sources 4 to 7 the distance given is from the top of the wooden crib to the lowest point of the test specimen.	

19 Test procedures

19.1 Smouldering cigarette test: ignition source 0

19.1.1 Place the MWFP on the test rig and place the bottom sheet over the MWFP. Place the pillow on the sheet. Prepare the combination of top bedcovers and fold it in half so that the top sheet is outermost.

Light a cigarette and draw air through it until the tip glows brightly. Not less than 5 mm and not more than 8 mm of the cigarette shall be consumed in this operation.

Place the smouldering cigarette in position J at the junction of the pillow and the bedcovers as shown in Figure 5(a) ensuring that it is at least 100 mm from the nearest edge of the test rig or marks left by any previous test. Place the folded bedcovers on the MWFP parallel to and with the fold in contact with the cigarette and simultaneously start the clock.

19.1.2 Observe the test specimen for any evidence of extensive or flaming combustion. Examine the test specimen for progressive or concealed smouldering (see **3.1**) 60 min after placement of the cigarette.

NOTE The detection of smouldering may be difficult and is eased by watching for smoke emerging at points at a distance from the cigarette. Smoke is most easily viewed by looking down a rising column by means of a mirror.

19.1.3 If ignition of the test specimen is observed, extinguish the test specimen record that ignition had occurred for the ignition source used and discontinue testing.

19.1.4 If ignition of the test specimen is not observed or if the cigarette fails to smoulder its complete length, repeat the test with a new cigarette placed in a new position as described in **19.1.1**.

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NOTE This repeat test may be run concurrently with the first test, when the spacing between the cigarettes should be at least 100 mm.

19.1.5 If ignition of the test specimen is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

19.1.6 If ignition is not observed in this repeat test, or if the cigarette fails to smoulder its complete length, record non-ignition for the smouldering cigarette test.

19.2 Butane flame tests: ignition sources 1 to 3

19.2.1 Light the butane emerging from the burner tube, adjust the gas flow to the rate given in BS 5852-1 or BS 5852-2 as appropriate and allow the flow to stabilize for at least 120 s.

19.2.2 Place the sheet over the MWFP and place the pillow on the sheet. Place the bedcovers on the MWFP so that they overlap the pillow. For a test on top, fold the bedcovers back at an angle of approximately 30° so that the pillow-bedcovers-sheet junction is at least 50 mm from any marks left by any previous test. For a test from below, the bedcovers shall overhang by 150 mm beneath the bottom of the test frame.

Place the burner tube in position J at the junction of the pillow and the bedcovers or below the test specimen in position B shown in Figure 5(b) at the distance below the overhang of the bedcovers given in Table 6, with the centreline of the ignition source directly in line with the overhang, and simultaneously start the clock.

19.2.3 Allow the gas to burn for the time given in BS 5852-1 or BS 5852-2 as appropriate and then terminate by removing the burner tube from the test specimen.

19.2.4 Observe the specimen for any evidence of extensive or flaming combustion or of progressive smouldering 120 s after removal of the burner tube. If ignition of the test specimen is observed, extinguish the test specimen, record that ignition had occurred and discontinue testing.

19.2.5 If ignition of the test specimen is not observed, repeat the test at a new position as described in **19.2.2**.

19.2.6 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

19.2.7 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the test specimen and record that ignition had occurred for the ignition source used. If concealed smouldering is not observed, record non-ignition for the ignition source used.

19.3 Wooden crib tests: ignition sources 4 to 7

19.3.1 Place the sheet over the MWFP and place the pillow on the sheet. Place the bedcovers on the MWFP so that they overlap the pillow. For a test on top, fold the bedcovers back at an angle of approximately 30° so that the pillow-bedcovers-sheet junction is at least 170 mm from any marks left by any previous test. For a test from below, the bedcovers shall overhang by 150 mm beneath the bottom of the test frame.

To the assembled crib and after conditioning (see **7.1**), add slowly 1.4 ± 0.1 mL of propan-2-ol to the centre of the lint.

Place the crib as follows:

a) for a test at the junction of the test components, in position J on the bottom sheet adjacent to the pillow and to the folded bedcovers as shown in Figure 5(b).

b) for a test below the test specimen in position B shown in Figure 5(b) at the distance below the overhang of the bedcovers given in Table 6, with the centreline of the ignition source directly in line with the overhang.

19.3.2 Within 2 min of adding the propan-2-ol, ignite the lint using a match, small gas flame or hot wire, and simultaneously start the clock.

19.3.3 Observe the test specimen for any evidence of extensive or flaming combustion or progressive smouldering 10 min after ignition of source 4 or 5, or 13 min after ignition of source 6 or 7. If ignition is observed, extinguish the test specimen, record that ignition had occurred for the ignition source used and discontinue testing.

NOTE Apparent extinction should be checked by closer examination, which may entail entering the test enclosure.

19.3.4 If ignition is not observed, repeat the test at a new position as described in **19.3.1**.

19.3.5 If ignition is observed in this repeat test, extinguish the test specimen and record that ignition had occurred for the ignition source used.

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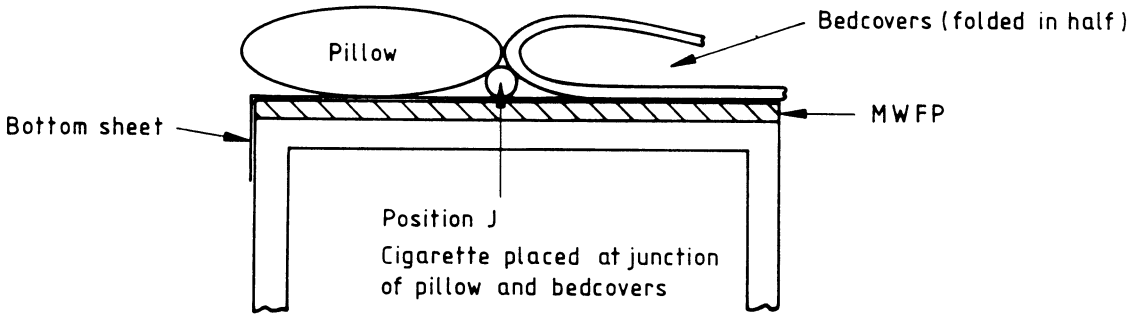
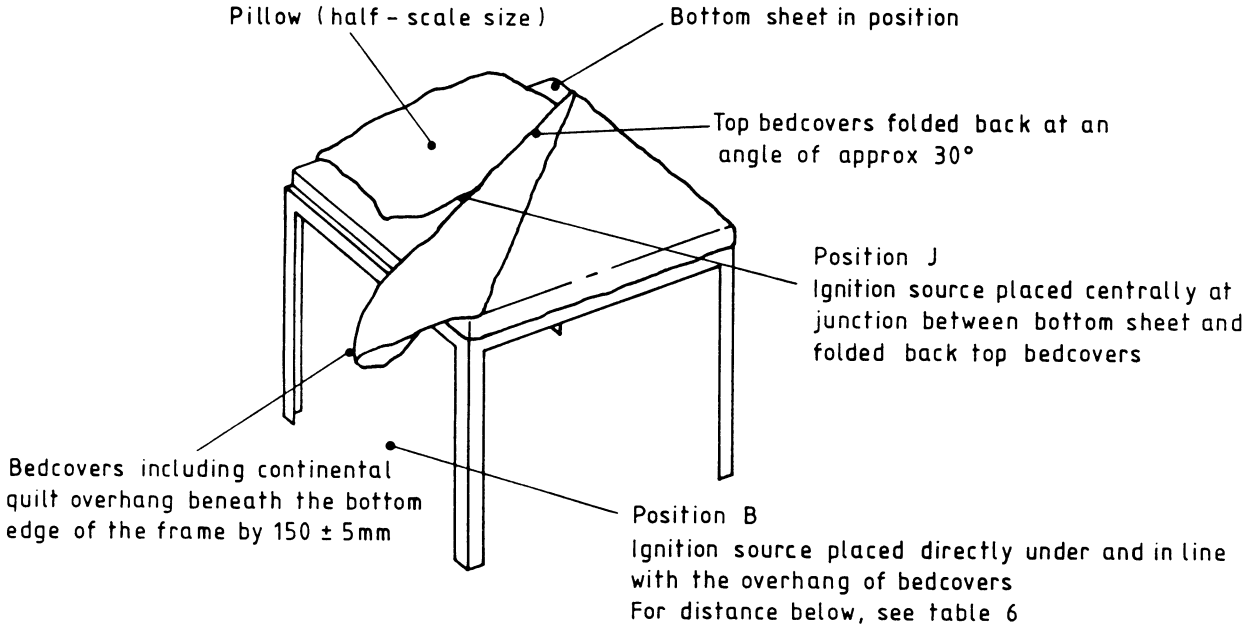
19.3.6 If ignition is not observed in this repeat test, carry out a final examination (see clause **20**) for concealed smouldering 60 min after applying the ignition source. If concealed smouldering is observed, extinguish the test specimen and record that ignition had occurred. If concealed smouldering is not observed, record non-ignition for the ignition source used.



(a) Smouldering ignition source



(b) Flaming ignition sources

Figure 5 — Position of ignition sources for composite of known bedcovers and pillows

Section 5. Final examination of test specimens and test report

20 Final examination

Any test specimen that is of sufficient thickness or construction that progressive smouldering is not obvious externally [see **3.2** e)] shall be dismantled 60 min after placement of the ignition source and examined internally for concealed smouldering. If this is present, extinguish the test specimen and record that ignition had occurred for the relevant ignition source. For safety reasons, ensure that all smouldering ignition has ceased before the rig is left unattended.

21 Test report

The report shall state the following:

a) "The following test results relate only to the ignitability of the test specimen under the particular conditions of test and are not intended as a means of assessing the full potential fire hazard of the bedcovers in use.";

b) the identification of the test specimen and the construction of the bed assembly where appropriate;

c) for each ignition source applied, the test result: ignition or non-ignition;

d) the criteria of ignition where ignition is reported;

e) the formation of a hole through the full thickness of the specimen for tests in positions A and J;

f) special features of burning, e.g. melting, dripping, charring and development of flames from smouldering;

g) the number and date of this British Standard, i.e. BS 7175:1989, and the section in which the method of test used is contained, e.g. section 3.

NOTE A preferred test report layout is shown in Appendix A. It has been designed to be completed in a logical test sequence.

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Appendix A Preferred test report layout

Testing authority

Date

Test specimen

Ref. no.

Tested to BS 7175:1989 Section .....

The following test results relate only to the ignitability of the test specimen under the particular conditions of test and are not intended as a means of assessing the full potential fire hazard of the bedcovers in use.

Ignition source		Specified time (see **3.2**)	Behaviour at specified time		Is concealed smouldering possible? (see clause **20**)	Behaviour on dismantling		Ignited/not ignited (I/NI)	Comments e) and f) of clause **21**
Number	position		Initial	Repeat		Initial	Repeat		

NOTE This report form is designed to be completed in the normal test sequence and for recording the types of behaviour defined in **3.1** at the times specified in **3.2**, e.g. the following:

A Extensive combustion

B Flaming combustion

C Progressive smouldering

D Concealed smouldering

NO Ignition not observed; examine for concealed smouldering.

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Publications referred to

BS 5803, *Thermal insulation for pitched roof spaces in dwellings.*
BS 5803-1, *Specification for man-made mineral fibre thermal insulation mats.*
BS 5852, *Fire tests for furniture.*
BS 5852-1, *Methods of test for the ignitability by smokers' materials of upholstered composites for seating.*
BS 5852-2, *Methods of test for the ignitability of upholstered composites for seating by flaming sources.*
BS 6807, *Methods of test for the ignitability of mattresses with primary and secondary sources of ignition*[1)].

[1)] Referred to in the foreword only.

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