BS 4560 : 1990

British Standard Specification for

Fabrics for linings in uniform clothing

Etoffes à doublure d'uniformes — Spécifications

Futtergewebe für Uniformen

British Standards Institution

Contents

Foreword

This British Standard has been prepared under the direction of the Textiles and Clothing Standards Policy Committee and forms a revision of BS 4560 : 1980 which is withdrawn.

BS 4560 is intended to provide a range of linings which will meet public and private sector requirements. The lining fabrics specified in this standard should be used in conjunction with the outer fabrics specified in BS 1771.

The standard is intended to be restricted to lining fabrics only, interlinings being specified in BS 4973.

In this revision, additional fabrics have been included and changes to requirements have been made to align with current practice.

Linings made from fabrics complying with this standard will be satisfactory under normal conditions of use. If they are to be used in garments which will be subjected to frequent cleansing, e.g. firemen's uniforms, then allowances should be made for the effects such frequent cleansing treatments may have on certain of the fabric properties.

Garment suppliers and purchasers should take account of all the environmental conditions (such as exposure to heat and water) likely to be met during use, to ensure the most suitable fabric is specified.

Many properties cannot be specified objectively and cannot therefore be included in this standard. Examples of such properties include colour, handle appearance and details of additional design features. Purchasing authorities should be able to supply standard patterns which cover these properties and thus serve to resolve any ambiguities of description.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to Statutory Instrument 1986 No. 26, The Textile products (Indications of Fibre Content) Regulations 1986.

Specification

1 Scope

This British Standard specifies requirements for woven fabrics and warp knitted fabrics for linings in uniform clothing suitable for use in the public and private sector. Requirements are specified for construction, mass per unit area, threads or wales/courses per unit length, strength, dimensional stability and colour fastness.

Recommended fabrics for various end uses are given in appendix A. Appendix B gives a method for determination of thickness and thickness on recovery, appendix C gives a method for determination of dimensional stability on heating and appendix D gives a method for determination of infra-red reflectance.

Supplementary information for MoD contracts is given in appendix E.

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

2 Definition

For the purposes of this British Standard the definitions given in BS 1903, BS 4815 and BS 6189 apply together with the following.

2.1 lining. A separate entity used in making-up garments and other articles, consisting of a single layer or multiple layers of textile material loosely held in place along one or more edges.

NOTE. The lining does not modify the properties of the main fabric with which it is associated but can impart certain performance characteristics to the article as a whole.

3 Construction and performance

3.1 General

Fabrics shall comply with tables 1, 2, 3 and 4, as appropriate.

NOTE 1. Yarns should be evenly spun, fabrics should be uniformly woven, and selvedges should be firm, straight and not of excessive thickness such as may cause build-up during laying-up for garment cutting. The colour and finish should be uniform throughout the fabric.

NOTE 2. Interested parties may agree that a flame retardant treatment may be applied, and may agree on the flammability performance which should be met and on the garment cleaning procedures.

3.2 Water repellency

If fabrics with fabric references 1.4, 2.1 and 2.2 are to be water repellent (see 6(d)), they shall have a minimum rating of 4 when tested in accordance with BS 3702.

4 Sampling

4.1 For the purposes of sampling, no batch shall exceed 5000 m in length. Samples of the fabric taken for testing in accordance with clause 5 shall be representative of each delivery batch.

4.2 One sample shall be taken from each batch and shall be identified with the piece from which it is taken.

4.3 Each sample shall be taken not less than 20 m from the end of the piece and shall be large enough to provide material for all the tests required by clause 5.

5 Testing

5.1 General

Tests in accordance with tables 1 to 4, other than the test for colour fastness to light (see 5.2), shall be carried out on every sample.

5.2 Colour fastness to light

Determination of colour fastness to light shall be carried out on one sample taken from the first batch of a contract. Provided this sample meets the requirements specified in table 4 and subject to the following proviso, no further colour fastness to light tests need be carried out. If, however, in the course of the contract, the dye formulation is changed, the colour fastness to light shall be redetermined on a sample taken from the first batch to which the new dyeing formulation applies. In cases of dispute, the colour fastness to light test shall be carried out on the basis of one sample per batch.

6 Marking

Fabrics shall bear the following information, for example on an invoice, or swing ticket on the piece or roll:

(a) the name, trade mark or other means of identification of the manufacturer;

(b) the number and date of this British Standard, i.e. BS 4560 : 1990*;

(c) instructions for care and cleansing in accordance with the recommendations and terminology of BS 2747;

(d) in the case of fabric with fabric reference 1.4, 2.1 or 2.2 a statement as to whether or not the fabric is water repellent.

NOTE. In addition the fabric should bear any other marking the contract or order may direct.

*Marking BS 4560 : 1990 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

Table 1. Woven fabrics

Fabric reference	Description/ fibre type*	Weave	Minimum mass per unit area	Minimum threads per centimetre		Minimum breaking strength		Maximum dimensional change warp and weft	Finish and other details
				Warp	Weft	Warp	Weft		
			g/m^2			N	N	%	
1.1	cotton	2 X 1 twill	190	31	15	840	300	± 2†	Water resistant fabric. Maximum water penetration 50 mL when tested in accordance with BS 5066. Piece dyed
1.2	cotton	Oxford	150	95 (2 fold)	37 (2 fold)	520	860	± 2†	Proofed, water vapour permeable fabric. Water penetration of 0 mL when tested in accordance with BS 5066
1.3	cotton, silesia	plain	150	23	21	400	450	–	
1.4	taffeta, cf polyamide 6 or 66	plain	65	35	29	550	450	± 2‡	Piece dyed. Heat set. If required to be water repellent see 3.2
1.5	taffeta, cf polyamide	plain	85	40	23	700	550	± 2‡	Piece dyed. Heat set
1.6	satin, cf viscose warp, spun viscose weft	8 end satin	200	99	27	850	450	± 2‡	Piece dyed
1.7	taffeta, cf polyanide 6 or 66	plain	120	27	22	1100	900	± 2‡	Heat set
1.8	serge wool	2 X 2 twill to right	295	17	16	310	420	± 2†	Unstoved
Test method			BS 2471	BS 2862		BS 2576			

*cf indicates continuous filament.
†When tested in accordance with BS 4736.
‡When tested in accordance with BS 4323.

Table 1. *(concluded)*

Fabric reference	Description/ fibre type*	Weave	Minimum mass per unit area	Minimum threads per centimetre		Minimum breaking strength		Maximum dimensional change warp and weft	Finish and other details
				Warp	Weft	Warp	Weft		
			g/m^2			N	N	%	
1.9	cf viscose warp, spun viscose weft	3 X 1	125	43	24.5	550	500	± 2‡	Piece dyed
1.10	cf viscose	2 X 1 twill	104	44	24.5	400	300	± 2‡	Piece dyed
1.11	cf viscose	3 X 1 twill	125	43	24.5	500	500	± 2‡	Piece dyed
1.12	cotton	plain	108	16.2	17.0	310	265	± 2†	Piece dyed
1.13	poplin, cotton	plain	140	56.6 (2 fold)	25.0	1000	330	± 2§	Mercerized, fully shrunk. Maximum water absorption 30 % and maximum penetration 5 mL when tested in accordance with clause 22 of BS 4F100 : 1982. Infra-red reflectance 35 ± 5 % when tested in accordance with appendix D
1.14	dull polyester, cf warp, textured weft	plain	70	40	22	420	520	± 1‡ ± 1‖	Heat set
Test method			BS 2471	BS 2862		BS 2576			

*cf indicates continuous filament.
†When tested in accordance with BS 4736.
‡When tested in accordance with BS 4323.
§When tested in accordance with BS 5807 after washing in accordance with process 2A of BS 4923 and press drying at 150 °C.
‖On heating, when tested in accordance with appendix B.

Table 2. Warp knitted fabrics

Fabric reference	Description/ fibre type*	Construction		Minimum mass per unit area	Yarn linear density nominal	Minimum wales/courses per centimetre		Maximum dimensional change		Minimum bursting strength
		Front bar movement	Back bar movement			Wales	Courses	Wales	Courses	
				g/m^2	dtex			%	%	kPa
2.1	cf polyamide 6 or polyamide 66	1-0/0-1 0-1/1-0 1-0/0-1 0-1/1-0 1-2/1-0	1-0/3-4 1-0/3-4 1-0/4-5 1-0/4-5 1-0/3-4	85	44	12	20	± 2	± 2	600
2.2	cf polyamide 6 or polyamide 66	1-0/0-1 0-1/1-0 1-0/0-1 0-1/1-0 1-2/1-0	1-0/3-4 1-0/3-4 1-0/4-5 1-0/4-5 1-0/3-4	98	44	12	26	± 2	± 2	750
Test method				BS 2471		BS 5441		BS 4323		BS 4768‡

*cf indicates continuous filament.
‡Using 30.5 mm diameter clamping ring.

NOTE. If fabric references 2.1, 2.2 are required to be water repellent see 3.2.

Table 3. Raised knitted fabric

Fabric reference	Description/ fibre type	Minimum mass per unit area	Minimum wales/courses per centimetre		Minimum bursting strength	Minimum thickness		Minimum thickness on recovery at 6.9 Pa
			Wales	Courses		At 6.9 Pa	At 980 Pa	
		g/m^2			kPa	mm	mm	%
3.1	raised wool face, viscose backing 70 % wool 30 % cellulosic	150	2.5	6.0	90	6.0	2.3	80
Test method		BS 2471	BS 5441		BS 4768*	appendix C		

*Using 30.5 mm diameter clamping ring.

Table 4. Colour fastness of dyed fabrics

Colour fastness to:	Fabric reference 1.1 to 1.11 2.1 to 2.2 3.1	1.12	1.13	1.14	Test method
	Minimum rating	Minimum rating	Minimum rating	Minimum rating	
Light (xenon arc)	–	–	5	4-5	BS 1006 : Test B02
Rubbing					
wet	3-4	3-4	3	5	BS 1006 : Test X12
dry	4	4-5	4-5	5	
Water					
change of colour	–	3	4-5	–	BS 1006 : Test E01
staining: wool	–	3	4-5	–	
: cotton	–	3	4-5	–	
Perspiration (acid and alkali)					
change of colour	–	–	4-5	5	BS 1006 : Test E04
staining: wool	4	4	4-5	5	
: cotton	4	4	4-5	4-5	
Dry cleaning					
change of colour	3	–	–	4-5	BS 1006 : Test D01
staining of solvent	3-4	–	–	–	
Washing					
change of colour	–	–	4-5	–	BS 1006 : Test C06 : test condition C2S
staining: cotton	–	–	4-5	–	

Appendices

Appendix A. Recommended fabrics for various end uses

Table 5 gives a list of recommended fabrics for various end uses.

Table 5. Recommended fabrics for various end uses

End use	Garment or component	Fabric reference
Linings	body and sleeves	1.1, 1.2, 1.4, 1.5, 1.8, 1.9, 1.10, 1.11, 2.1, 2.2
	crotch	1.3, 1.4, 1.5, 1.6, 1.9, 1.10, 1.11, 2.1, 2.2
	waistbands	1.3, 1.4, 1.5, 1.6, 1.9, 1.10, 1.11, 2.1, 2.2
	caps (mainly)	1.14
Linings specifically for men's garments	body and sleeves	1.4, 1.5, 1.9, 1.10, 1.11, 2.1, 2.2
	waistcoat back	1.4, 1.5, 1.9, 1.10, 1.11, 2.1, 2.2
	overcoat body	1.6, 1.9, 1.10, 1.11
	raincoat*	1.4, 2.1, 2.2
Linings specifically for women's garments	skirt	1.4, 1.5, 2.1, 2.2
	body and sleeves	1.4, 1.5, 1.9, 1.10, 1.11, 2.1, 2.2
	raincoat*	1.4, 2.1, 2.2
Linings (and patches)	NBC suits†	1.12
Linings	combat clothing	1.13
Detachable liners	—	1.1, 1.2
Pocketings	jackets and waistcoats	1.3, 1.4, 1.5, 1.7, 2.1, 2.2
	trousers	1.3, 1.4, 1.5, 1.7, 2.1, 2.2
Lining assemblies	fire tunic	3.1

*Water repellent treated fabrics only to be used (see 3.2).
†NBC indicates nuclear, bacteriological and chemical.

Appendix B. Determination of dimensional change on heating

B.1 Apparatus

B.1.1 *Oven,* as described in method 14B of BS 3424 : Part 12, maintained at a temperature of 160 ± 4 °C.

B.1.2 *Scale,* graduated in millimetres.

B.2 Preparation of test specimens

B.2.1 Pre-condition the sample and bring it into equilibrium with the standard temperate atmosphere for conditioning and testing defined in BS 1051. From the sample, cut a specimen 300 mm x 300 mm, with its respective edges parallel to the warp and weft threads.

B.2.2 Mark the specimen with reference points, as indicated in figure 1.

B.3 Procedure

B.3.1 Suspend the test specimen inside the oven so that air is free to circulate around the specimen and so that the edges of the specimen are not within 50 mm of the sides of the oven.

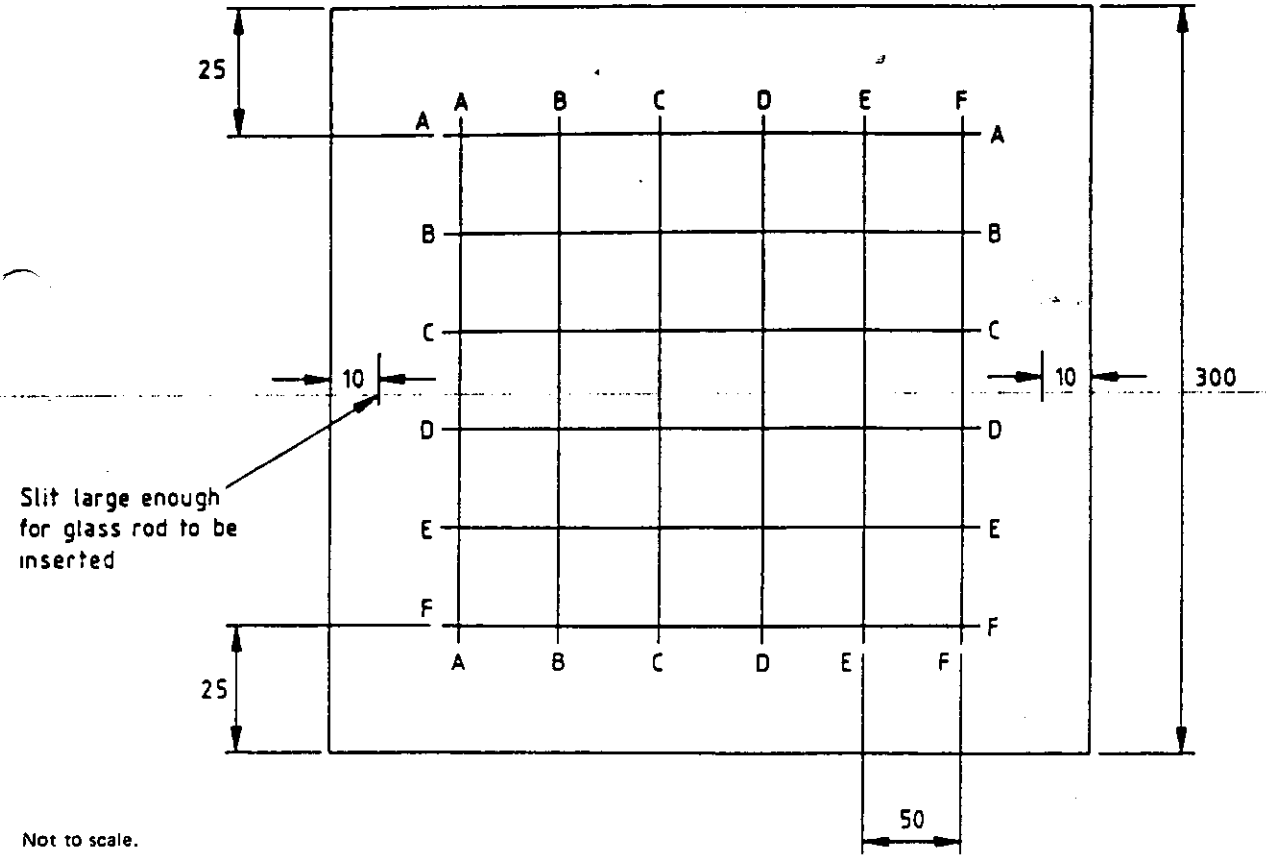
NOTE. Specimens may be suspended by passing a rod through slits cut in the edges of the specimen, as shown in figure 4.

B.3.2 Expose the specimen to the temperature of 160 + 4 °C for 15 min. Remove the specimen from the oven, lay it flat upon a smooth surface and allow it to cool. Condition the specimen in the standard temperate atmosphere for conditioning and testing defined in BS 1051.

B.3.3 Measure the distance between marks A, B, C, D, E and F, i.e. A to A, B to B etc., in both the warp and weft directions and record the results.

B.4 Calculation and expression of results

Calculate the arithmetic mean of the six measurements taken in the warp direction and the arithmetic mean of the six measurements taken in the weft direction. Express the warp and weft shrinkages as percentages of the original dimension.



Not to scale.
All dimensions are in millimetres.

Figure 1. Marking of test specimens

Appendix C. Determination of thickness, and thickness on recovery

Measure the thickness of the fabric in accordance with method B of BS 2544 using a pressure-foot of 5000 mm^2. Measure the initial thickness at a pressure of 6.9 Pa, then measure the thickness at a pressure of 980 Pa, after which, allow the fabric to recover for 1 min then remeasure the thickness at 6.9 Pa.

Express the thickness on recovery as a percentage of the initial thickness.

Appendix D. Determination of infra-red reflectance

D.1 Apparatus

D.1.1 *Spectrophotometer,* fitted with a diffuse reflection attachment, working over the range 1.0 μm to 1.2 μm.

NOTE. Interested parties may agree that an alternative type of instrument be used.

D.1.2 Reference specimen, of freshly prepared barium sulphate of minimum thickness 2 mm.

NOTE. Secondary reference standards may be used provided they have been calibrated against freshly prepared barium sulphate.

D.2 Procedure

By means of the spectrophotometer (**D.1.1**), plot reflection curves over 1.0 μm to 1.2 μm for the test specimen and for the reference specimen (**D.1.2**) respectively.

D.3 Calculation and expression of results

Calculate the ratio of the area under the reflection curve of the test specimen to the area under the reflection curve of the reference specimen. Express the result as the integrated reflectance over 1.0 μm to 1.2 μm.

Appendix E. Supplementary information for MoD contracts

E.1 Fabric width

Unless otherwise specified by the purchaser, the minimum width of the fabric is as specified in table 6. The minimum width refers to the usable width. Unless otherwise specified by the purchaser this is the width of the fabric that meets all the requirements of the finished fabric specification and excludes selvedge material, marks and pinholes.

E.2 Fabric reference cross-reference information

Table 6 contains cross-reference information between the fabric references used in this BS 4560, MoD pattern numbers and NATO stock numbers. The table also includes names and descriptions and minimum fabric widths.

Table 6. Cross-references between fabric references used in BS 4640, MoD pattern numbers and NATO stock numbers together with item names and descriptions and minimum fabric widths

Fabric reference	Item name	Item description*	Pattern number	Nato stock number (8305-99-)	Fabric width
					cm
1.12	Cloth, plain weave, cotton	Olive-drab	8306B	130-5638	100
1.13	Cloth, poplin, cotton	Olive-drab, FS, WR	8049A	135-7285	100
1.14	Cloth, plain weave polyester	Dark grey	8721A	769-6218	148
	"	Black	8721B	769-6219	148
	"	Dark blue	8721C	769-6222	148
	"	Olive-drab	8721D	769-6220	148
	"	Red	8721E	769-6221	148
Test method					BS 1930

*FS indicates fully shrunk; WR indicates water repellent.

Publications referred to

BS 4F 100	Procedure for inspection and testing of textiles
BS 1006	Methods of test for colour fastness of textiles and leather
BS 1051	Glossary of terms relating to the conditioning, testing and mass determination of textiles
BS 1771	*Fabrics for uniforms and workwear
BS 1903	Glossary of terms used by the clothing industry
BS 1930	Method for the determination of width of woven or knitted fabrics when relaxed at zero tension
BS 2471	Methods of test for textiles — woven fabrics — determination of mass per unit length and mass per unit area
BS 2544	Methods for determination of thickness of textile materials
BS 2576	Method for determination of breaking strength and elongation (strip method) of woven fabrics
BS 2747	Code of practice for textile care labelling
BS 2862	Methods for determination of number of threads per unit length
BS 3424	Testing coated fabrics Part 12 Accelerated ageing tests
BS 3702	Method of test for determination of resistance of textile fabrics to surface wetting (spray test)
BS 4323	Method for determination of dimensional change of fabrics induced by free steam
BS 4736	Method for determination of dimensional changes of fabrics induced by cold-water immersion
BS 4768	Method for the determination of the bursting strength and bursting distension of fabrics
BS 4815	Glossary of generic names for man-made fibres
BS 4923	Schedule of domestic washing and drying procedures for textile testing
BS 4973	*Interlinings
BS 5066	Method of test for the resistance of fabrics to an artificial shower
BS 5441	Methods of test for knitted fabrics
BS 5807	Method for determination of dimensional change of textiles in domestic washing and drying
BS 6189	Glossary of terms relating to fabrics and associated fibres, yarns and processes

*Referred to in foreword only.

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Textiles and Clothing Standards Policy Committee (TCM/-) to Technical Committee TCM/5, upon which the following bodies were represented:

British Interlining Manufacturers' Association
British Nonwovens Manufacturers' Association
British Railways Board
British Textile Employers' Association
Home Office
London Regional Transport
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