BRITISH STANDARD AEROSPACE SERIES

BS 3F 119: 1990

(Superseding BS 2F 119:1982)

Specification for

145 g/m^2 to 235 g/m^2 nylon parachute fabric

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Aerospace Standards Policy Committee (ACE/-) to Technical Committee ACE/54, upon which the following bodies were represented:

British Fabric Association
British Rubber Manufacturers' Association
British Textile Employers' Association
Man-made Fibres Producers' Committee
Ministry of Defence
Society of British Aerospace Companies Ltd.
Society of Dyers and Colourists

This British Standard, having been prepared under the direction of the Aerospace Standards Policy Committee was published under the authority of the Board of BSI and comes into effect on 28 September 1990

The following BSI references relate to the work on this standard:
Committee reference ACE/54
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Contents

Foreword

This British Standard, prepared under the direction of the Aerospace Standards Policy Committee, is one of a series for textiles of a quality suitable for aerospace purposes, and is a revision of BS 2F 119:1982 which is withdrawn. During its preparation account has been taken of the fact that the term “permeability” is now used in place of “porosity”, and metric units for this property are included for the first time. Quality requirements as defined in the latest edition of BS F 100 are also included, as are details of information to be supplied by the purchaser.

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 and ii, pages 1 to 4, 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 British Standard specifies the requirements for a range of nylon fabrics, of nominal mass per unit area of 145 g/m^2 to 235 g/m^2 for aerospace purposes, primarily for parachute canopies.

NOTE 1 The information to be supplied by the purchaser in the contract or order is listed in Appendix A.
NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.
NOTE 3 The latest revision of an Aerospace Series Standard is indicated by a prefix number.

2 General requirements

2.1 In addition to the requirements specified in clauses **2** to **9**, the following sections and clauses of the latest edition of BS F 100 shall apply (see Table 1).

2.2 The breaking strength and extension at break of the yarn (see **3.2**) shall be determined in accordance with BS 1932-1 except that the number of tests required to produce a package mean shall be 5.

2.3 The yarn twist shall be determined in accordance with BS 2085 except that the number of tests required to produce a package mean shall be 5.

3 Yarn

3.1 Type

3.1.1 Fabric 694-1 shall be woven from continuous filament, round cross-section, high tenacity nylon 6.6 yarn manufactured from semi-dull polymer.

3.1.2 Fabrics 694-4, 694-5 and 694-6 shall be woven from continuous filament, round cross-section, high tenacity nylon 6.6 yarn manufactured from bright polymer.

3.2 Properties

The yarn prior to twisting shall have the following properties.

a) The yarn for fabric 694-1 shall have a nominal linear density of 67 dtex and contain 20 filaments. It shall have a mean breaking strength per package of not less than 250 cN and a mean extension at break per package not exceeding 50 %.

b) The yarn for fabrics 694-4, 694-5 and 694-6 shall have a nominal linear density of 235 dtex and contain 34 filaments. It shall have a mean breaking strength per package of not less than 1 500 cN and a mean extension at break per package not exceeding 25 %.

c) The yarn for fabrics 694-1 and 694-5 shall be folded.

Table 1 — General requirements (given in BS F 100)

Section	Title	Requirements and tests
1	General	All requirements
2	Quality requirements	Requirements for the manufacture of wide fabrics Requirements for dyed textiles Requirements for dimensions and tolerances: general and wide fabrics Requirements for freedom from corrosive impurities Requirements for freedom from defects
2	Physical tests	Test for the determination of mass of wide fabrics Tests for breaking strength and extension under load of wide fabrics Test for air porosity[a] of parachute fabrics
4	Chemical tests	Test for water extractable matter

[a] In the context of the method of test specified in BS F 100 the words “porosity” and “permeability” are interchangeable.

4 Manufacture

The weaves shall be mock leno as detailed in Figure 1 for fabric 694-1 or Figure 2 for fabrics 694-4, 694-5 and 694-6.

	X	X		X			X
X			X				
X			X				
	X	X		X			X
X			X		X	X	
				X			X
				X			X
X			X		X	X	

NOTE X denotes warp threads lifted.

Figure 1 — Weaving diagram for fabric 694-1

X			X		X	X	
				X	X	X	X
				X	X	X	X
X			X		X	X	
	X	X		X			X
X	X	X	X				
X	X	X	X				
	X	X		X			X

NOTE X denotes warp threads lifted.

Figure 2 — Weaving diagram for fabrics 694-4, 694-5 and 694-6

5 Finish

5.1 General

The fabrics shall not be pressed or calendered and shall be supplied scoured and either:

a) undyed; or

b) dyed (see **5.2**).

5.2 Dyeing

Where dyeing is required, the colour of the fabric shall be specified either by reference to a British Standard, e.g. BS 381C, or otherwise by pattern.

NOTE The requirement for dyed or undyed fabric should be stated in the contract or order (see Appendix A).

6 Construction and properties of finished fabric

NOTE 1 The minimum usable width of the finished fabric should be as stated by the purchaser in the contract or order (see Appendix A) but a minimum usable width of 920 mm is usually supplied.

NOTE 2 The fabric may be woven in multiple widths with leno weave selvedges, and slit to yield finished fabric of the minimum usable width stipulated.

When tested in accordance with clause **2** the fabric in the finished state shall comply with the requirements of Table 2.

7 Permeability

When tested in accordance with clause **2**, each piece of finished fabric shall have an average permeability as shown in Table 3.

NOTE It is most desirable that the average permeability of the fabric shall be as near as possible to the relevant mean figure shown in Table 3, and that the variation between the individual readings should be as low as possible.

Table 2 — Construction and properties of finished fabric

Designation	Nominal yarn linear density		Nominal yarn twist		Minimum number[a] of threads per centimetre		Maximum mass per unit area	Minimum average breaking strength	
	Warp	Weft	Warp	Weft	Warp	Weft		Warp	Weft
	dtex	dtex	turns/m	turns/m			g/m^2	N/50 mm	N/50 mm
694-1	67 × 2	67 × 3	400[b]	400[b]	40.0	28.5	145	1 050	1 050
694-4	235	235	200	200	33.0	31.0	185	2 010	2 010
694-5	235 × 2	235 × 2	200[b]	200[b]	20.5	20.5	235	2 450	2 450
694-6	235	235	Spinning	Spinning	29.0	27.0	160	1 660	1 660

[a] Calculated from the number of threads in a measured length of not less than 2 cm.
[b] These figures are for the folding twist.

Table 3 — Permeability requirements

Fabric	Average permeability
694-1	17.5 ± 2[a] (5 350 ±600)[b]
694-4	17.5 ± 2[a] (5 350 ± 600)[b]
694-5	17.5 ± 2[a] (5 350 ± 600)[b]
694-6	9 ± 1[a] (2 750 ± 300)[b]

[a] Average permeability readings refer to $ft^3/(ft^2\ s)$, i.e. volume of air in cubic feet passing through 1 ft^2 of fabric in 1 s at 10 in (25.4 cm) water gauge.
[b] Average permeability readings refer to $L/(m^2\ s)$, i.e. volume of air in litres passing through 1 m^2 of fabric in 1 s at 25.4 cm (10 in) water gauge.

8 Water extractable matter

When tested in accordance with clause **2**, the amount of water extractable matter in the finished fabric shall not exceed 1.0 % by mass.

9 Identification

The fabric shall be identified for ordering purposes by the number and date of this British Standard, i.e. BS 3F 119:1990[1)] together with the relevant designation given in Table 2 and, if required dyed, the colour.

NOTE This identification may be codified, e.g. fabric 694-4 required dyed olive drab may be identified as BS 3F 119/694-4/BS 381C No. 298.

[1)] Marking BS 3F 119:1990 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.

Appendix A Information to be supplied by the purchaser

The following information should be stated by the purchaser in his contract or order:

a) the number of this British Standard, i.e. BS 3F 119;

b) the fabric designation from Table 2;

c) whether any fabric is required dyed (see clause **5**);

d) the minimum usable width required (see clause **6**).

Publications referred to

BS F 100, *Procedure for inspection and testing of textiles for aerospace purposes.*
BS 381C, *Specification for colours for identification, coding and special purposes.*
BS 1932, *Methods of testing the strength of yarns from packages.*
BS 1932-1, *Determination of breaking strength and extension.*
BS 2085, *Method of test for determination of twist in yarns, direct counting method.*

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