BRITISH STANDARD AEROSPACE SERIES

BS 4F 119:2002

145 g/m² to 235 g/m² nylon parachute fabric

ICS 49.025.60

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ACE/54, Wide fabrics and coated fabrics for aerospace purposes, upon which the following bodies were represented:

British Rubber Manufacturers' Association Ltd.

Ministry of Defence

Society of British Aerospace Companies Ltd.

Textile Finishers' Association

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Committee reference ACE/54
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Contents

Foreword

This British Standard, prepared by Technical Committee ACE/54, Wide fabrics and coated fabrics for aerospace purposes, is one of a series of specifications for textiles of a quality suitable for aerospace purposes, and is a revision of BS 3F 119:1990, which is withdrawn.

This revision updates the standard, introduces intermingled yarns and deletes the imperial units for air permeability. 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.

NOTE The latest revision of an aerospace series standard is indicated by a prefix number.

Annex A is informative.

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 7 and a back cover.

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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 The information to be supplied by the purchaser in the contract or order should be as listed in Annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS F 100, *Procedure for inspection and testing of textiles for aerospace purposes.*

BS EN ISO 2061:1996, *Textiles — Determination of twist in yarns — Direct counting method.*

BS EN ISO 2062:1995, *Textiles — Yarns from packages — Determination of single-end breaking force and elongation at break.*

3 Terms and definitions

For the purposes of this British Standard, the following term and definition applies.

3.1
intermingle
impart cohesion to the filament bundle of a multifilament yarn by entwining the filaments

4 General requirements

4.1 In addition to the requirements specified in Clause **4** to Clause **11** of this standard, the requirements and tests of the latest edition of BS F 100 as specified in Table 1 shall apply.

4.2 The breaking force and elongation at break of the yarn (see **5.2**) shall be determined in accordance with BS EN ISO 2062:1995, Method A, except that the number of packages to be tested shall be a minimum of five, and the number of tests required to produce a package mean shall be five.

4.3 The yarn twist shall be determined in accordance with BS EN ISO 2061, except that the number of packages to be tested shall be a minimum of five, and the number of tests required to produce a package mean shall be five.

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

Section of BS F 100	Section title	Requirements and tests in BS F 100
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 (see also section **4**) Requirements for freedom from faults in wide fabrics
3	Physical tests	Test for the determination of the number of threads in woven fabrics Test for the determination of mass of wide fabrics Tests for breaking strength and extension under force of wide fabrics Test for air permeability of parachute fabrics
4	Chemical tests	Test for water extractable matter If required by section **2** — test for pH value of aqueous extract — test for water-soluble chloride — test for water-soluble sulfate

5 Yarn

5.1 Type

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

5.1.2 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.

5.2 Properties and construction

5.2.1 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[1)] and contain 20 filaments. It shall have a mean breaking strength per package of not less than 250 cN and a mean elongation 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 elongation at break per package not exceeding 25 %.

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

[1)] 1 tex = 10^{-6} kg/m.

5.2.2 Yarn construction shall comply with the values stated in Table 2.

Table 2 — Yarn construction

Fabric designation	Nominal yarn linear density		Yarn twist	
	Warp dtex	Weft dtex	Warp turns/m	Weft turns/m
694-1	67 × 2	67 × 3	400 ± 40[a]	400 ± 40[a]
694-4	235	235	200 ± 20	200 ± 20
694-5	235 × 2	235 × 2	200 ± 20[a]	200 ± 20[a]
694-6	235	235	Intermingled	Intermingled

[a] These figures are for the folding twist.

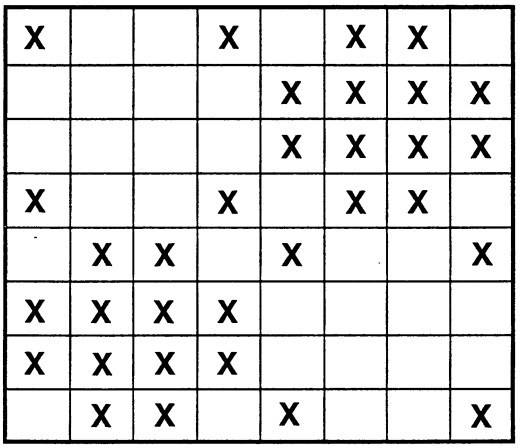
6 Manufacture

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



NOTE X denotes warp threads lifted.

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

7 Finish

7.1 General

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

a) undyed; or

b) dyed (see **7.2**).

7.2 Dyeing

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

NOTE 1 An appropriate British Standard would be BS 381C:1996.

NOTE 2 The requirement for dyed or undyed fabric should be stated by the purchaser in the contract or order (see Annex A).

8 Construction and properties of finished fabric

8.1 When tested in accordance with **4.1** the fabric in the finished state shall comply with the requirements of Table 3.

8.2 The minimum usable width of the finished fabric shall be 920 mm unless otherwise stated by the purchaser in the contract or order (see Annex A).

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

Table 3 — Construction and properties of finished fabric

Designation	Minimum number of threads per centimetre[a]		Maximum mass per unit area g/m²	Minimum average breaking strength N/50 mm	
	Warp	Weft		Warp	Weft
694-1	40.0	28.5	145	1 050	1 050
694-4	33.0	31.0	185	2 010	2 010
694-5	20.5	20.5	235	2 450	2 450
694-6	29.0	27.0	160	1 660	1 660

[a] Calculated from the number of threads in a measured length of not less than 20 mm.

9 Permeability

When tested in accordance with **4.1**, each piece of finished fabric shall have a mean permeability as shown in Table 4.

NOTE It is most desirable that the mean permeability of the fabric should be as near as possible to the relevant mean figure shown in Table 4, and that the variation between the individual readings should be as low as possible.

Table 4 — Permeability requirements

Fabric	Mean permeability[a]
694-1	5 350 ± 600
694-4	5 350 ± 600
694-5	5 350 ± 600
694-6	2 750 ± 300

[a] Mean permeability readings refer to l/(m²·s), i.e. volume of air in litres passing through 1 m² of fabric in 1 s at 2.5 kN/m² (25.4 cm water gauge).

10 Water extractable matter

When tested in accordance with **4.1**, the amount of water extractable matter in the finished fabric shall not exceed 1.0 % by mass.

11 Identification

The fabric shall be identified for ordering purposes by the number and date of this British Standard, i.e. BS 4F 119:2002[2)] together with the relevant designation given in Table 3 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 4F 119:2002/694-4/BS 381C:1996 No 298.

[2)] Marking BS 4F 119:2002 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.

Annex A (informative)
Information to be supplied by the purchaser

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

a) the number of this British Standard, i.e. BS 4F 119;

b) the fabric designation from Table 3;

c) whether the fabric is required dyed or undyed (see Clause **7**);

d) the minimum usable width required (see Clause **8**).

Bibliography

Standards publication

BS 381C, *Specification for colours for identification, coding and special purposes*.

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