

Heavy duty linen (flax) sewing thread for aerospace purposes

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee ACE/22, Cords, ropes and threads for aerospace purposes, upon which the following bodies were represented:

Linen Sewing Threads Manufacturers' Association
Ministry of Defence — UK Defence Standardization
Society of British Aerospace Companies Ltd.

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Foreword

This British Standard, prepared under the direction of Technical Committee ACE/22, is one of a series for textiles of a quality suitable for aerospace purposes. It supersedes BS 4F 54:1985 which is withdrawn.

NOTE The previous edition, BS 4F 54:1985, differed from the earlier edition in that it required all thread be supplied rotproofed.

This new edition incorporates all earlier amendments, updates references and improves nomenclature in line with other standards in the same series.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

WARNING NOTES

This standard calls for the use of substances and/or test procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves either the supplier or the user from statutory obligations relating to health and safety at any stage of manufacture or use.

This standard specifies pentachlorophenyl laurate (PCPL) as the only approved rotproofing treatment for aerospace textiles. Alternative treatments are under development, and this standard will be updated to delete PCPL as soon as an approved alternative treatment for aerospace textiles is available.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 3 and a back cover.

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1 Scope

This British Standard specifies requirements for heavy duty linen (flax) sewing thread for aerospace purposes.

NOTE The latest revision of an Aerospace Series standard is indicated by a prefix number.

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 2087-1, *Preservative treatments for textiles — Specification for treatments*.

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

BS EN ISO 2060:1995, *Textiles — Yarn from packages — Determination of linear density (mass per unit length) by the skein method*.

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

3 General

3.1 General

In addition to the requirements specified in Clause 4, Clause 5, Clause 6 and Clause 7 of this standard the requirements and tests given in the latest edition of BS F 100 as specified in Table 1, shall apply.

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

Section of BS F 100	Section title	Requirements and tests
1	General	All requirements
2 ^a	Quality requirements	Requirements for dyed textiles except those related to fabric intended for coating. Requirements for freedom from corrosive impurities (see BS F 100, Section 4).
3	Physical tests	Tests for breaking strength and extension under force
4	Chemical tests	Test for residual alkali solubility. If required by BS F 100, Section 2: — test for conductivity of aqueous extract; — test for pH value of aqueous extract; — test for water soluble chloride; — test for water soluble sulfate.
^a It is not intended that BS F 100, Section 2 tests should be performed on each thread batch. The frequency of these tests should be agreed between the Quality Assurance Authority and the thread manufacturer, see BS F 100.		

3.2 Freedom from faults

The thread shall have uniformity of thickness, construction, and component ply tension so that there are no visually irregular twist faults. The thread shall contain no thread knots.

3.3 Length per unit mass

The length per unit mass of thread shall be determined in accordance with BS EN ISO 2060:1995, Option 1.

4 Yarn

4.1 The thread shall be manufactured from flax fibre (*Linum usitatissimum*).

4.2 The mass of the yarn shall be reduced by not less than 10 % by boiling.

NOTE The degree of boiling of the yarn should be determined from the manufacturer's records, where available. Otherwise, the residual alkali solubility of the thread should be determined and should not exceed 10 %.

5 Finish

5.1 Condition of material

The thread shall be supplied in one of the following conditions:

- a) undyed and rotproofed;
- b) undyed, rotproofed and wax finished;
- c) dyed and rotproofed;
- d) dyed, rotproofed and wax finished.

5.2 Dyeing

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

5.3 Rotproofing

The thread shall be treated with pentachlorophenyl laurate (PCPL) from aqueous emulsion, normal process, in accordance with BS 2087-1, normal process.

5.4 Wax finishing

Where wax finishing is required, beeswax substitute microcrystalline hydrocarbon wax shall be used and the added mass due to the wax shall be $(20 \pm 5) \%$. Prior to waxing, the thread shall have been rotproofed in accordance with 5.3.

5.5 Surface finish

Thread supplied in accordance with item 5.1a) or 5.1c) shall have a soft, smooth finish, but substances that may promote microbiological growth (e.g. starch or modified starch) shall not be applied.

6 Construction and properties

6.1 Where undyed thread is supplied, the thread shall conform to the requirements given in Table 2.

6.2 Where dyed thread is supplied, the thread shall conform to the requirements of Table 2 except that the minimum breaking strengths shall be reduced by 10 %.

NOTE Unless otherwise specified, the direction of final twist should be Z.

Table 2 — Construction and properties

Nominal resultant linear density tex	Number of plies	Final twist ^a Turns/m	Length per unit mass ^b m/kg	Minimum breaking strength	
				unwaxed N	waxed N
690	8	118 ± 6	1 450 ± 160	220	180

^a The final twist shall be determined in accordance with BS EN ISO 2061.

^b The length per unit mass shall be determined by weighing a skein conditioned and reeled in accordance with BS EN ISO 2060:1995, Option 1. The values stated for length per unit mass exclude the mass of added dye and/or finishes.

7 Identification

The thread shall be identified by the number of this British Standard, i.e. BS 5F 54, together with the finish and, if required dyed, the colour.

NOTE This identification may be codified. For example, thread required dyed black and unwaxed may be identified as "BS 5F 54/black/unwaxed".

Bibliography

Standards publications

BS 381C:1996, *Specification for colours for identification, coding and special purposes.*

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