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Indian Standard

**SPECIFICATION FOR
COTTON FABRICS FOR SUPPLY
DROPPING PARACHUTES**

(First Revision)

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Gr 2

May 1988

Indian Standard

SPECIFICATION FOR COTTON FABRICS FOR SUPPLY DROPPING PARACHUTES

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards on 24 December 1987, after the draft finalized by the Textile Materials for Aerospace Purposes Sectional Committee had been approved by the Textile Division Council.

0.2 This standard was first published in 1964, based on IND/AIR/TC/0022(a) 'Long cloth for cotton parachutes S.D/Scoured or dyed' issued by the Ministry of Defence, Government of India. It is now being revised to incorporate the following changes:

- a) Constructional particulars of the fabric have been made suggestive provided it meets the functional requirements like air permeability breaking load, etc.

- b) The requirement of air permeability for Type 2 fabric has been modified in order to align it with the latest Defence specification.
- c) The requirement for rot-proofing has been included.
- d) The state of fabric in which it can be supplied has been included.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements for two types of cotton fabrics used in the fabrication of parachutes intended for supply dropping purposes.

1.2 Cotton fabric of Type 1 is generally used in the fabrication of parachutes having a diameter of 18 m and is intended for heavy supplies dropping. Cotton fabric of Type 2 is generally used in the fabrication of parachutes having a diameter 8.5 m and is intended for light supplies dropping.

2. MANUFACTURE

2.1 Yarn — The yarn used in the manufacture of fabric shall be of cotton yarn conforming to IS : 171-1985*. The yarn shall be of the quality required to ensure that the fabric complies with the requirements of this standard and it shall be satisfactory in evenness and reasonably free from spinning defects.

2.2 Fabric

2.2.1 The fabric shall be of plain weave.

2.2.2 The selvages shall be woven strong and uniform.

2.2.3 The fabric, when visually examined, shall be reasonably free from weaving flaws.

2.2.4 The fabric shall be scoured or dyed, as required.

2.2.4.1 If the fabric is dyed, it shall be dyed after scouring.

2.2.5 The fabric shall be free from substances liable to cause subsequent tendering.

3. FINISH

3.1 State of Material — The fabric shall be supplied in one of the following states:

- a) Loomstate;
b) Scoured and rot-proofed; and
c) Scoured, dyed and rot-proofed.

3.2 Dyeing — If dyeing is required, the colour shall be as stated in the contract or order and either the fabric or yarns from which it is to be manufactured, shall be dyed. Sulphur dyes shall not be used. The rot-proofing treatment, as prescribed in 3.3, may be given subsequently.

3.3 Rot-Proofing — If rot-proofing is required, the fabric or the yarns from which it is to be manufactured, shall be evenly and thoroughly impregnated with a solvent solution or aqueous emulsion of lauryl pentachlorophenol (LPCP) or of pentachlorophenyl

*Specification for cotton and cotton regenerated cellulosic fibre blended grey yarn (*third revision*).

laurate (PCPL). This shall be followed by removal of the excess and subsequent drying. The treated textile shall be dry in handling and non-tacky. The LPCP or PCPL content of the treated textile, when tested according to the methods prescribed in IS : 3522 (Part 2)-1970* or IS : 11662-1986†, shall not be less than 1.7 percent and not more than 2.5 percent on the oven-dry mass of the textile material. The free pentachlorophenol content of the treated textile shall not exceed 10 percent of the LPCP or PCPL content, when determined according IS : 3522 (Part 1)-1966‡.

4. REQUIREMENTS

4.1 The fabric shall comply with the constructional particulars, physical and chemical requirements given in Tables 1 and 2.

NOTE — The linear density of yarn, ends and picks per decimetre given in Table 1 are suggestive and the manufacturers may make suitable alterations without changing the basic characteristics of the fabric, provided the fabric meets all other requirements given in this specification.

5. SEALED SAMPLE

5.1 If, in order to illustrate or specify the general appearance, workmanship, finish, etc., of fabric, a sample has been agreed upon and sealed, the supply shall be in conformity with the sealed sample in such respects.

5.1.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

6. MARKING

6.1 The fabric shall be marked with the following information:

- a) Name of the material and type;
- b) Manufacturer's name, initials or trade-mark;

*Methods for estimation of common preservatives used in the textile industry, Part 2.

†Specification for preservative treatments of textiles.

‡Methods for estimation of common preservatives used in textile industry, Part 1.

c) Width and length of the piece;

d) Month and the year of manufacture; and

e) Colour fastness ratings.

6.1.1 The fabric may also be marked with Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7. PACKING

7.1 The fabric shall be packed in bales or cases in conformity with the procedure laid down either in IS : 1347-1972* or IS : 293-1980† as required.

8. SAMPLING

8.1 Lot — The quantity of fabric of the same type, width and quality delivered to one buyer against one despatch note shall constitute a lot.

8.2 For determining the conformity of the lot to the requirements of (a) width, (b) breaking load, and (c) air-permeability, all the pieces in the lot shall be subjected to testing.

*Inland packaging of cotton cloth and yarn (first revision).

†Code for seaworthy packaging of cotton yarn and cloth (third revision).

TABLE 1 CONSTRUCTIONAL PARTICULARS OF COTTON FABRICS FOR SUPPLY-DROPPING PARACHUTES

TYPE	LINEAR DENSITY OF YARN IN TEX (COTTON COUNT)		ENDS/dm	PICKS/dm	MASS IN g/m ² , Max	BREAKING LOAD IN kg ON 5.0 × 20.0 cm STRIPS, Min		LENGTH, m	WIDTH
	Warp	Weft				Warp Way	Weft Way		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	5.4	5.4	528	492	60	27	27	As agreed	93 cm or as agreed
2	(110 s) 30 (20 s)	(110 s) 30 (20 s)	205	205	130	50	50	As agreed	93 cm or as agreed
Tolerance, percent	—	—	—	—	—	—	—	+ 2 — 0	+ 2 — 1
Method of Test	—	—	—	—	IS : 1964-1970*	IS : 1969-1985†	IS : 1954-1969‡	—	—

*Methods for determination of weight per square metre and weight per linear metre of fabrics (first revision).

†Methods for determination of breaking load and elongation of woven textile fabrics (second revision).

‡Methods for determination of length and width of fabrics (first revision).

TABLE 2 PHYSICAL AND CHEMICAL REQUIREMENTS OF COTTON FABRICS FOR SUPPLY DROPPING PARACHUTES
(Clause 4.1)

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST
(1)	(2)	(3)	(4)
i)	Colour fastness to:		
	a) Light	5 or better	IS : 2454-1985*
	b) Washing test 3	4 or better	IS : 764-1979†
	Change in colour and staining of adjacent fabrics		
ii)	Scouring loss, percent, Max	2.0	IS : 1383-1977‡ (mild method)
iii)	Water soluble matter, percent, Max	2.0	IS : 3456-1966§
iv)	pH value of aqueous extract	6.0-8.5	IS : 1390-1983 (hot method)
v)	Air permeability in cm ³ /cm ² /Sec		IS : 11056-1984¶
	a) Type 1	550 ± 60	
	b) Type 2	490 ± 125	

*Method for determination of colour fastness of textile materials to artificial light (xenon lamp) (*first revision*).

†Method for determination of colour fastness of textile materials to washing, Test 3 (*second revision*).

‡Method for determining scouring loss in grey and finished cotton textile materials (*first revision*).

§Method for determination of water soluble matter of textile materials.

||Methods for determination of pH value of aqueous extracts of textile materials (*first revision*).

¶Method for determination of air permeability of fabrics.

8.3 The conformity of the lot to the requirements other than width, breaking load and air-permeability of this standard shall be determined on the basis of tests carried out on the samples selected from the lot.

8.3.1 Unless otherwise agreed between the buyer and the seller, the number of pieces of fabric to be selected at random from a lot shall be in accordance with col 2 of Table 3. These pieces shall be selected from at least 20 percent of the bales, an equal number of pieces, as far as possible, being drawn at random from each bale.

TABLE 3 SAMPLE SIZE AND CRITERIA FOR CONFORMITY

(Clauses 8.3.1, 8.3.2, 8.3.3 and 8.4.2)

NUMBER OF PIECES IN THE LOT	SAMPLE SIZE (NUMBER OF PIECES TO BE SELECTED)	PERMISSIBLE NUMBER OF DEFECTIVE PIECES	SUB-SAMPLE SIZE (NUMBER OF PIECES TO BE SELECTED)
(1)	(2)	(2)	(4)
Up to 100	10	0	5
101 to 300	15	1	6
301 to 500	25	1	7
501 to 800	35	2	8
801 to 1 300	50	3	9
1 301 and above	75	4	10

8.3.2 For evaluating length and mass, the sample selected as in col 2 of Table 3 shall constitute the test sample.

8.3.3 For evaluating water solubles, scouring loss, pH value, colour fastness and rot proofness, the number of pieces of fabric specified in col 4 of Table 3 shall constitute the test sample. These pieces may be drawn from the pieces selected for the purpose of 8.3.2. The required test specimens shall be drawn from each of the pieces and subjected to corresponding tests.

8.4 Criteria for Conformity

8.4.1 Those pieces in the lot which conform to the requirement of width, breaking load and air-permeability of this standard shall be accepted provided lot satisfies the criteria of conformity for other requirements of this standard as given in 8.4.2.

8.4.2 The lot shall be considered to be in conformity with the requirements other than width, breaking load and air-permeability of the standard, if the following conditions are satisfied:

- The number of pieces found defective with respect to mass does not exceed the corresponding number given in col 3 of Table 3.
- In the case of length, the length of each piece is not less than the specified, declared or marked length, and if not, the mean percentage of deficiency in length is determined and made applicable to the lot.
- From the observed values of water soluble matter, the average \bar{X} and the range R are calculated and the value of the expression $\bar{X} + 0.6 R$ is found to be less than or equal to the specified value.
- From the observed values of scouring loss, the average \bar{X} and the range R are calculated and the expression $\bar{X} + 0.6 R$ is less than or equal to the specified value.
- From the observed pH values, the average \bar{X} and the R are calculated and the values of the expressions $\bar{X} + 0.6 R$ and $\bar{X} - 0.6 R$ lie within the specified limits.

NOTE 1 — Average \bar{X} is the value obtained by dividing the sum of the observed values by the number of tests.

NOTE 2 — Range R is the difference between the maximum and the minimum in a set of observed values.

- The colour fastness ratings for various agencies obtained on test satisfy the corresponding requirements.
- All the test specimens meet the requirements of rot-proofing given in 3.3.