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RAKSHA MANTRALAYA
MINISTRY OF DEFENCE

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SPECIFICATION
FOR
FABRIC NYLON 93g UNDYED

ISSUED BY
DIRECTOR/NIDESHAQ
HAWAI VITRAN ANUSANDHAN AVAM VIKAS SANSTHAPAN
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RECORD OF AMENDMENTS

Amendment No.	Sub heading to which amendment pertains	Authority	Incorporated by	Initials & Date
1	<p><u>Column no. 5, Appendix - A</u> For: Mass, g/m^2: 93 ± 3 Read: Mass, g/m^2: 90 ± 3</p> <p><u>Column no. 8, Appendix - A</u> For: Extension at Break, %: 23 ± 3 Read: Extension at Break, %: 20, Min.</p> <p><u>Column no. 11 & 12, Appendix - A</u> For: Linear density of twisted yarn (with a tolerance of -3 to +8%), Tex: 16.67(both ways) Read: Maximum nominal linear density of twisted yarn, Tex: 16.67 (both ways)</p> <p><u>Column no. 13 & 14, Appendix - A</u> For: Threads/cm: 28 ± 2 (both ways) Read: Suggested Threads/cm: 28 (both ways)</p>	DIRECTOR, ADRDE	HEAD, TDTM	02/06/20 8/9/9
2	<p><u>Clause no. 5.3, Page no. 9</u> Read: The selvages should be straight, even & well made and should have the same tension as the remainder of the fabric. The tension given to the yarn during weaving shall be estimated with the other processing/manufacturing details. A piece of five metre sample along with the test results shall be forwarded as an advance sample for approval.</p> <p><u>Clause no. 5.4, Page no. 9</u> The use of shuttle or shuttleless loom is acceptable.</p>	DIRECTOR, ADRDE	HEAD, TDTM	02/06/20 16/6/10 16 June 10

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FABRIC NYLON 93g UNDYED

O. FOREWORD

- 0.1 This specification has been prepared by a special committee at ADRDE and approved by the Director, ADRDE, Agra
- 0.2 This specification would be used for manufacture inspection and procurement of Fabric nylon 93g, undyed against Defence requirements.
- 0.3 In case of any discrepancy between this specification and any sample or pattern, this specification shall be taken as correct.
- 0.4 Enquiries regarding this specification in relation to any contractual conditions should be addressed to the Inspection Authority named in tender or contract. Other enquiries will be referred to the issuing authority, Director, ADRDE, Agra.
- 0.5 Whenever a reference to any other specification occurs in this specification, It shall be taken as a reference to the latest version of that specification.

0.6 Copies of this specification can be obtained on payment from:

- i. The Director,
A.D.R. & D.E.,
P.B. No. 51, Station Road,
Agra Cantt. - 282 001
- ii. Concerned Inspectors and Inspection Authority

0.7 IS specifications quoted in this specification may be obtained directly from B.I.S., Manak Bhawan, 9, Bahadur Shah Zafar Marg, New Delhi - 110 002 or its offices located in the country.

1. **SCOPE**

1.1 This specification covers the requirement of woven Fabric, Nylon 93g undyed used in the manufacture of Parachutes and other miscellaneous Aerial Delivery Equipments.

2. **RELATED SPECIFICATIONS**

2.1 Reference is made in this specification to :

- i. IS:2 Rules for rounding off numerical values
- ii. IS:6359 Methods for conditioning of textiles
- iii. IS:1954 Methods for determination of length and width of fabrics
- iv. IS:7702 Method for determination of thickness of woven and knitted fabrics.
- v. IS: 1963 Method for determination of threads per unit length in woven fabrics.
- vi. IS: 1964 Method for determination of weight per square metre and weight per linear metre of fabrics.
- vii. IS:1969 Methods for determination of breaking load and elongation at break of woven textile fabrics.

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|-------|---------|---|
| viii. | IS:1670 | Determination of breaking load, elongation at break and tenacity of yarns |
| ix. | IS:3442 | Determination of crimp and count of yarn removed from fabric. |
| x. | IS: 832 | Method for determination of twist in yarn. |
| xi. | IS:3456 | Method for determination of water soluble matter of textile materials. |
| xii. | IS:4726 | Light weight nylon fabric for parachutes. |
| xiii. | IS:1390 | Method for determination of pH value of aqueous extracts of Textiles (cold method). |
| xiv. | IS:1843 | Specification for nylon-monofilaments. |
| xv. | IS:7151 | Specification for corrugated fibre board boxes for para dropping of supplies. |
| xvi. | IS:9738 | Polythene bags. |

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- 2.2 All specifications referred to in this specification for any tender or contract shall mean the current edition on the date of such tender or contract.

3. **REFERENCE STANDARD**

- 3.1 The standard of the fabric, held by ADRDE, Agra Cantt, shall constitute the reference standard as regards any particulars or properties not noted/defined in this specification.

4. **MATERIAL**

- 4.1 The basic material shall be nylon-66, bright, high tenacity (7.5 gpd minimum), multifilament yarn suitably twisted as per appendix 'A' to meet the requirements stipulated at clause 7. **One spool of about 200 metre of the basic yarn material along with its test results should be supplied by the firm for testing / approval before starting the production of Advance sample ref. Clouse 5.3)**

5. **MANUFACTURE**

- 5.1 Nylon yarn used in the manufacture of the fabric shall be of Du Pond or its equivalent standard manufactures product that will ensure the compliance of the fabric with the requirement of this standard.

5.2 The fabric shall not be more than one year old from the date of manufacture to the date of delivery. A certificate to this effect shall be provided by the manufacturer/contractor at the time of delivery.

5.3 The selvages should be straight, even & well made and should have the same tension as the remainder of the fabric. The tension given to the yarn during weaving shall be intimated with the other processing /manufacturing details. A piece of five metre sample along with the test results shall be forwarded as an advance sample for approval.

5.4 The use of shuttle or shuttleless loom is acceptable.

6. FINISH

6.1 The fabric shall have minimum weaving flaws, stains and other processing defects. For the detailed classification of defects, number of permissible defects appendix 'E' of IS: 4726-1984 may be preferred to.

6.2 The fabric shall be given a preliminary scour, sufficient to remove sizing and other adhering material to a temperature which will not result in permanent setting of the fabric.



The fabric shall then be heat set under already approved conditions of temperature pressure and time. The supplier should primarily get approved the sequence of processes to achieve the specified properties. The fabric shall not be bleached.

- 6.3 The finished fabric shall be thoroughly clean and shall not have any objectionable odour.
- 6.4 The finished fabric shall contain no sizing or weighing material of any description. The amount of matter extractable by water when determined by the method given in IS:3456 shall not exceed 0.5 % by mass.

7. **REQUIREMENTS**

- 7.1 The fabric shall conform to the particulars given in appendix 'A'. The air porosity of the fabric shall be determined as per appendix 'A' of IS:4726.

7.2 Permanance of Finish: The permanance of finish of the fabric shall be such that when the fabric is subjected to the test as specified in Appendix 'B' of IS: 4726, the condition in para 7.2.1 to 7.2.3 are fulfilled.

7.2.1 The mean of air porosity values determined after testing shall not alter by more than 15 percent of the mean of the reading determined before testing.

7.2.2 The fabric thickness after testing shall not exceed by more than 10.0 percent.

7.2.3 The fabric shrinkage shall not be more than 2.0 percent either in warp or weft direction.

7.3 Stability of Finish : The stability of finish of the fabric shall be such that when the fabric is subjected to the test as specified in appendix 'C' of IS:4726, only keeping the size of metal bushing as given in Fig. 1 of appendix 'B' of this specification, the air porosity shall not alter by more than 7.5 percent of the specified value.

- 7.4 pH Value : pH value of the finished fabric shall be within the range of 5.5 to 8.5.
- 7.5 Melting Point: The melting point of nylon yarn used in the manufacture of the fabric shall be $250 \pm 6^{\circ}\text{C}$.
- 7.5.1 The melting point of the nylon yarn shall be determined according to Appendix B of IS : 1843-1963.
- 7.6 Sealed Sample: If, in order to illustrate or specify the unmeasurable characteristics like general appearance, feel, etc of the fabric, sample has been agreed upon and sealed, the supply shall be in conformity with the sample in such respects.
- 7.6.1 The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.

8. MARKING

- 8.1 Each piece, prior to being offered for inspection shall legibly be marked by the supplier with his name, initials or recognised trade mark, the year of manufacture, brief nomenclature, DS

Cat. number of the store and length of the piece along with the number of flags contained in the piece.

9. **QUALITY**

- 9.1 Examination of sample taken from any portion of consignment shall show that the fabric conforms to the requirements of clause 7 above.

10. **PRE-INSEPTION OF STORES/CONSIGNMNET**

- 10.1 Manufacturers / contractors must satisfy themselves that the stores are in accordance with the terms of the contract and fully conform to the required specification by carrying out a thorough pre-inspection of each lot before actually tendering the same for inspection to the inspecting officer nominated under the terms of the contract. A declaration by the contractor that necessary pre-inspection has been carried out on the stores tendered, will be submitted along with the challan. The declaration will also indicate the method followed

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in carrying out pre-inspection showing the features checked/tested and will have the test certificate attached to the challan/declaration.

- 10.2 If the Inspecting officer finds that pre-inspection of the consignment as required above has not been carried out, the consignment is liable for rejection.

11. **SAMPLING**

- 11.1 The manufacturer / supplier shall tender stores duly numbered and arranged in such a way that all the units are easily accessible to the Inspector.

- 11.2 The samples shall be drawn lot wise for carrying out tests specified in this standard. Unless otherwise agreed to between the buyer and the seller, the lot shall be defined under respective sampling plans as detailed below. The fabric shall be in continuous length without joints of not less than 50m or its multiple or as agreed between the buyer and the seller.

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However, shorter cuts may be allowed in accordance with the following schedule or as agreed between the buyer and the seller : -

95% of the total supply in length of 50m or above
3 % of the total supply in length of 40m or above
2 % of the total supply in length of 20m or above

11.3 **SAMPLING PLAN 'A'**

11.3.1 **LOT** - The total length of the fabric manufactured from same type of yarn received from the same source / manufacturer and of same weave and finish, delivered to a buyer against one despatch note, shall constitute a lot.

11.3.2 Each roll of the lot shall be tested for air porosity at intervals of 5m. All the air porosity readings shall be rounded off in accordance with IS:2.

11.3.3 Each roll of the lot shall be measured for its length.

11.3.4 Five percent of the lot or ten rolls whichever is more, shall be subjected for the width measurement.

11.4 **SAMPLING PLAN 'B'**

11.4.1 **LOT** - All the rolls of fabric manufactured from same type of yarn procured from the same supplier / manufacturer and of same weave and finish, delivered to a buyer against one despatch note, shall constitute a lot.

11.4.2 One sample of one metre length and of full width shall be drawn from each roll of the lot for carrying out the following tests:

- a) Mass
- b) Breaking load and Extension at break

11.5 **SAMPLING PLAN 'C'**

11.5.1 **LOT** - The quantity of fabric manufactured from the same type of yarn procured from the same supplier / manufacturer and of the same weave and finish, delivered to a buyer against one despatch note, shall constitute a lot.

11.5.2 One sample of three metre length and of full width shall be selected from any roll of each lot for carrying out the following tests :

- a) Weave
- b) No. of threads/dm (warp & weft)
- c) Linear density of yarn
- d) Twist of yarn
- e) Permanance of Finish
- f) Stability of finish
- g) pH value

Signature

- h) Water soluble matter
- i) Melting point of yarn

12 **CRITERIA FOR CONFORMITY**

- 12.1 All the sample units drawn as per clause 11.2, shall be tested/examined to the relevant requirement / specification. The lot shall be considered to be in conformity, if the requirements given in clause 7, are satisfied.

13 **INSPECTION**

- 13.1 If, on examination, 20 percent of the supply are found not to conform to this specification in any respect, the whole consignment should be rejected.

14. **WARRANTY**

14.1 The store supplied shall be deemed to bear a warranty of the contractor against defective material, poor workmanship and performance for a period of twelve months from the date of receipt of the stores at consignee's depot.

14.2 If during the period, the stores supplied are found by the consignee to be defective, the same shall be replaced immediately with serviceable stores by the contractor at site, free of any charge or cost.

15. **PACKAGING**

15.1 Each roll / piece shall be wrapped with polythene bag as per IS:9738 and secured at two ends by line cotton (0.32 cm) to form a unit pack. Suitable number of such unit packs shall then be wrapped with paper craft wrapping and placed in corrugated fibre board boxes as per IS:7151 of suitable size, provided with line water proof bag. The gross mass of the box shall not exceed 40 kg. The empty spaces if any shall be filled in with cushioning material to prevent any movement of the contents inside the corrugated fibre board box and the top lid of the box

shall be properly sealed with adhesive tape. The packing shall be made secured by fastening it with suitable nylon tape.

15.2 Packing material used should be approved by Inspecting Officer. If ordered for delivery to a local inspection depot, the store shall be delivered in the same fashion as stated above in clause no. 15.1. After inspection, the accepted supplies shall be packed by the inspection depot concerned as indicated in para 15.1 above.

15.3 Before despatch, each corrugated fibre board box shall be legibly and indelibly marked showing following details :-

- a) Nomenclature and D S Cat. number.
- b) Quantity packed in each corrugated fibre board box.
- c) Serial no. of the corrugated fibre board box.
- d) Month and year of packing.
- e) Name and trade mark of the manufacturer.
- f) Gross mass of each corrugated fibre board box in Kg.

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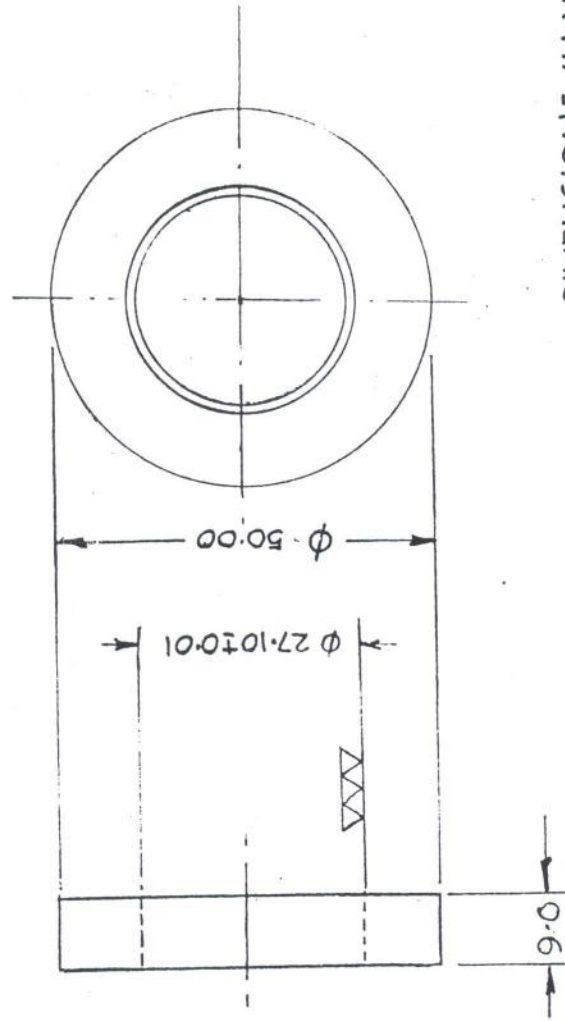
APPENDIX 'A'

Roll Length, min, or as agreed, m	Width, min, or as agreed, cm	Thickness, under 200g/cm ² pressure, max, mm	Air Porosity at 25cm wcp, cm ³ /cm ² /s (ft ³ /ft ² /s)	Mass, g/m ²	Breaking Load, (5X20 cm strips) min, kgf		Extension at Break, %	
					Warp	Weft	Warp	Weft
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
50	100 or 120	0.16±0.01	213±61 (7±2)	93±3	130	130	20±3	20±3

Weave	Linear density of twisted yarn (with a tolerance of -3 to +8%), tex		Threads per cm		Twist of Yarn (with a tolerance of 15%)	
	Warp	Weft	Warp	Weft	Warp	Weft
(10)	(11)	(12)	(13)	(14)	(15)	(16)
Plain	16.67	16.67	28±2	28±2	200	100

APPENDIX 'B'

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DIMENSIONS IN MILLIME
SCALE:- 1:1

BUSHING

FIGURE :- 1

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