Government of India

Ministry of Defence

Specification

For

Fabric Nylon 35 gsm

Approved by

Director

Aerial Delivery Research and Development Establishment

Ministry of Defence

Post Box No. 51

Station Road

Agra Cantt - 282 001

RECORD OF AMENDMENTS

Amendment No.	Sub heading to which amendment pertains	Authority	Incorporated by Name & Rank in Block letters	Initials

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Fabric Nylon 35 gsm

0. FOREWORD

0.0 This specification is the conversion of existing technical particulars being used in fabrication of canopy of pilot parachute Mirage-2000/Sea Harrier/ Hawk-132 aircraft.

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 35 gsm 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 Fabric Nylon used in the fabrication of canopy of pilot parachute Mirage-2000/Sea Harrier/ Hawk-132 aircraft and can also be used in other aerial delivery application considering its suitability.

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 meter and weight per meter of fabrics
vii.	IS: 1969	Methods for determination of breaking load and elongation at break of woven textile fabrics.
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.
ix.	IS: 832	Method for determination of twist in yarn
x.	IS: 1390	Method for determination of pH value of aqueous extracts of Textiles (cold method).
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: 5762 Method for determination of melting temperature/range

xv. IS: 7151 Specification for corrugated fibre board boxes for para dropping of supplies

xvi. IS: 9738 Polythene bags

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

4. MATERIAL

4.1 The basic material shall be of Nylon 66, High Tenacity, Multifilament, Bright yarn suitably twisted as per Appendix 'A' to meet the requirements stipulated at clause 7. One spool of about 200 meters 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. Clause 5.3)

5. MANUFACTURE

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

5.2 The finished fabric should contain silicone polymer finish so applied that it is evenly and uniformly distributed throughout the fabric. The amount of silicone polymer applied shall be from 0.3 to 0.5 percent based on the dry mass of the fabric. The fabric after padding with silicone emulsion shall be dried and cured to obtain proper silicone polymer finish. The manufacturer shall submit a certificate for each roll indicating that the required quantity of silicone polymer finish has been applied.

5.3 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.

5.4 The selvedges should be straight, even and well made. There should have the same tension as the reminder 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 alongwith the test results shall be forwarded as an advance sample for approval.

5.5 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 detail classification of defects, no. of permissible defects, Appendix 'E' of IS 4726 may be referred to.

6.2 The fabric shall be given a preliminary scour, sufficient to remove sizing and other adhering material at 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 & 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 determined by the method given in IS: 3456 shall not exceed 2% 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 Tearing Strength: The tearing strength of the fabric shall be such that when the fabric is subjected to the test as specified in Appendix-D of IS: 4726, it fulfils the requirements as per Appendix-A of this specification.

7.3 pH Value : pH value of the finished fabric shall be within the range or 5.5 to 8.5.

7.4 Melting Point: The melting point of nylon yarn used in the manufacture of the fabrics shall be 250±6°C.

7.5 Colour Fastness: The dyed fabric shall be fast to light and water. The minimum colour fastness rating of change in colour of the fabric to artificial light and to washing shall be 4 when tested by the method given in IS : 2454 or IS : 687.

7.6 Sealed Sample: If, in order to illustrate or specify the immeasurable 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.

7.5.1 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 recognized 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 On examination of sample taken from any portion of consignment, shall show that the fabric conforms to the requirements of clause 7 above.

10. PRE-INSEPCTION 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 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 specification. 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. However, shorter cuts may be allowed in accordance with the following schedule or as agreed between the buyer and seller.

95 % of the total supply in length of 50 m or above

3 % of the total supply in length of 40 m or above

2 % of the total supply in length of 20 m or above

11.3 SAMPLING PLAN 'A'

11.3.1 LOT - The total length of the fabric manufactured from same type of yarn purchased from the same supplier/ manufacturer and of same weave and finish, delivered to a buyer against one dispatch 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 purchased 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 meter 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
c) Tearing Strength

11.5 **SAMPLING PLAN 'C'**

11.5.1 LOT - The quantity of fabric manufactured from the same type of yarn purchased from the same supplier / manufacturer and of the same weave and finish, delivered to a buyer against one dispatch 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) pH value
e) Type of basic material
f) Twist of yarn
g) Melting point of yarn

12 CRITERIA FOR CONFORMITY

12.1 All the sample units drawn as per clause 11.2 above 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 those examined, are found not to conform to this specification in any respect, the whole consignment may be rejected.

14. WARRANTY

14.1 The stores 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 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 box as per IS 7151of 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 box shall be properly fixed with adhesive tape. The box packing shall be made secured by fastening with suitable tapes/cords.

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 cl 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 box of corrugated fibre board packing 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.
g) Name and address of the consignee.
h) Inspection Note number and date.

16. DEFENCE STORES CATALOGUE NUMBER

16.1 Not yet allotted.

17. SUGGESTION FOR IMPROVEMENT

17.1 Any suggestion for improvement of this document may be forwarded to the Director, ADRDE, Agra Cantt - 282 001.

APPENDIX 'A' (Page1/2)

Roll Length, min, or as agreed, m	Width, min, or as agreed, cm	Thickness, under 200g/cm² pressure, max, mm	Mass, max, g/m²	Breaking Load, (5X20 cm strips) min, kgf		Tearing Strength, kgf, min, both directions	Air Permeability at 10" WHP, ft³/ft²/sec	Material	Weave Design
				Warp	Weft				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
50 m or As agreed between buyer & seller	100	0.07	35±1	38	38	2.3	2 – 6	High Tenacity Multifilament, Nylon 6,6 Yarn	Rip Stop Plain

APPENDIX 'A' (Page2/2)

Nominal Yarn linear density, Tex		No. of Threads per dm		Yarn Twist per metre (TPM)	
Warp	Weft	Warp	Weft	Warp	Weft
(11)	(12)	(13)	(14)	(15)	(16)
3.33 x 1	3.33 x 1	490±15	490±15	150±15%	150±15%

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