		Specn No. ADRDE/SPECN/75(a)		Revision no: 1 Dated:
Prepared By: <i>DKB</i> Dev Kishan Bairwa Sc 'B'	<i>P.K. Mallik</i> P.K. Mallik Sc 'D'	Reviewed By: <i>Gaurav Singh</i> Gaurav Singh Sc 'F', GD, TGTE	Issue: 2 Dated:	Page 1 of 9

Government of India  
Ministry of Defence

Specification  
For

**Polyurethane Coated Nylon  
Fabric 370 gsm and 475 gsm Air Textured**


Approved by

*[Signature]*  
27/8/20

Sc 'G' & Associate Director




Aerial Delivery Research and Development Establishment  
Ministry of Defence  
Post Box No. 51  
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RECORD OF AMENDMENTS

Amendment No.	Sub heading to which amendment pertains	Authority	Incorporated by Name & Rank in Block letters	Initials
1	Clause 4.2.1:  <b>ADD:</b> 30000 cycles when tested on DE-MATIA as per IS:7016 (part IV)	Director ADRDE	GD, TGTE	
2	Appendix 'A', Column 3, Vty No. 2: <b>For:</b> Mass, g/m <sup>2</sup> , max: 425  <b>Read:</b> Mass, g/m <sup>2</sup> , max: 475	Director ADRDE	GD, TGTE	

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## SPECIFICATION FOR POLYURETHANE COATED NYLON FABRIC 370 GSM AND 475 GSM AIR TEXTURED

### 0. FOREWORD


- 0.0 This specification is the revision of existing specification no ADRDE/SPECN/75 being used against defence requirements.
- 0.1 This specification has been prepared by a special committee, reviewed and approved by Group Director, Technology Group (Textile Engineering), ADRDE, Agra.
- 0.2 This specification would be used for manufacture inspection and procurement of polyurethane coated nylon fabric 370 gsm and 475 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 Polyurethane Coated Nylon Fabric 370 gsm and 475 gsm used in fabrication of Combat Free Fall (CFF) system and can be used in other aerial delivery equipments considering 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: 1963 Method for determination of threads per unit length in woven fabrics.
  - v. IS: 7702 Method for determination of thickness of woven and knitted fabrics.
  - vi. IS: 1964 Method for determination of weight/square meter and weight/meter of fabric.
  - vii. IS: 7016 (pt. II) Methods of test for coated and treated fabrics (for breaking strength and extension at break).
  - viii. ADRDE/IPS/ 01/44 Inspection process schedule of coated fabrics for inflatables.
  - ix. IS: 7016 (pt. VI) Method of test for coated and treated fabrics (resistance to damage by flexing).
  - x. IS: 105 C-10 Method for determination of colour fastness of textile materials to washing.

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- xi. IS: 105 B-02 Method for determination of colour fastness of textile materials to artificial light (xenon arc).
- xii. IS: 1390 Method for determination of pH value of aqueous extracts of textiles (hot method).
- xiii. IS: 5762 Method for determination of melting temperature/range
- xiv. IS: 5 Colours for ready mixed paints and enamels.
- 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. REQUIREMENTS

- 4.1 Base Fabric – The base fabric shall be made of nylon 66, multifilament, high tenacity, industrial grade, UV & heat stabilized, air textured yarn.
- 4.2 Coating – The coating shall be made from polyurethane and one side of the fabric. It shall be non irritant to skin and shall not contain any ingredient which may be harm full to person with whom it may come in contact.
- 4.2.1 Resistance to damage by flexing: The fabric should be subjected to the test for determination of resistance to damage by flexing as per IS: 7016 (part IV) by DE-MATTIA method for 30000 cycles and there shall be no cracking when examined under a magnification of  $\times 10$ .
- 4.3 Colour of coating: Polyurethane coated fabric shall be Disruptive design ( as per sample to be produced) on the other side of coating, for variety no. 1 and Olive Drab shade as per shade no. 298 of IS:5 for variety no. 2. However, basic dye or sulphur dye should not be used while dyeing the coated fabric.
- 4.4 Length: The length of the each piece of polyurethane coated fabric shall be not less than 50 meters unless otherwise agreed between the purchaser and the supplier. There shall be no joints in any single piece. However, shorter length may be accepted as under:  
90% of the total supply – in length of 50 m or more or as agreed.  
10% of the total supply – in length of 30m or more or as agreed.  
The length shall be determined in accordance with IS: 1954
- 4.5 Finished fabric: The finished fabric material shall be soft, pliable, smooth and free from cuts embedded foreign material, surface irregularation and other mechanical defects. The no. of visual defects when determined as per IPS ADRDE/IPS/01/44 shall be more than one major or 3 minor defects per 10m length.
- 4.6 Width: The usable width of the polyurethane coated fabric shall be as stipulated in Appendix 'A' (selvedge free) or as agreed to between the purchaser and the supplier. The un-proofed portion if any, near either selvedge, shall be not more than 10mm in width. The width shall be determined in accordance with IS: 1954.
- 4.7 Thickness: The thickness of the fabric shall be determined as per IS: 7702. It should be satisfy the requirements as given in Appendix 'A'.
- 4.8 Mass: The thickness of the polyurethane coated nylon fabric shall be determined as per IS: 1964 and cl 4.1(a) of ADRDE/IPS/01/44 and should satisfy the requirements as given in Appendix 'A'.
- 4.9 Breaking Load: Breaking load of the fabric shall be determined as per IS: 7016 (pt. II) and clause 4.1(b) of ADRDE/IPS/01/44. IT shold satisfy the requirements as given in Appendix 'A'.

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- 4.10 pH Value: pH value of the finished fabric when determined as per IS: 1390 (hot method), shall be within the range of 5.5 – 8.5.
- 4.11 Colour fastness to washing: The colour fastness to washing of the fabric shall be determined as per IS: 105-C10 [Test Number A (1)] and the rating should be 4 or better.
- 4.12 Colour fastness to light: The colour fastness to light of the fabric shall be determined as per IS: 105-B02 and the rating should be 5 or better.
- 4.13 Resistance to Acid and Alkali: When a piece, 2.5 x 2.5cm cut from any portion of the finished material, is dipped in 20% hydrochloric acid or 20% sodium hydroxide solution for 30 minutes, there shall be no sign of damage of the coating.
- 4.14 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.  
The custody of the sealed sample shall be a matter of prior agreement between the buyer and the seller.
- 4.15 The finished fabric should comply with all the requirements prescribed in Appendix 'A'
5. **MARKING**
- 5.1 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.
6. **QUALITY**
- 6.1 On examination of sample taken from any portion of consignment, shall show that the fabric conforms to the requirements of clause 4 above.
7. **PRE-INSEPCION OF STORES/CONSIGNMNET**
- 7.1 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.
- 7.2 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.
8. **SAMPLING**
- 8.1 The manufacturer/supplier shall tender stores duly numbered and arranged in such a way that all the units are easily accessible to the Inspector.
- 8.2 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.
- 8.2.1 **SAMPLING PLAN 'A'**
- 8.2.1.1 LOT - The total length of the fabric manufactured from same base fabric using same type of material and process of manufacturing/coating, delivered to a buyer against one dispatch note shall constitute a lot

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- 8.2.1.2 Each roll of the lot shall be measured for its length (IS: 1954) and also for visual inspection as per ADRDE/TECH PART/01/44.
- 8.2.1.3 Five percent of the lot or ten rolls whichever is more, shall be subjected for the width measurement.

8.2.2 **SAMPLING PLAN 'B'**

- 8.2.2.1 LOT - The total length of the fabric manufactured from same base fabric using same type of material and process of manufacturing/coating, delivered to a buyer against one dispatch note shall constitute a lot
- 8.2.2.2 One sample of two meter length and of full width shall be drawn from each roll of the lot for carrying out the following tests:
- Thickness
  - Mass
  - Breaking load

8.2.3 **SAMPLING PLAN 'C'**

- 8.2.3.1 LOT - The total length of the fabric manufactured from same base fabric using same type of material and process of manufacturing/coating, delivered to a buyer against one dispatch note shall constitute a lot.
- 8.2.3.2 One sample of half metre length and of full width shall be selected from any roll of each lot for carrying out the following tests:
- Threads/dm
  - Weave
  - pH value
  - Colour fastness to washing
  - Colour fastness to washing
  - Polyurethane coating content
  - Resistance to acid and alkali.

9. **CRITERIA FOR CONFORMITY**

- 9.1 All the sample units drawn as per clause 8 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 5 are satisfied.

10. **INSPECTION**


- 10.1 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.

11. **WARRANTY**

- 11.1 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.
- 11.2 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.

12. **PACKAGING**

- 12.1 Each roll/piece shall be wrapped with polyethylene bag as per IS: 9738 to form a unit pack. Suitable number of such unit packs shall then be wrapped with paper craft wrapping and placed

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in corrugated fibre boxes (as per IS: 7151) of suitable size, provided with line water proof bag. The gross mass of the package shall not exceed 40 Kgs. 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 tapes.

12.2 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. 13.1. After inspection, the accepted supplies shall be packed by the inspection depot concerned as indicated in para. 13.1 above.

15.4 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.



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APPENDIX 'A'

Variety No.	Width, cm, or as agreed	Mass, g/m <sup>2</sup> , max	Thickness, at 200 g/cm <sup>2</sup> pressure, max	Breaking Load (5cm X 20 cm strips), min, in kgf	Threads/dm (Suggested)	Linear Density of yarn in Denier* (before air texturing)	PU Coating (on one side), g/m <sup>2</sup>	Weave			
									Warp	Weft	Warp
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	100±5	370	0.60	300	250	138	120	840x1	840x1	15, max	Plain
2	100±5	475	0.60	380	350	120	110	1260x1	1260x1	65±5	Plain

\*Manufacturer's certificate of compliance of linear density of yarn shall be obtained.