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|  | Specn No. ADRDE/SPECN/1984/23(d) | | Revision no: 4 Dated: 04.03.2022 |
| Prepared By: <i>Dev Kishan Bairwa</i> Dev Kishan Bairwa, Scientist 'B', TG(TE) | Reviewed By: <i>Prasanta Kr Mallik</i> Prasanta Kr Mallik Scientist 'E', DH, TG(TE) | Issue: 5 Dated: 04.03.2022 | Page 1 of 9 |

Government of India
Ministry of Defence

Specification
For

DUCK NYLON VARIOUS OG


Gaurab Malik
04/03/22

Approved by

Group Director
Technology Group (Textile Engineering)




Aerial Delivery Research and Development Establishment
Ministry of Defence
Post Box No. 51
Station Road
Agra Cantt - 282 001

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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 | Insert Clause 4.2: Yarn Twist: Any yarn twist in (warp & weft) is acceptable, provided all requirements for this specification are met. | Director ADRDE | GD, TG(TE) | |
| 2 | <u>Appendix 'A', Column 2, Variety 1</u> For: Linear Density of yarn in Tex (Tolerance -5% to +10%): Warp :23.3×1 Read: Linear Density of yarn in Tex (Tolerance -5% to +10%): Warp - Option A: 23.3×1 Option B: 46.7×1 | Director ADRDE | GD, TG(TE) | |
| 3 | <u>Appendix 'A', Column 4 & 5</u> For: Ends/dm, min: 400 Picks/dm, min: 400 Read: Ends/dm, min - Option A: 420 Option B: 210 Picks/dm, min - Option A: 380 Option B: 190 | Director ADRDE | GD, TG(TE) | |
| 4 | <u>Appendix 'A', Column 6, Variety - 1</u> For : Mass in gsm: 230±5% Read: Mass in gsm: 230, max. | Director ADRDE | GD, TG(TE) | |
| 5 | <u>Appendix 'A', Column 9, Variety - 1</u> For : Weave: 2/2 Hopsack or Plain (2 ends working as 1) Read: Weave - Option A: 2/2 Hopsack Option B: Plain | Director ADRDE | GD, TG(TE) | |

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| Prepared By: <i>DK</i> Dev Kishan Bairwa, Scientist 'B', TG(TE) | Reviewed By: <i>Prasanta</i> Prasanta Kr Mallik Scientist 'E', DH, TG(TE) | Issue: 5 Dated: 04.03.2022 |
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SPECIFICATION FOR DUCK NYLON VARIOUS OG

0. FOREWORD



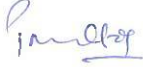
- 0.0 This specification is the revision of existing specification no ADRDE/SPECN/1984/23(c) being used against defence requirements.
- 0.1 This specification has been prepared by a special committee, reviewed and approved by Group Director, Technology Group (Textile Engineering), ADRDE, Agra.
- 0.2 This specification would be used for manufacture inspection and procurement of Duck Nylon Various OG (dyed) 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 Duck Nylon Various OG of three types used in fabrication of packs and harnesses for personnel Parachutes in particular and other miscellaneous aerial Delivery equipments, in general.

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/square meter and weight/meter of fabric.
 - 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.
 - x. IS: 832 Method for determination of twist in yarn.
 - xi. IS: 1390 Method for determination of pH value of aqueous extracts of Textiles (cold method).
 - xii. IS: 5762 Method for determination of melting temperature/range.
 - xiii. IS: 7151 Specification for corrugated fibre board boxes for para dropping of supplies
 - xiv. IS: 9738 Polythene bags.
 - xv. IS: 105 B-02 Method for determination of colour fastness of textile materials to artificial light (xenon arc).

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- xvi IS: 105 C-10 Method for determination of colour fastness of textile materials to washing.
- Xvii IS: 4726 Light weight nylon fabric for parachutes.
- 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 duck nylon, 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 6 or 66, High Tenacity, Multifilament, Bright yarn 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.
- 4.2 Yarn Twist: Any yarn twist in (warp & weft) is acceptable, provided all requirements for this specification are met.

5. **MANUFACTURE**


- 5.1 Nylon yarn used in the manufacture of the fabric shall be of Du ponts or its equivalent standard manufacture's 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 and well made. There 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 alongwith 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 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 dyed duck shall be manufactured either by use of dyed yarn or by dyeing the woven fabric. The yarn or fabric shall be dyed with disperse or acid dyes. The dyed fabric shall be of uniform shade and to the approved standard.

7. **REQUIREMENTS**

- 7.1 The fabric shall conform to the particulars given in appendix 'A'.
- 7.2 Shrinkage: Shrinkage of of the duck nylon shall not be more than 2 percent either in warp or weft direction.

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7.3 **pH Value:** pH value of the finished fabric shall be within the range or 5.5 to 8.5 when tested as relevant test method.

7.4 **Colour fastness:** the dyed Duck Nylon shall be fast to light and washing. The colour fastness rating of the duck shall be as below:

Fastness to washing: 4 or better when tested as IS: 105-C10 [Test Number A(1)].

Fastness to light: 4 or better when tested as IS: 105 B-02.

7.5 **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-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 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

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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 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

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) 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.

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15. **PACKAGING**


- 15.1 Each roll of duck nylon shall be wrapped with polyethylene film of 40 micron (150 gauge). Suitable number of rolls shall be arranged in cylindrical bundle and secured by Jute twin to form a unit pack. Appropriate number of unit packs shall then be placed in a case wood packing, conforming to IS: 1398. The empty spaces if any shall be stuffed with cushioning materials to prevent movement of the contents inside. The case, properly nailed with the top lid shall be bound by baling hoops or GI wires of adequate strength. While nailing the top lid care shall be taken that the contents are not pierced. Packing material shall be of best quality and previously approved by the inspector.
- 15.2 The gross mass of the package shall not exceed 40 Kgs.
- 15.3 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.
- 15.4 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. | Linear Density of yarn in Tex (Tolerance -5% to +10%) | | Ends/dm, minimum | Picks/dm, minimum | Mass in gsm | Breaking Load (5cm X 20 cm strips), min, in N | | Weave | Width, min, or as agreed, cm | Roll Length, min, or as agreed, m |
|-------------|----------------------------------------------------------|---------|---------------------|----------------------|----------------|-----------------------------------------------------|------|-------------|---------------------------------------|--------------------------------------------|
| | Warp | Weft | | | | Warp | Weft | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| 1 | Option A | 23.3×1 | 420 | 380 | 230, max | 2260 | 2260 | 2/2 Hopsack | 120 | 40 unless otherwise specified |
| | Option B | 46.7×1 | 210 | 190 | 230, max | 2260 | 2260 | Plain | 120 | |
| 2 | | 93.3×1 | 210 | 210 | 425±5% | 5400 | 5400 | 2/2 Hopsack | 120 | |
| 3 | | 93.3×1 | 352 | 352 | 700±5% | 9800 | 9800 | 3/4 Hopsack | 120 | |
| Test Method | | IS:1315 | IS:1963 | IS:1963 | IS:1964 | IS:1969 | | Visual | IS:1954 | IS:1954 |

Note: Variety No. 1 shall be manufactured using either Option A or Option B.

