

No. U.II-98(Spec)/2015-16-Prov(RAF-DC) 2106
भारतसरकार/Government of India
गृहमंत्रालय/Ministry of Home Affairs
पुलिसआधुनिकीकरणप्रभाग /Police Modernization Division
संभरण-I डेस्क /Prov.I Desk

Jaisalmer House, 26 Man Singh Road,
New Delhi, the 3rd October, 2015

To

The DsG: CRPF & BPR&D.

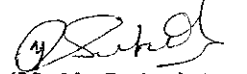
Subject: QRs/Specification of Cloth for RAF Dangree.

Sir,

The undersigned is directed to refer to the subject mentioned above and to say that the QRs/Specifications in respect of Cloth for RAF Dangree as per Annex-I have been approved by the competent authority in MHA.

2. Henceforth, CRPF should procure the above items, required by them strictly as per the laid down QRs/Specification.
3. CRPF will be accountable for correctness of the QRs/Specifications of Cloth for RAF Dangree.

Yours faithfully,




(M. N. Sukole)

Under Secretary to the Govt. of India

Encl: As above.

Copy forwarded for necessary action to:

ISO (IT), MHA - With the request to host the QRs/Specifications of Cloth for RAF Dangree on official website of MHA (under the page of Organizational Set up, Police Modernization Division-Clothing items).



(R. K. Soni)

Under Secretary to the Govt. of India

Copy to: Director (Procurement), MHA.

QRs/ Specification of Cloth for RAF Dangri

0.0 FORWARD

- 0.1. This specification has been prepared by M/s NITRA,
- 0.2. This specification is for use by the RAF.
- 0.3. This specification would be used for manufacture, quality assurance and procurement of the item.
- 0.4. Copies of the specification attached :
- 0.5. This specification holds good only for the supply order for which it is issued.
- 0.6. The Quality Assurance Authority reserves the right to amend or modify this specification as and when required.
- 0.7. The Quality Assurance Authority is the competent authority to grant concessions, if any, in respect of any clause contained in this specification
- 0.8. For the purpose of deciding whether a particular requirement of this specification 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 (Reaffirmed 2006). The number of significant places retained in the rounded off value should be the same as that of the specified value in this specification.

1.0 SCOPE

- 1.1. The specification prescribes the requirement of *DANGARI* (Disruptive Pattern) uniform cloth herein referred as *DANGARI* cloth made of Cotton and Polyamide 66 (PA 66) blended material.
- 1.2. This specification does not specify the pattern and stitching of uniform from the disruptive pattern cloth.
- 1.3. This specification does not specify general appearance; feel etc of the Disruptive Pattern cloth.

2.0 MANUFACTURE AND FINISH

- 2.1. The *DANGARI* cloth shall have Rip stop weave (IS 13510:2000). It shall be made from uniform blend of 78-80% Cotton and remaining PA 66 fibres. The selvages shall be firm and straight. The cloth shall be well singed. The fabric shall be 'Heat set' and fully shrunk. The blend composition of the cloth shall conform to the requirements given in the Table 1.



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2.2 The *DANGRI* cloth disruptive pattern may be obtained by repeats of the design of 25.2 inch±5% and 54.5 inch±5% (see Figure 1). Figure 2 indicate various colours of the disruptive pattern *DANGRI* cloth. The pattern shall be printed using dyes having fastness properties as given in Table 1. The various areas of the pattern shall be properly registered in relation to each other and shall present definite sharp demarcations with a minimum of feathering or spew. Each pattern shall show solid coverage. Dyes used in the dyeing and printing shall be free from banned amines (Test method IS 15570 : 2005).

2.3 The cloth should be supplied in the width of 150±2 cm. The length of each piece shall be 40 meters or as agreed between buyer and seller.

2.4 Freedom from Defect: The cloth shall be free from major flaws (defects) which shall not exceed 10 per 100 meters length (see Note). A list of major flaws (defects) is given in Appendix A of IS : 4125. The allowance for providing extra length of cloth in lieu of the flaws (defects) not exceeding the permissible limit may be agreed between the buyer and seller. It shall also be free from dyeing defects such as streaks, stains and uneven dyeing and improper printing in case of printed design etc. The finished cloth shall be free from sizing, filling and dressing materials and substance liable to cause subsequent tendering.

The cloth shall be free from any other defect which may significantly mark the appearance or serviceability.

Note- The number of defects shall be determined on all pieces under test and converted into number of defects per 100 meter length. (See 6.4)

3.0 REQUIREMENTS

3.1 The *DANGRI* cloth shall conform to the requirements given in Table 1. Specification for colour used in printing of *DANGRI* cloth shall be as given in Table 2A, 2B, and 2C.

3.2 Sealed Sample: In order to illustrate or specify the indeterminable characteristics such as general appearance, luster, feel and print design of the Disruptive Pattern cloth, a sample has been agreed upon and sealed; the supply shall be conformity with the sample in such respects.

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

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4.0 MARKING

Each piece of cloth shall be marked with the following :

- (a) Name of the material, namely DANAGRI cloth-Cotton/PA 66 blended material;
- (b) Composition, namely, Cotton 78-80% and rest PA 66 to be marked on every alternate meter of the cloth at a height not exceeding 2.5 cm from the selvedge;
- (c) Length and width;
- (d) Manufacturer's name, initials or trade-mark;
- (e) Any other information required by the law in force and/or by the buyers.

5.0 PACKAGING & PACKING

The DANAGRI cloth shall be packed in polyethylene or polypropylene bags and or in box, as required by the buyer (see IS 2194 and IS 2195).

6.0 SAMPLING AND CRITERIA FOR CONFORMITY









6.1 The number of pieces to be selected at random from a lot for inspection shall be according to col. 1 and 2 of Table 3. To ensure randomness of selection, procedure given in IS : 4905 shall be followed.

6.2 The sampling procedure detailed in 6.2 to 6.4 shall give desired protection to the buyer and the seller, provided that the lot submitted for inspection is homogeneous. To achieve this, the manufacturer shall maintain a system of process control at all stages of manufacturing ensuring the Disruptive Pattern cloth tendering by him for inspection to comply with the requirements of this standard in all respects.

NOTE: For effective process control the use of statistical quality control technique is recommended and helpful guidance may be obtained in this respect from IS 397 (Part I) : 2003 and IS 397 (Part II) : 2003

6.3 Lot: The number of pieces of cloth of same composition and constructional particulars delivered to a buyer against a dispatch note shall constitute a lot.

6.3.1 The conformity of a lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from the lot.

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6.4 The number of pieces to be tested at criterion for conformity for each of the characteristics shall be as follows:

Characteristics	No. of Samples	Criterion for conformity
i) Visual inspection for freedom from major flaws (defects)	According to col 2 of Table 3	All the pieces of cloth selected according to col 2 of Table 3 shall be visually examined for major flaws, meter by meter. The Total number of defects observed on sample piece shall be converted into number of defects per 100 meter length. Permissible number of non-conforming pieces not to exceed corresponding number given in col 3 of Table 3.
ii) Construction, Ends, picks, mass, length and width	According to col 4 of Table 3	All specimens shall satisfy the relevant requirements.
iii) Blend composition, shrinkage, breaking strength, tearing strength, colour fastness, pH etc.	According to col 5 of Table 3	All specimens shall satisfy the relevant requirements.


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7.0 TERMINOLOGY

For the purpose of this specification the definitions given in IS 3596:1967 shall apply.

Table 1 : Requirements of Disruptive pattern cloth


Sl. No.	Characteristics	Requirements	Test Method
1	Approximate count of yarn (For guidance only) - Warp - Weft	2 X 40s (Resultant 20s) 16s	IS 3442:1980
2	Composition, % - Cotton - PA 66	73-80 Remainder	AATCC Test method 20 and 20A
3	End/dm (minimum)	330	IS 1963:1981
4	Picks/dm (minimum)	170	IS 1963:1981
5	Width, cm	150±2	IS 1954:1980
6	Mass, gm/m ²	200 ±10	IS 1964 : 1970
7	Breaking strength, Newton (Minimum) - Warp-wise - Weft-wise	650 450	IS 1969:1985
8	Elongation at break, % (Minimum) - Warp-wise - Weft-wise	10 10	IS 1969:1985
9	Tearing Strength, Newton (Minimum) - Warp-wise - Weft-wise	20 20	IS 6489:1983
10	Abrasion Resistance - Up to 50,000 cycles	-No thread breakage	IS: 12673:1989
11	Colour fastness to washing - Change in colour - Staining on adjacent fabric	4 or better 4 or better	IS/ISO 105 - C10 C(3): 2006
12	Colour fastness to perspiration - Change in colour - Staining on adjacent fabric	4 or better 4 or better	IS 971:1983


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13	Colour fastness to Hot pressing (200°C, only dry press) - Change in colour - Staining on adjacent Fabric	4 or better 4 or better	IS 689:1988
14	Colour fastness to rubbing - Dry - Wet	3-4 or better 3 or better	IS 766:1988
15	Colour fastness to sea water - Change in colour - Staining on adjacent Fabric	4 or better 4 or better	IS 690:1988
16	Colour fastness to light	5 or better	IS 2454:1985
17	Dimensional Change due to relaxation, both directions, percentage, maximum	2.0	IS 2977:1989
18	Dimensional stability to dry heat at 150± 2 oC, both directions, percentage, maximum	1.0	IS 12170 : 1987
19	pH value of aqueous extract	6.0-8.0	IS 1390 (Cold method) :1983
20	Pilling (after 5 hours of test), Minimum	3	IS 10971:1984
21	Wrinkle Recovery (after 24 hours), Minimum	3	AATCC 138-2004
22	Crease recovery angle in dry state, degree. Minimum (Initially and after three repeated washes as per ISO 6330-2A)	240°	IS 4681: 1981
23	Air permeability, cc/sec/cm ² , Minimum	3.0	IS 11056:1984
24	Water vapour permeability (water method), g/m ² /day, Minimum	1400	ASTM E-96/E 96M-05 (Water method) Tem. (32±2)°C, RH: 50±2% (Upright method) Air velocity: 0.02-0.3 m/sec)
25	Colour difference (for all colours)(ΔE)	≤ 3.0	See Table 2A, 2B and 2C
26	Banned amine	Less than 30 ppm	IS 15570 : 2005
27	Weave	Rip Stop (Plain)	Visual


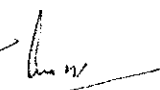






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Table-2A: Specification of colour of Disruptive Pattern DANGRI cloth- Light Blue
(AATCC Test method 173 : 2009 & AATCC Evaluation Procedure 7 : 2009)

Colour	:	Light Blue						
System	:	CIE LCH						
Illuminant Observer	:	D 65						
Standard Observer	:	10 Degree						
Tristimulus Values	:	<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>23.673</td> <td>25.605</td> <td>45.514</td> </tr> </table>	X	Y	Z	23.673	25.605	45.514
X	Y	Z						
23.673	25.605	45.514						
L C H	:	<table border="1"> <tr> <td>L</td> <td>C</td> <td>H</td> </tr> <tr> <td>57.660</td> <td>23.388</td> <td>263.532</td> </tr> </table>	L	C	H	57.660	23.388	263.532
L	C	H						
57.660	23.388	263.532						
CMC (l:c)	:	2:1						
Colour difference, ΔE_{cmc}	:	≤ 3.0						

Interpretation of Results :

- i) If ΔE_{cmc} is less than or equal to 3, then sample is acceptable.
- ii) If ΔE_{cmc} is greater than 3, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between samples of same type i.e., identical fabric construction parameters and filament/ fibre composition.

Note-2 : Test should be carried out after proper conditioning as per AATCC 173.


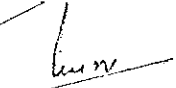

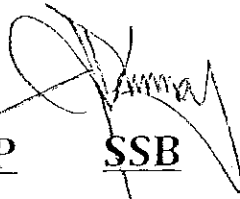




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Table 2B: Specification of colour of Disruptive Pattern Uniform- Medium Blue
(AATCC Test method 173 : 2009 & AATCC Evaluation Procedure 7 : 2009)


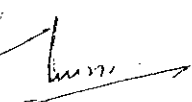





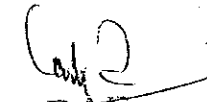
Colour	Medium Blue		
System	CIE LCH		
Illuminant Observer	D 65		
Standard Observer	10 Degree		
Tristimulus Values	X	Y	Z
	11.164	11.863	25.099
L C H	L	C	H
	40.998	24.040	268.623
GMC (i:c)	2:1		
Colour difference, ΔE_{cmc}	≤ 3.0		

Interpretation of Results :

- iii) If ΔE_{cmc} is less than or equal to 3, then sample is acceptable.
- iv) If ΔE_{cmc} is greater than 3, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between samples of same type i.e., identical fabric construction parameters and filament/ fibre composition.

Note-2 : Test should be carried out after proper conditioning as per AATCC 173.

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Table-2C: Specification of colour of Disruptive Pattern Uniform- Dark Blue
(AATCC Test method 173 : 2009 & AATCC Evaluation Procedure 7 : 2009)

Colour	:	Dark Blue		
System	:	CIE LCH		
Illuminant Observer	:	D 65		
Standard Observer	:	10 Degree		
Tristimulus Values	:	X	Y	Z
		3.878	3.905	9.061
L C H	:	L	C	H
		23.355	20.051	277.651
CMC (l:c)	:	2:1		
Colour difference, ΔE_{cmc}	:	≤ 3.0		

Interpretation of Results :

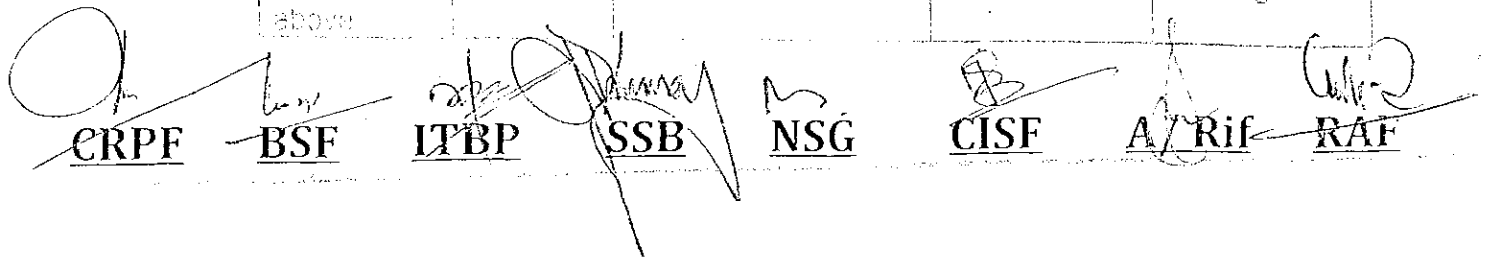
- (v) If ΔE_{cmc} is less than or equal to 3, then sample is acceptable.
- (vi) If ΔE_{cmc} is greater than 3, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between samples of same type i.e., identical fabric construction parameters and filament/ fibre composition.

Note-2 : Test should be carried out after proper conditioning as per AATCC 173.

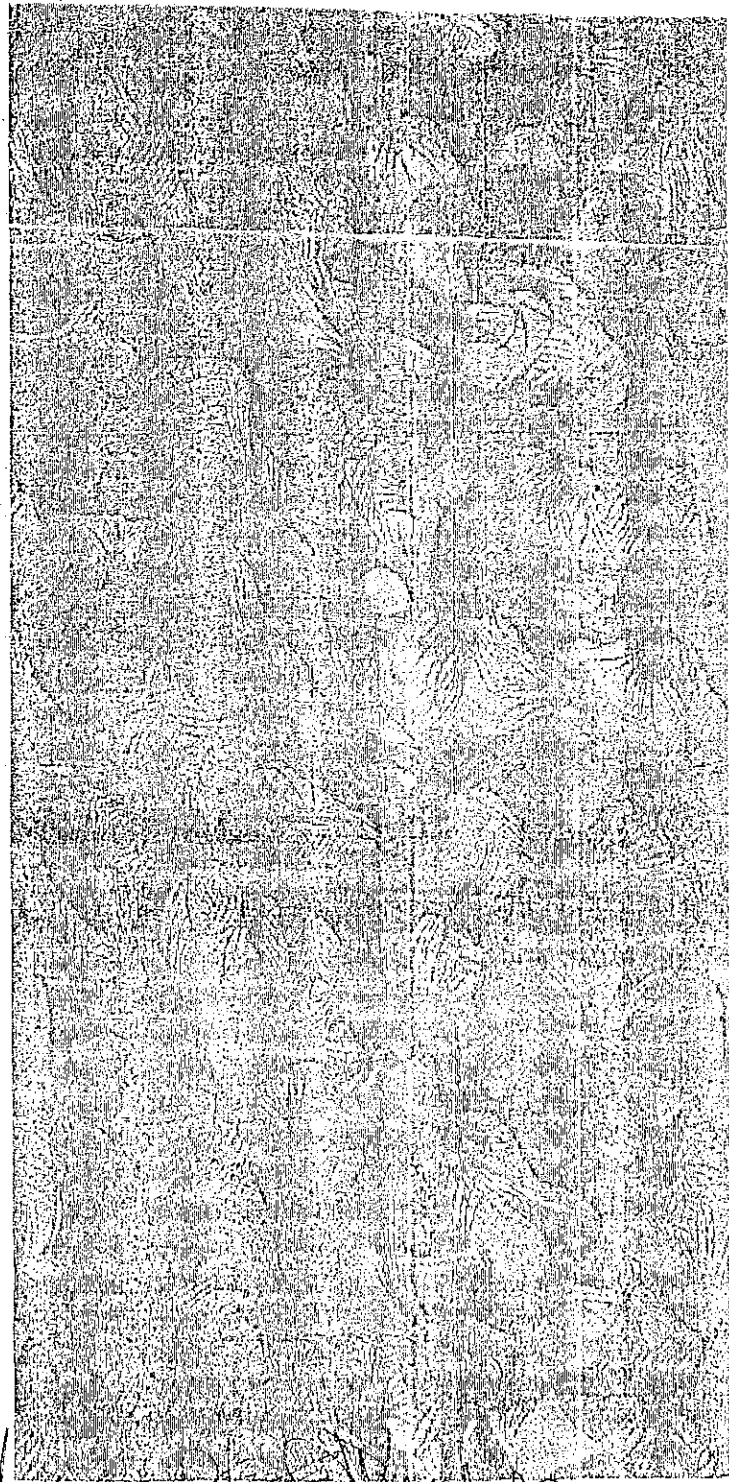
Table 3 : Sample size and permissible number of non-conforming Disruptive Printed Uniform Cloth

Lot size	Sample size	Permissible number of non-conforming pieces	Sub-sample size	Sub-sub sample size
(1)	(2)	(3)	(4)	(5)
Up to 100	5	0	3	3
101-150	8	0	3	3
151-300	13	1	5	3
301-500	20	1	5	3
501-1000	32	2	8	5
1001 and above	50	3	13	5



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54.5 inch ± 5%

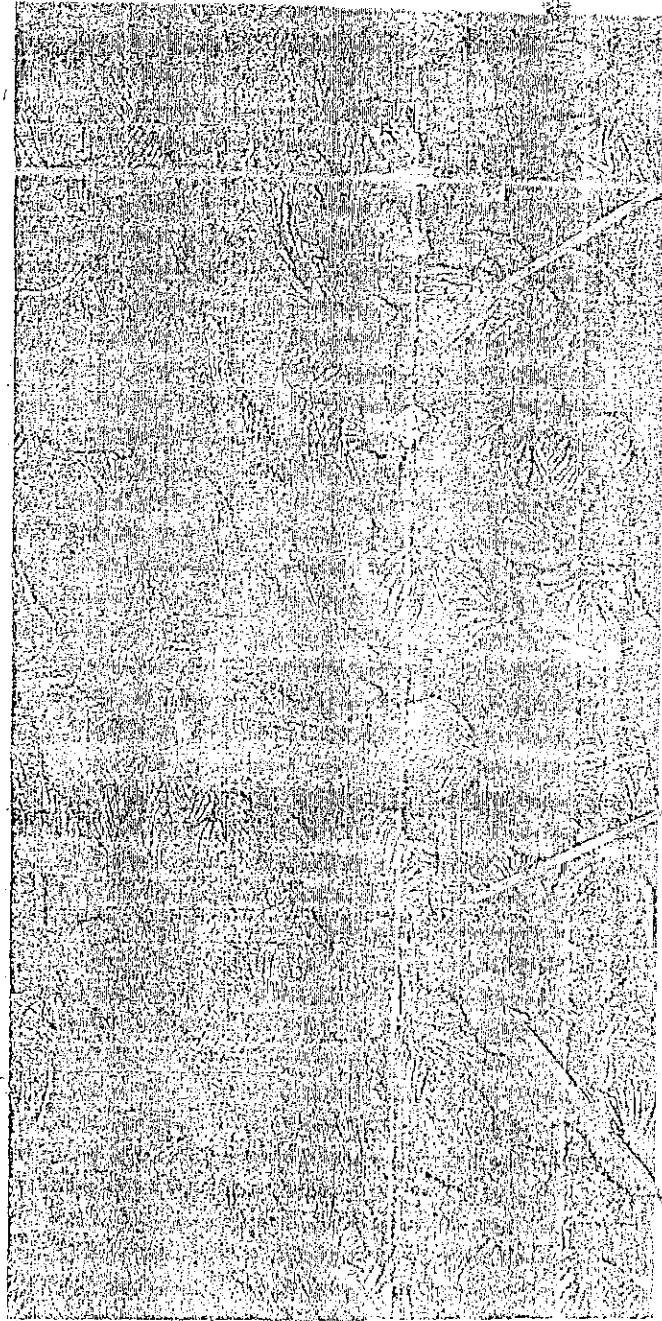
Fig.1 : DANGARI Disruptive Print – One repeat of the design
(For true colours refer sealed fabric sample)

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45.8 inch

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Light Blue

Medium Blue

Dark Blue

Fig. 2 : DANGARI Disruptive Print (For colour identification only)
(For true colours refer sealed fabric sample)


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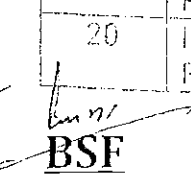
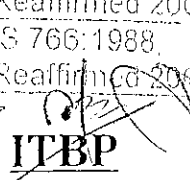
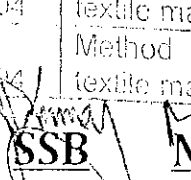
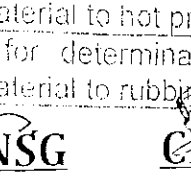
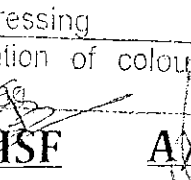
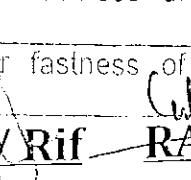

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3.0 REFERENCES

3.1 The list of referred standards is given below :

LIST OF REFERRED STANDARDS

Sl. No.	Method/Spec. number	Title
1	IS:397(Part I) : 2003	Method for statistical quality control during production : Part I Control charts for variable
2	IS:3596 : 1967 (RA 2004)	Glossary of terms relating to hosiery
3	IS:14452:1997 (RA 2006)	Textiles-Care Labeling code using symbols
4	IS:397 (Part II): 2003	Method for statically quality control during production: Part 2 Control charts for attributes and count of defects
5	IS:6359: 1971 (RA 2004)	Method for conditioning of Textiles
6	IS 13510:2000 (RA 2006)	Textile-duck, Polyester/cotton blended, Rip-stop-Specification
7	IS:3442:1980 (RA 2004)	Methods for identification of crimp and count of yarn removed from fabric
8	IS:1963:1981 (RA 2004)	Method for determination of thread per unit length in woven fabric
9	IS:1964:1970 (RA 2006)	Methods for determination of weight per square meter and weight per linear meter of fabric
10	IS: 1954:1990 (RA 2007)	Determination of length and width of woven fabric
11	IS:1969:1985, (RA 2006)	Method for determination of breaking strength and elongation of woven fabrics
12	IS:6489:1993, (RA 2006)	Textiles-woven fabrics-determination of tear resistance by the falling pendulum method
13	IS:12673:1989, (RA 2005)	Textile fabrics-Abrasion resistance-method for determination
14	IS:110971:1984, (RA 2006)	Method for determination of pilling resistance of fabrics
15	IS:11056:1984, (RA 2006)	Method for determination of air permeability of fabrics
16	IS:11248:1995 (RA 2007)	Textiles-Polyester blend suiting for uniform-specification
17	IS/ISO 105 C10 C(3) : 2006	Method for determination of colour fastness of textile material to washing
18	IS 971:1983, Reaffirmed 2004	Method for determination of colour fastness of textile material to perspiration
19	IS 689:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to hot pressing
20	IS 766:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to rubbing

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21	IS 690:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to sea water
22	IS 2454:1985, Reaffirmed 2006	Method for determination of colour fastness of textile material to artificial light (Xenon lamp) pressing
23	IS 1390 : 1983 (RA 2004)	Method for determination of pH value of aqueous extract of textile materials
24	AATCC Test method 173 : 2009	CMC: Calculation of small colour differences for acceptability
25	AATCC Evaluation Procedure 7 : 2009	Instrumental assessment of the change in colour of a test specimen
26	AATCC Test method 20:2011	Fibre analysis: qualitative
27	AATCC Test method 20A: 2012	Fibre analysis: quantitative
28	AATCC test method 128:2009	Wrinkle recovery of fabrics: Appearance method
29	ASTM E-96/E * 96M-05	Standard test methods for water vapor transmission


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