

# DRAFT SPECIFICATION OF CLOTH DISRUPTIVE PATTERN UNIFORM FOR CRPF

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## **1.0 SCOPE**

- 1.1 The specification prescribes the requirement of “Cloth disruptive pattern uniform” for CRPF herein referred as “Cloth disruptive”
- 1.2 This specification does not specify the design/ pattern and stitching of uniform from the “Cloth disruptive”.
- 1.3 This specification does not specify general appearance; feel etc of the “Cloth disruptive”.

## **2 REFERENCES**

The standards listed in Annex A contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

## **3.0 MANUFACTURE**

- 3.1 The Disruptive Pattern cloth shall have 1 up 2 down twill weave. It shall be made from uniform blend of 80% Cotton and 20% Polyester. 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.
- 3.2 The disruptive pattern may be obtained by repeats of the design of 21 cm $\pm$ 5% in warp direction and 21 cm $\pm$ 5% weft direction (see Figure 1). Figure 2 indicates various colours of the disruptive pattern cloths. 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 amine (Test method IS 15570).

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- 3.3 The fabric should be supplied in the minimum width of 150 cm. The length of each piece shall be 40 meters or as agreed between supplier and purchaser.
- 3.4 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 Disruptive Pattern 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)

## **4.0 WORKMANSHIP AND FINISH**

The “Cloth disruptive” shall be free from workmanship defects i.e. texture, weaving, dyeing flaws etc. The “Cloth disruptive” shall not have missed stitches, hole, cut, oil stains or any other defect which may significantly affect the appearance or serviceability of “Cloth disruptive”.

## **5.0 REQUIREMENTS**

- 5.1 The Disruptive Pattern Uniform cloth shall conform to the requirements given in Table 1. Specification for colour used in printing shall be as given in Table 2A, 2B, 2C and 2D.
- 5.2 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.

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

**Table 1: Requirements of Cloth disruptive**

Sl. No.	Characteristics	Requirements	Test Method
1	Approximate count of yarn (For guidance only), Ne - Warp - Weft	2/30 <sup>s</sup> 2/30 <sup>s</sup>	IS 3442:1980
2.	Weave	2 Up 1 down, Right Hand Twill	Visual
3	Composition ,% - Cotton - Polyester	(80±2)% Remainder	IS 3416(Pt 1):1988
4	End/dm	420±5%	IS 1963:1981
5	Picks/dm	220±5%	IS 1963:1981
6	Width, cm (Minimum) (including selvedge)	150	IS 1954:1990
7	Mass, gm/m <sup>2</sup>	250±5%	IS 1964 : 1970
8	Breaking strength, Newton (Minimum) - Warp-wise - Weft-wise	1000 500	IS 1969:1985 (5 cm X 20 cm between grip)
9	Tearing Strength, Newton (Minimum) - Warp-wise - Weft-wise	25 25	IS 6489:1993
10	Colour fastness to washing - Change in colour - Staining on cotton fabric	4 or better 4 or better	IS/ISO 105 C10 C(3): 2006 (Repeated four times)
11	Colour fastness to perspiration - Change in colour - Staining on adjacent fabric	4 or better 4 or better	IS 971:1983
12	Colour fastness to rubbing - Dry - Wet	4 or better 4 or better	IS 766:1988

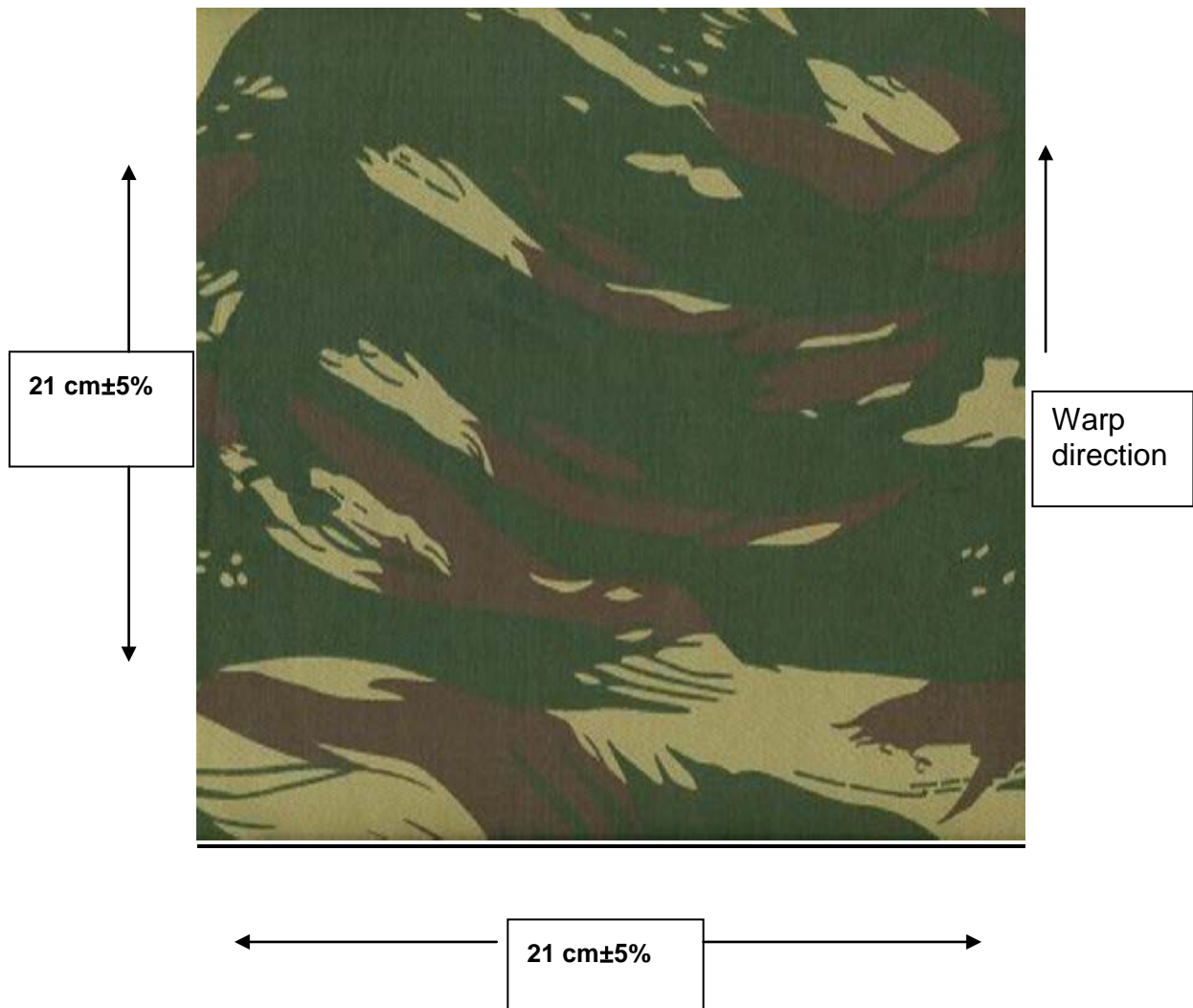
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13	Colour fastness to light	5 or better	IS 2454:1985
14	Dimensional Change due to relaxation, both directions, percentage, maximum	2.0	IS 2977: 1989
15	Dimensional stability to dry heat (both direction), percentage, maximum	2.0	IS 12170: 1987 (Temperature: 150±2°C)
16	pH value of aqueous extract	6.0-8.5	IS 1390:1983 (Cold method)
17	Water soluble matter, %, Maximum	1	IS 3456: 1966
18	Pilling resistance, Grade, Minimum	4	IS 10971:1984
19	Air permeability, cc/sec/cm <sup>2</sup> , Minimum	3.5	IS 11056:1984
20	Drape Co efficient, %	60-70	IS: 8357: 1977
21	Water vapour permeability, g/m <sup>2</sup> /day, Minimum	1400	ASTM E-96,/E 96M-05 (water method), RH: 50±2 % and Temperature: (32±2)°C
22	Identification of dye	Disperse & Vat class	IS 4472 ( Part I ) - 1967
23	Colour difference (ΔE)	≤ 3.0	See Tables 2A, 2B, 2C and 2D (Also see Fig. 2)

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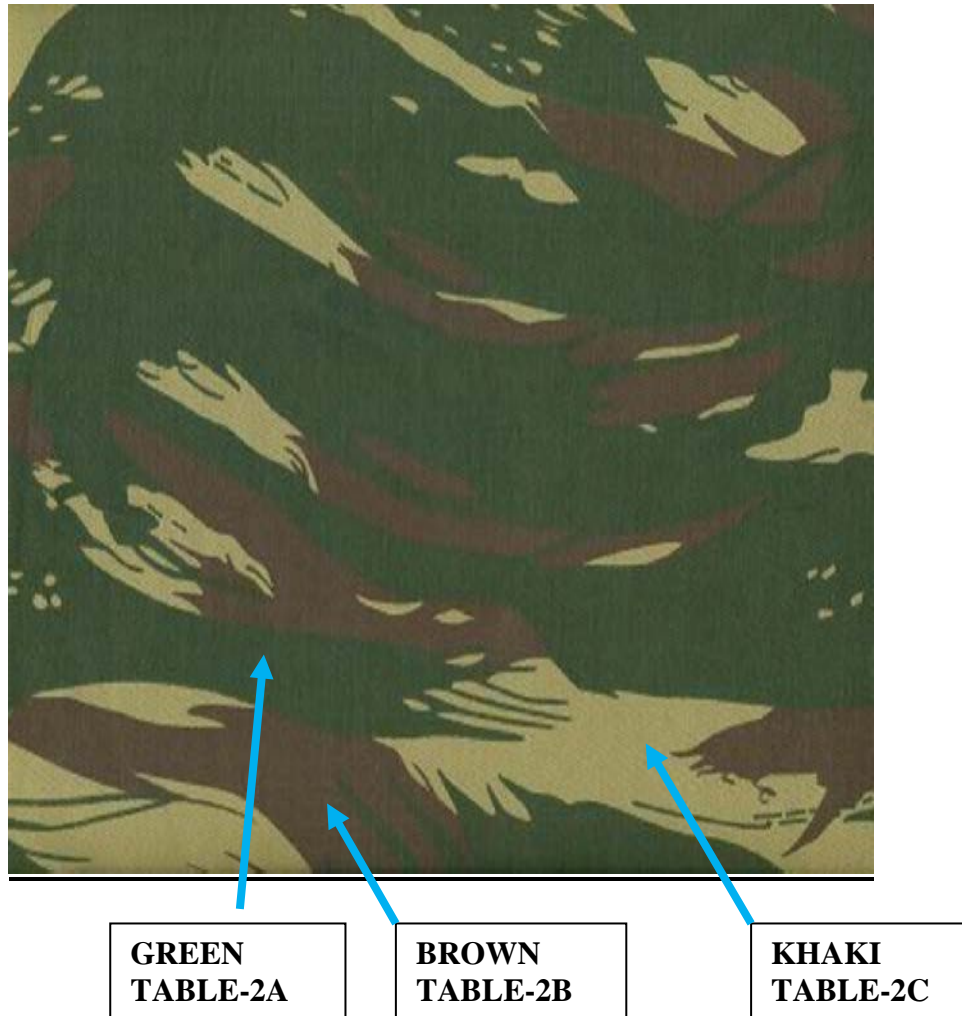
**CENTRAL RESERVE POLICE FORCE (CRPF)**



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

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**Cloth Disruptive Pattern Print-Colour Specification for CRPF**

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**Table–2A: Specification of colour Disruptive Pattern-Green**

(Guideline of AATCC Test Method 173 : 2009 & AATCC Evaluation Procedure-7:2009)

Colour	:	Green						
System	:	CIE LCH						
Illuminant Observer	:	D-65						
Standard Observer	:	10 Degree						
Tristimulus Values	:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; border: 1px solid black;">X</th> <th style="width: 33%; border: 1px solid black;">Y</th> <th style="width: 33%; border: 1px solid black;">Z</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black; text-align: center;">4.385</td> <td style="border: 1px solid black; text-align: center;">4.766</td> <td style="border: 1px solid black; text-align: center;">3.826</td> </tr> </tbody> </table>	X	Y	Z	4.385	4.766	3.826
X	Y	Z						
4.385	4.766	3.826						
LCH	:	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%; border: 1px solid black;">L</th> <th style="width: 33%; border: 1px solid black;">C</th> <th style="width: 33%; border: 1px solid black;">H</th> </tr> </thead> <tbody> <tr> <td style="border: 1px solid black; text-align: center;">26.057</td> <td style="border: 1px solid black; text-align: center;">6.933</td> <td style="border: 1px solid black; text-align: center;">104.977</td> </tr> </tbody> </table>	L	C	H	26.057	6.933	104.977
L	C	H						
26.057	6.933	104.977						
CMC (l:c)	:	2:1						
Colour Difference, $\Delta E_{cmc}$	:	$\leq 3.0$						

**Interpretation of Results:**

- i) If  $\Delta E_{cmc}$  is less than or equal to 3, then sample is acceptable.
- ii) If  $\Delta E_{cmc}$  is greater than 3, the sample is unacceptable.

Note-1 : Absorbance/ reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between sample 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 Disruptive Pattern-Brown**

(Guideline of AATCC Test Method 173 : 2009 & AATCC Evaluation Procedure-7:2009)

Colour	:	<b>Brown</b>						
System	:	CIE LCH						
Illuminant Observer	:	D-65						
Standard Observer	:	10 Degree						
Tristimulus Values	:	<table style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 33.33%; text-align: center;">X</th> <th style="width: 33.33%; text-align: center;">Y</th> <th style="width: 33.33%; text-align: center;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5.262</td> <td style="text-align: center;">5.192</td> <td style="text-align: center;">4.030</td> </tr> </tbody> </table>	X	Y	Z	5.262	5.192	4.030
X	Y	Z						
5.262	5.192	4.030						
LCH	:	<table style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 33.33%; text-align: center;">L</th> <th style="width: 33.33%; text-align: center;">C</th> <th style="width: 33.33%; text-align: center;">H</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">27.275</td> <td style="text-align: center;">8731</td> <td style="text-align: center;">61.138</td> </tr> </tbody> </table>	L	C	H	27.275	8731	61.138
L	C	H						
27.275	8731	61.138						
CMC (l:c)	:	2:1						
Colour Difference, $\Delta E_{cmc}$	:	<b><math>\leq 3.0</math></b>						

**Interpretation of Results:**

- i) If  $\Delta E_{cmc}$  is less than or equal to 3, then sample is acceptable.
- ii) If  $\Delta E_{cmc}$  is greater than 3, the sample is unacceptable.

Note-1 : Absorbance/ reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between sample 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 Disruptive Pattern-Khaki**

(Guideline of AATCC Test Method 173 : 2009 & AATCC Evaluation Procedure-7:2009)

Colour	:	Khaki						
System	:	CIE LCH						
Illuminant Observer	:	D-65						
Standard Observer	:	10 Degree						
Tristimulus Values	:	<table style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 33.33%; text-align: center;">X</th> <th style="width: 33.33%; text-align: center;">Y</th> <th style="width: 33.33%; text-align: center;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">19.478</td> <td style="text-align: center;">19.974</td> <td style="text-align: center;">12.295</td> </tr> </tbody> </table>	X	Y	Z	19.478	19.974	12.295
X	Y	Z						
19.478	19.974	12.295						
LCH	:	<table style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 33.33%; text-align: center;">L</th> <th style="width: 33.33%; text-align: center;">C</th> <th style="width: 33.33%; text-align: center;">H</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">51.808</td> <td style="text-align: center;">19.983</td> <td style="text-align: center;">81.959</td> </tr> </tbody> </table>	L	C	H	51.808	19.983	81.959
L	C	H						
51.808	19.983	81.959						
CMC (1:c)	:	2:1						
Colour Difference, $\Delta E_{cmc}$	:	<b><math>\leq 3.0</math></b>						

**Interpretation of Results:**

- i) If  $\Delta E_{cmc}$  is less than or equal to 3, then sample is acceptable.
- ii) If  $\Delta E_{cmc}$  is greater than 3, the sample is unacceptable.

Note-1 : Absorbance/ reflectance/ transmittance are affected by surface characteristic features of the substrate. Therefore comparison should be made between sample 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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## **6.0 SAMPLING AND CRITERIA FOR CONFIRMITY**

- 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 4. 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. The tendering authority reserves the right to carry out inspection of bigger lot sizes, even to the extent of 100% inspection, if considered necessary.

*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.

- 6.4 The number of pieces to be tested at criterion for conformity for each of the characteristics shall be as follows (Table 3):

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**Table 3: Criterion for conformity**

<b>Characteristics</b>	<b>No. of Samples</b>	<b>Criterion for conformity</b>
i) Visual inspection for freedom from major flaws (defects)	According to col 2 of Table 4	All the pieces of cloth selected according to col 2 of Table 4 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 4.
ii) Construction, Ends, picks, mass, length and width	According to col 4 of Table 4	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 4	All specimens shall satisfy the relevant requirements.

Note: Sampling officer will select sampling unit randomly and select ultimate items from each sampling unit as per the above table.

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**Table 4 : Sample size and permissible number of non-conforming  
Disruptive Printed Uniform Cloth**

Lot size (meter)  (1)	Sample size  (2)	Permissible number of non-conforming pieces  (3)	Sub-sample size  (4)	Sub-sub sample size  (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

## **7.0 MARKING**

Each piece of cloth shall be marked with the following :

- (a) Name of the material, namely disruptive pattern cloth- Cotton/polyester blended material;
- (b) Composition, namely, Cotton 80 percent and Polyester 20 percent 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.

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## **8.0 PACKAGING & PACKING**

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

Before dispatch, each box shall be legibly marked by stencil showing the following information:

- i) Nomenclature and Category number of the store
- ii) Quantity packed in the box
- iii) Serial number of the box
- iv) Month & Year of packing
- v) Name/Trademark of the Manufacture
- vi) Gross weight of the box in Kg.
- vii) Name & Address of the consignee
- viii) Inspection note number and date
- ix) Any other information required by the customer

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## ANNEX A (Clause 2)

### LIST OF REFERRED STANDARDS

Standard number	Title	Standard number	Title
IS:397(Part I)	Method for statistical quality control during production : Part I Control charts for variable	IS:9543	Spun polyester sewing threads
IS:14452	Textiles-Care Labeling code using symbols	IS:10789	Classification and terminology of stitch types used in seams
IS:397(Pt II)	Method for statically quality control during production: Part 2 Control charts for attributes and count of defects	IS:11161	Textiles-seam types-classification and terminology
IS:6359	Method for conditioning of Textiles	IS:1963	Method for determination of thread per unit length in woven fabric
IS:1964	Methods for determination of weight per square meter and weight per linear meter of fabric	IS:971	Method for determination of colour fastness of textile material to perspiration
IS: 1954	Determination of length and width of woven fabric	IS 12673	Methods for determination abrasion resistance

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IS:1969	Method for determination of breaking strength and elongation of woven fabrics	IS:766	Method for determination of colour fastness of textile material to rubbing
IS:2977	Fabrics (other than wool)-Method for determination of dimensional changes on soaking in water	IS 2454	Method for determination of colour fastness of textile material to artificial light (Xenon lamp)
IS 667	Method for identification of textile fibres	IS 1390	Method for determination of pH value of aqueous extract of textile materials
IS 6489	Woven fabrics- Determination of tear resistance by falling pendulum method	IS 3416 (Pt I)	Method for quantitative chemical analysis of binary mixtures of polyester fibres with cotton or regenerated cellulose
AATCC Test method 173	CMC: Calculation of small colour differences for acceptability	IS/ISO 105 C10 C(3)	Method for determination of colour fastness of textile material to washing
AATCC Evaluation Procedure 7	Instrumental assessment of the change in colour of a test specimen		