DRAFT QRs/ SPECIFICATION OF "CLOTH DISRUPTIVE POLYESTER AND COTTON (20:80) WITH DIGITAL PRINT.

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. 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 selvedges 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±5% in warp direction and 21 cm±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).

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)

3.5 **Cloth should have woven Selvedge on both side of the fabric with manufacturer's name in running length.**

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.

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	2/30S 2/30 S	IS 3442:1980
2.	Weave	2 Up 1 down, Right Hand Twill	Visual
3	Blend Composition	Cotton-80% ±2 Polyester-20%±2	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^2	250±5%	IS 1964 : 2001
8	Breaking strength, Newton (Minimum) - Warp-wise - Weft-wise	1100 550	IS 1969: 2018(Part-1) (5 cm X 20 cm between grip)
9	Tearing Strength, Newton (Minimum) - Warp-wise - Weft-wise	25 25	IS 6489 (Part-1) : 2011
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/ISO 105-E04 : 2013

12	Colour fastness to rubbing - Dry - Wet	4 or better for all colour 4 or better for ground colour, 3-4 or better for Print colour	IS/ISO 105-x12 : 2016
13	Colour fastness to light	4-5 or better	IS/ISO 105-B02 : 2014
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 : 2022
17	Water soluble matter, %, Maximum	1.5	IS 3456 : 2022
18	Pilling resistance, Grade, Minimum	4	IS 10971 : 2022 (Part-1)
19	Air permeability, cc/sec/cm^2, Minimum	3	IS 11056 : 2013
20	Drape Co efficient, %	60-70	IS: 8357: 1977
21	Water vapour permeability, g/m^2/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) : 2021
23	Colour difference (ΔE)	≤ 3.0	See Tables 2A, 2B, 2C and 2D (Also see Fig. 2)

CENTRAL RESERVE POLICE FORCE (CRPF)

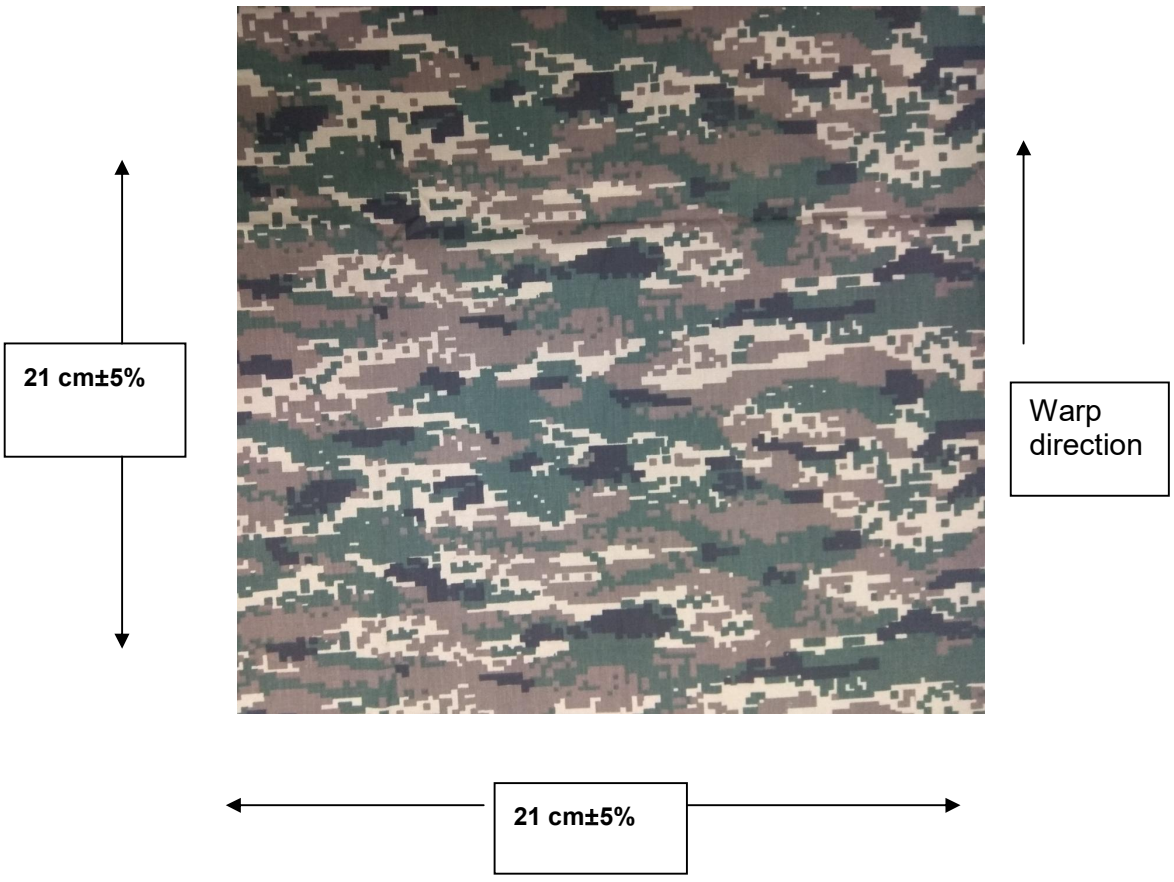
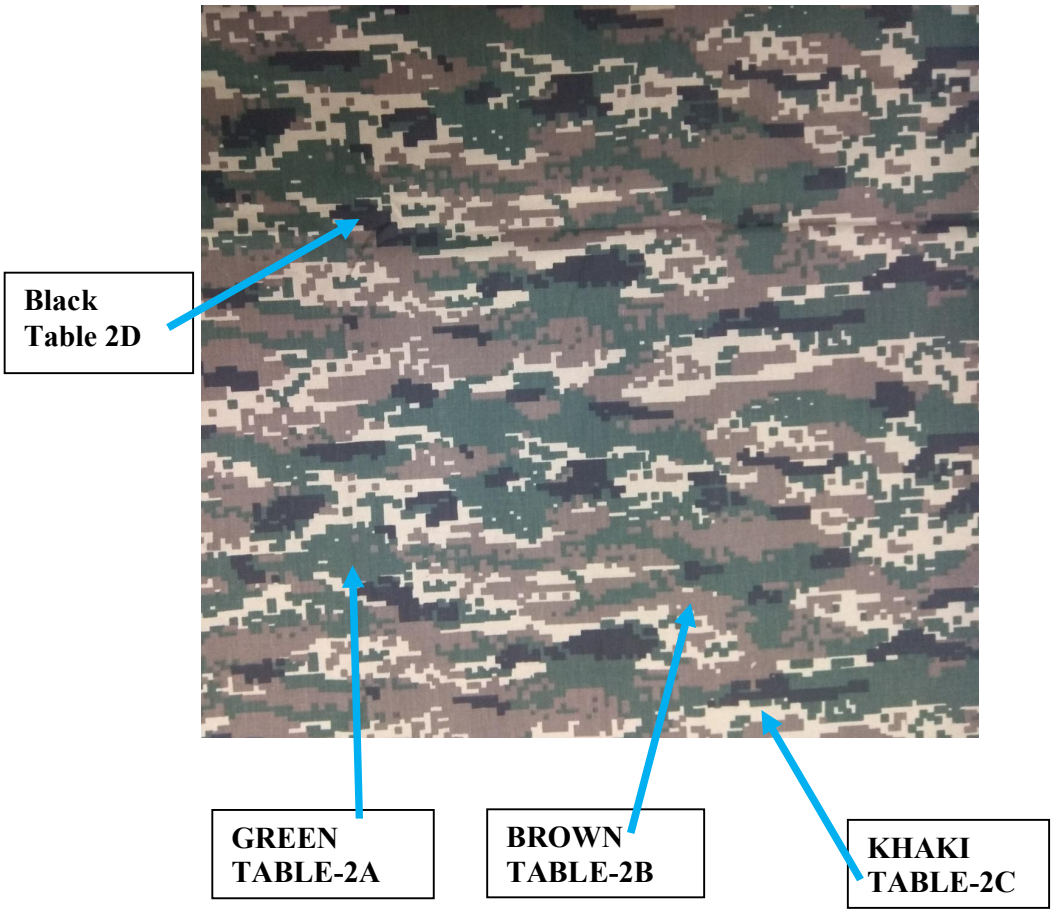


Fig.1 : Disruptive Pattern Print –One repeat of the design
(For true colours refer sealed fabric sample)



Cloth Disruptive Pattern Print-Colour Specification for CRPF

CRPF

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 :

X	Y	Z
5.998	7.164	5.681

LCH :

L	C	H
32.177	11.595	136.527

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, 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/ fiber composition.

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

CRPF

Table–2B: **Specification of colour Disruptive Pattern-Brown**

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

Colour	:	**Brown**
System	:	CIE LCH
Illuminant Observer	:	D-65
Standard Observer	:	10 Degree

Tristimulus Values :

X	Y	Z
9.852	9.778	6.554

LCH :

L	C	H
37.441	14.206	70.472

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, 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/fiber composition.

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

CRPF

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 :

X	Y	Z
27.478	27.872	22.381

LCH :

L	C	H
59.773	12.805	70.293

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, 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/ fiber composition.

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

CRPF

Table–2D: **Specification of colour Disruptive Pattern-Black**
(Guideline of AATCC Test Method 173 : 2009 & AATCC Evaluation Procedure-7:2009)

Colour	:	**Black**
System	:	CIE LCH
Illuminant Observer	:	D-65
Standard Observer	:	10 Degree

Tristimulus Values :

X	Y	Z
3.041	3.320	3.219

LCH :

L	C	H
21.282	2.816	130.310

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, 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/ fiber composition.

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

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 is 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 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):

Table 3: Criterion for conformity

Characteristics	No. of Samples	Criterion for conformity
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.

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.

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

 # *Potential vendors must have weaving and processing units under same PAN card*.

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

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 fibers	IS 1390	Method for determination of pH value of aqueous extract of textile materials
IS 6489	Woven fabrics-Determination if tear resistance by falling pendulum method	IS 3416 (Pt I)	Method for quantitative chemical analysis of binary mixtures of polyester fibers 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		