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No.U.II-98(Spec)/2023-24-Prov-(RAF-Dis/Pattern)-14 Dated, the 29th April' 2024

To

The DsG: AR, BSF, CISF, ITBP, NSG, SSB and BPR&D

Subject: QRs/Specification of "Cloth Disruptive Digital Print for RAF personnel".

I am directed to refer on the subject mentioned above and to say that the QRs/Specification in respect of "**Cloth Disruptive Digital Print for RAF personnel**" has been approved by the competent authority. Henceforth, RAF will procure the above item required by them, strictly as per the parameters laid down in the QRs/Specification.

2. Further, earlier QRs/Specification of "Cloth for RAF Dangree" **approved vide MHA letter No. U-II-98(Spec)/2015-16-Prov(RAF-DC)2106 dated 30/10/2015 is rescinded**.

3. This has the approval of DG, CRPF on 18/04/2024 (empowered vide MHA letter F. No. 11012/02/2009-Fin-I-17 dated 02/01/2018).

Encl: As above.

29/04/24
(Shahnawaz Khan)
DIG (Prov) Dte

No.U.II-98(Spec)/2023-24-Prov-(RAF-Dis/Pattern)-14 Dated, the 29th April' 2024

Copy forwarded to:-

1. SO (IT), North Block-with request to upload the approved QRs/Specification of "**Cloth Disruptive Digital Print for RAF personnel**" on MHA Website (e-mail ID : soit@nic.in).
2. **Sh. Paritosh Singhal, ACEO(GeM), and Sh. Abhishek Kakkar, Director - Category Management,** Government of India, Ministry of Commerce & Industry, Government e-Marketplace, Jeevan Tara Building, 5-Parliament Street, New Delhi-110001 with request to upload the approved QRs/Specification of "Cloth Disruptive Digital Print for RAF personnel" on GeM Portal.
3. DIG (IT), Dte Genl., CRPF-with request to upload this approved QRs/Specification of "Cloth Disruptive Digital Print for RAF personnel" on CRPF Portal and Selo Module.
4. All Zones/Sectors/GCs/Units HQr for information and necessary action.

29/04/24.
(Shahnawaz Khan)
DIG (Prov) Dte

QRs/SPECIFICATIONS OF "CLOTH DISRUPTIVE POLYESTER AND COTTON (20:80) WITH DIGITAL PRINT FOR RAF

1. 0 SCOPE

1.1 The specification prescribes the requirement of "Cloth Disruptive Pattern Digital Print" for RAF 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 RIP STOP (plain) 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). 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.

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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 confirm to the requirements given in Table 1. Specification for color used in printing shall be as given in Table 2A, 2B, 2C.

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	 2/30^{S} 2/30^{S}	IS 3442:2023
2.	Weave	RIP Stop (Plain) Box size: 14 X 7 (Each warp rip shall consist of three parallel yarn after 14 ends and each weft rip consists of 3 parallel yarn after 7 picks)	Visual
3	Blend Composition	Cotton-80±2 (%) Polyester-20±2 (%)	IS 667 : 1981 (RA 2022) IS 3416: 1988 (RA 2022)
4	Thread Density End/dm Picks/dm	 420±5% 220±5%	IS 1963:1981 (RA 2018)
5	Width, cm (Minimum) (including selvedge)	152	IS 1954:1990 (RA 2022)

6	Mass, gm/m^2	250±4%	IS 1964 : 2001 (RA 2022) Method A
7	Breaking strength, Newton (Minimum) - Warp - Weft	1100 650	IS 1969: 2018(Part-1) (5 cm X 20 cm Ravelled Strip Method)
8	Elongation at Break (Minimum, in percentage) - Warp - Weft	20 10	
9	Tearing Strength, Newton (Minimum in percentage) - Warp-wise - Weft-wise	50 40	IS 6489 (Part-1) : 2011
10	Color fastness to washing - Change in color - Staining on Wool - Staining on Acrylic - Staining on Polyester - Staining on Nylon - Staining on cotton - Staining on Acetate	4 or better	IS/ISO 105 C10 C(3): 2006 (RA 2021)
11	Color fastness to perspiration - Change in color - Staining on Wool - Staining on Acrylic - Staining on Polyester - Staining on Nylon - Staining on cotton - Staining on Acetate	4 or better	IS/ISO 105-E04 : 2013
12	Color fastness to Sea water - Change in color - Staining on Wool - Staining on Acrylic - Staining on Polyester - Staining on Nylon - Staining on cotton - Staining on Acetate	4 or better	IS/ISO 105-E02 : 2013

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13	Color fastness to rubbing - Dry - Wet	4 or better for all colour 4 or better for ground colour 3 or better for print colour	IS/ISO 105 X 12 : 2016
14	Color fastness to light	4 or better (On Blue Wool)	IS/ISO 105-B02: 2014 Exposure Cycle A1 (RA 2022)
15	Color fastness to Hot Pressing (200°C only dry press) - Staining on Color - Staining on Cotton	4 or better	IS/ISO 105-X 11: 1994
16	Dimensional Change due to relaxation, maximum in percentage Warp Direction Weft Direction	 2 2	IS 2977: 1967 (RA 2020)
17	Dimensional stability to dry heat, maximum in percentage Warp Direction Weft Direction	 2 2	IS 12170: 1987 (Temperature: 150±2°C)
18	pH value of aqueous extract at 26°C	6.0 to 8.5	IS 1390 : 2022 (Cold Method)
19	Appearance/Drape Co-efficient	60-70	AATCC TM 128-2017e2
20	Pilling resistance, Grade, Minimum	4	IS 10971 : 2022 (Part-1)
21	Air permeability, cc/sec/cm^2, Minimum	3	IS 11056 : 2013
22	Abrasion Resistance (upto 40,000 cycles)	No Thread Breakage	IS: 12673 part-1: 2014
23	Water vapor permeability, gm/m^2/day, minimum	1400	ASTM E-96/E 96M-16 (Water Method), Temperature: (32±2)^{0}c, RH: 50±2 %(Upright Method) Air velocity: 0.5-2.5 m/sec
24	Type of dye	Ground- Disperse & Vat Print-Vat Class	IS 4472 (Part 1) 2021 & IS 4472 (Part 2) 2021

Table–2A: Specification of color Disruptive Pattern-Light Blue

(Guideline of AATCC Test Method 173 : 2015 & AATCC Evaluation Procedure-7:2015)

Color	:	Light Blue
System	:	CIE LCH
Illuminant Observer	:	D-65
Standard Observer	:	10 Degree

Tristimulus Values :

X	Y	Z
28.375	28.795	50.903

LCH :

L	C	H
60.600	24.298	280.264

CMC (l:c) : 2:1

Color 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.

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Table–2B: Specification of color Disruptive Pattern-Medium Blue

(Guideline of AATCC Test Method 173 : 2015 & AATCC Evaluation Procedure-7:2015)

Color	:	Medium Blue
System	:	CIE LCH
Illuminant Observer	:	D-65
Standard Observer	:	10 Degree

Tristimulus Values :

X	Y	Z
19.467	20.195	38.724

LCH :

L	C	H
52.057	25.108	273.826

CMC (l:c)	:	2:1
Color 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.

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Table–2C: Specification of color Disruptive Pattern-Dark Blue

(Guideline of AATCC Test Method 173 : 2015 & AATCC Evaluation Procedure-7:2015)

Color	:	Dark Blue
System	:	CIE LCH
Illuminant Observer	:	D-65
Standard Observer	:	10 Degree

Tristimulus Values :

X	Y	Z
4.489	4.517	11.700

LCH :

L	C	H
25.313	24.485	276.694

CMC (l:c)	:	2:1
Color 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.

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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 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, color 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;

(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

 # Woven name of firm will be mandatory.

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

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ANNEX A
(Clause 2)
LIST OF REFERRED STANDARDS

Standard number	Title	Standard number	Title
IS: 3442:2023	Textiles method for determination of crimp and linear density of yarn removed from fabric.	IS 6489 (Part-1) : 2011	Tear properties of fabrics Part 1 Determination of tear force using ballistic pendulum method (Elmendorf).
IS:397(Part-I) : 2003	Method for statistical quality control during production: Part I Control charts for variable.	IS:397(Pt-II) : 2003	Method for statically quality control during production: Part 2 Control charts for attributes and count of defects.
IS 1963 : 2004 (RA-2018)	Method for determination of thread per unit length in woven fabric.	IS/ISO 105 C10 C(3): 2006 (RA 2021)	Tests for colour fastness — Part C10: colour fastness to washing with soap or soap and soda.
IS 1954:1990 (RA-2022)	Determination of length and width of woven fabric.	IS/ISO 105-E04 : 2013	Tests for colour fastness Part E04 Colour fastness to perspiration.
IS 1964 : 2001 (RA-2022) Method A	Methods for determination of mass per unit length and mass per unit area of fabrics (second revision).	IS/ISO 105-E02 : 2013	Tests for colour fastness Part E02 Colour fastness to sea water.
IS 1969: 2018(Part-1)	Tensile properties of fabrics – Part 1 Determination of maximum force and elongation at maximum force using the strip method (fourth revision).	IS/ISO 105-B02 : 2014 Exposure Cycle A1 (RA 2022)	Tests for colour fastness – Part B02 Colour fastness to artificial light: Xenon arc fading lamp test.

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IS/ISO 105 X 12 : 2016	Tests for colour fastness Part X12 Colour fastness to rubbing (first revision).	IS/ISO 105-X 11: 1994	Tests for colour fastness Part X11 Colour fastness to hot pressing.
IS 2977: 1967 (RA 2020)	Fabrics (other than wool)-Method for determination of dimensional changes on soaking in water.	IS 12170: 1987	Method for determination of dimensional stability of textile fabric to dry heat.
IS 1390 : 2022	Textiles Determination of pH of aqueous extract third revision of IS 1390.	IS 10971 : 2022 (Part-1)	Determination of fabric propensity to surface pilling fuzzing or matting Part 1: Pilling box method (second revision).
IS: 12673 part-1: 2014	Determination of the abrasion resistance of fabrics by the martindale method Part 1 Martindale abrasion testing apparatus (first revision).	IS 4681: 1981	Method for determination of recovery from creasing of textile fabrics by measuring the angle of recovery (first revision).

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Approved/Not Approved

Anish Dayal Singh, IPS
Director General, CRPF