

No. U.II-98(Spec)/2012-13-Prov(Nyco-Dis)
भारत सरकार/Government of India
गृह मंत्रालय/Ministry of Home Affairs
पुलिस आधुनिकीकरण प्रभाग /Police Modernization Division
संभरण-I डेस्क /Prov.I Desk

26, Man Singh Road, Jaisalmer House
New Delhi, Dated : 24 December, 2013

To,


DsG : AR (through LOAR), BSF, CISF, CRPF, ITBP, SSB, NSG & BPR&D.

Subject : QRs/Specification of Cloth Disruptive pattern (NYCO) for CRPF personnel.

The QRs/Specification of Cloth Disruptive pattern (NYCO) for CRPF personnel, as per Annexure have been accepted by the Competent Authority in MHA

2. Henceforth, all the CAPFs should procure the above items required by them strictly as per the laid down Technical QRs/Specification.

Yours faithfully,



(Smt. S. B. Nanda)

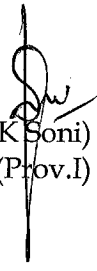
Under Secretary to the Govt. of India
Tel : 23381278

Encl : As above.

Copy forwarded to : SO (IT), MHA, with the request to host the QRs (soft copy being sent through email) on the MHA website (under the page Organisational Set up-Police Modernisation Division - Qualitative Requirements)

Copy to : DDG(Procurement), MHA.

Copy for information to : PPS to JS (PM)



(R K Soni)
Section Officer (Prov.I)

CENTRAL RESERVE POLICE FORCE STANDARD

SPECIFICATION FOR DISRUPTIVE PATTERN UNIFORM CLOTH MADE OF NYLON AND COTTON (NYCO)



Submitted to :

Directorate General CRPF
Block No 1, CGO Complex, Lodhi Road
New Delhi-110003
(Bharat Sarkar, Grih Mantralya)

Prepared by :

NORTHERN INDIA TEXTILE RESEARCH ASSOCIATION
Sector-23, Raj Nagar, Ghaziabad (U.P.)
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CRPF

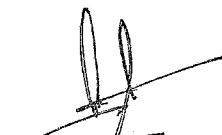

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CISF


ITBP


AIRIF


NSG



SSB



BPR&D


SPECIFICATION FOR DISRUPTIVE PATTERN UNIFORM CLOTH MADE OF NYLON AND COTTON (NYCO)


RECORD OF AMENDMENTS

Amendment No. and Date	Amendment pertains to SI.No./Para No./Column No./Table No	Authority	Amended by Name and Appointment (in block letter)	Signature and Date


K RIF

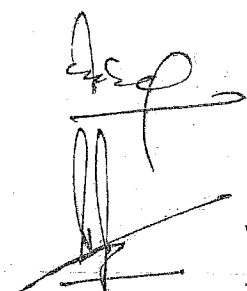

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NSG


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PREAMBLE

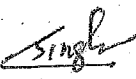
The Directorate General, CRPF, has asked NITRA to prepare technical specifications for Disruptive pattern uniform cloth made of Nylon and Cotton blended material, in general known as NYCO. The specification describes the fabric particular and properties – ends/inch, picks/inch, weave, weight, yarn count, fibre composition, dimensions, color fastness to light, washing, perspiration, and sea water; pH, dimensional change due to washing, tear strength, tensile strength, abrasion resistance etc. Bureau of Indian Standards (BIS), American Association of Textile Chemists and Colorists (AATCC) and American Society for Testing and Materials (ASTM) test methods are considered to draw this specification.

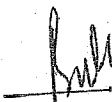
This report contains 16 pages which describe the technical specifications of Disruptive pattern uniform cloth made of "NYCO" material for CRPF.

This technical specification will enable the CRPF to prepare tender documents (technical details) at the time of placing orders for disruptive pattern uniform cloth made of "NYCO" material and final inspection as well.



CRPF

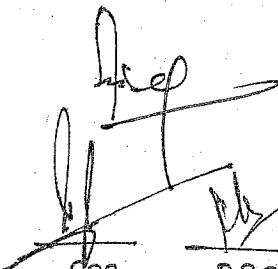

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SPECIFICATION FOR DISRUPTIVE PATTERN UNIFORM CLOTH MADE OF NYLON AND COTTON (NYCO)

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CRPF

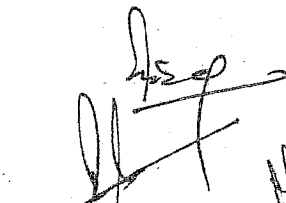

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0.0 FORWARD



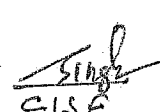


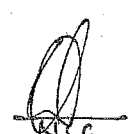

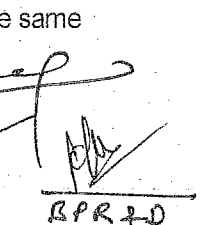
- 0.1. This specification has been prepared by Office of the Inspector General of Police, CRPF on the authority of The Inspector General of Police.
- 0.2. This specification is for use by the CRPF.
- 0.3. This specification would be used for manufacture, quality assurance and procurement of the item.
- 0.4. Quality assurance authority for the item covered in this specification is Office of the Inspector General of Police, CRPF, New Delhi. All enquiries regarding this specification, including those relating to any contractual conditions contained therein shall be addressed to the Quality Assurance authority at the following address:

Directorate General CRPF
 Block No 1, CGO Complex, Lodhi Road
 New Delhi-110003
 (Bharat Sarkar, Grih Mantralya)

- 0.5. Copies of the specification can be obtained from:

Office of the Inspector General of Police, CRPF
 Block No 1, CGO Complex, Lodhi Road
 New Delhi-110003
 (Bharat Sarkar, Grih Mantralya)

- 0.6. This specification holds good only for the supply order for which it is issued.
- 0.7. The Quality Assurance Authority reserves the right to amend or modify this specification as and when required.
- 0.8. The Quality Assurance Authority is the competent authority to grant concessions, if any, in respect of any clause contained in this specification
- 0.9. 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.

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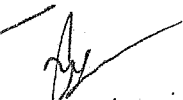
1.0 SCOPE

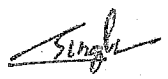
- 1.1 The specification prescribes the requirement of Disruptive Pattern (Camouflage pattern) cloth made of Nylon and Cotton blended material, in general known as NYCO.
- 1.2 This specification does not specify the design/ pattern and stitching of uniform from the disruptive pattern cloth.
- 1.3 This specification does not specify general appearance; feel etc of the Disruptive Pattern cloth.

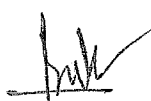
2.0 MANUFACTURE AND FINISH

- 2.1 The Disruptive Pattern cloth shall have Rip stop weave (IS 13510:2000). It shall be made from uniform blend of 50% Nylon fibres with 50% Cotton. 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.
- 2.2 The disruptive pattern may be obtained by repeats of the design of 12.6 inch \pm 10% in warp direction and 14.1 inch \pm 10% weft direction (see Figure 1). Figure 1 indicates various colours of the disruptive pattern 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 amine (Test method IS 15570 : 2005).
- 2.3 The fabric should be supplied in the width of 150 \pm 2 cm. The length of each piece shall be 40 meters or as agreed between supplier and purchaser.



SRPF


RBF

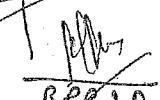

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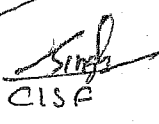

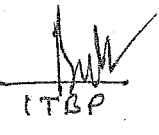


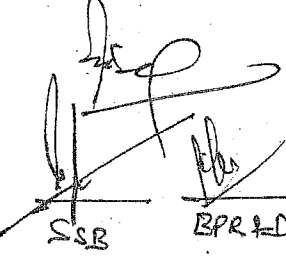
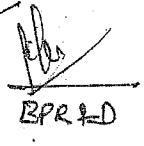

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2.4 Freedom from Defect: The cloth shall be free from major flaws (defects) which shall not exceed 10 per 100 meters length (see Note). A list of major flaws (defects) is given in Appendix A of IS : 4125. The allowance for providing extra length of 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 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)

2.5 The design and shape of the Disruptive Pattern Uniform shall be as per the buyer requirement. The type of stitch (see IS 11161: 2000, Reaffirmed 2007) and count of sewing thread for seams and stitches (see IS 10789: 2000, Reaffirmed 2007) at various portions of Disruptive Pattern Uniform may be as per the requirement of buyer. The uniform may be assembled throughout with lock stitches regulated at 35 to 40 stitches per 10 cm. The stitches shall be of even tension with all loose ends fastened. However selection of type of stitch and sewing thread shall be as agreed to between the buyer and seller. The disruptive pattern uniform shall be visually examined and shall be evenly sewn or stitched and shall be free from missed stitches, holes, cuts and free from puckering defects. The colour of the sewing thread used in the disruptive pattern uniform shall not bleed or stain.

 RPF	 CISE	 BSF	 ITBP	 ATRIP	 NSG	 SSB	 BPR&D
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3.0 REQUIREMENTS

- 3.1 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, 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.

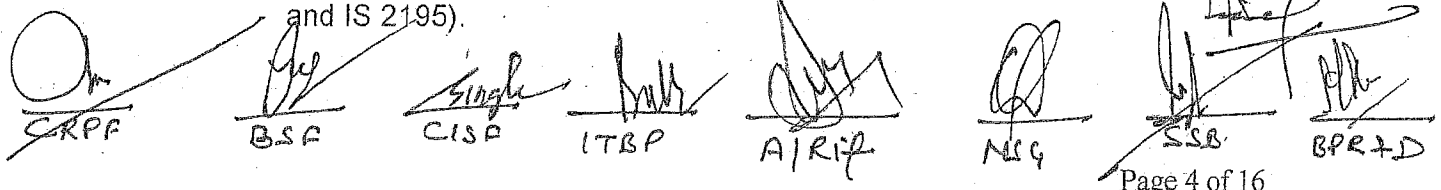
4.0 MARKING

Each piece of cloth shall be marked with the following :

- (a) Name of the material, namely disruptive pattern cloth-Nylon/cotton blended material;
- (b) Composition, namely, Nylon 50 percent and cotton 50 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.

5.0 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).



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6.0 SAMPLING AND CRITERIA FOR CONFORMITY



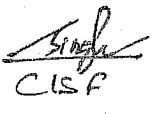
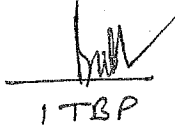

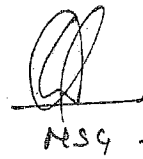
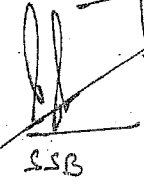
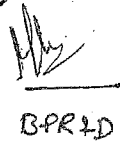
6.1 The number of pieces to be selected at random from a lot for inspection shall be according to col. 1 and 2 of Table 3. To ensure randomness of selection, procedure given in IS : 4905 shall be followed.

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.



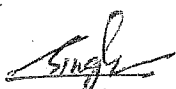



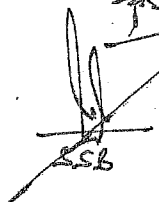
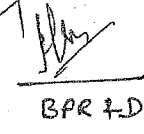
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6.4 The number of pieces to be tested at criterion for conformity for each of the characteristics shall be as follows:

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.

7.0 TERMINOLOGY

For the purpose of this specification the definitions given in IS 3596:1967 (RA 2004) shall apply.

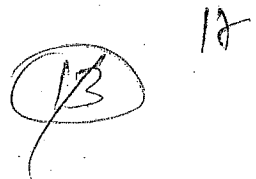
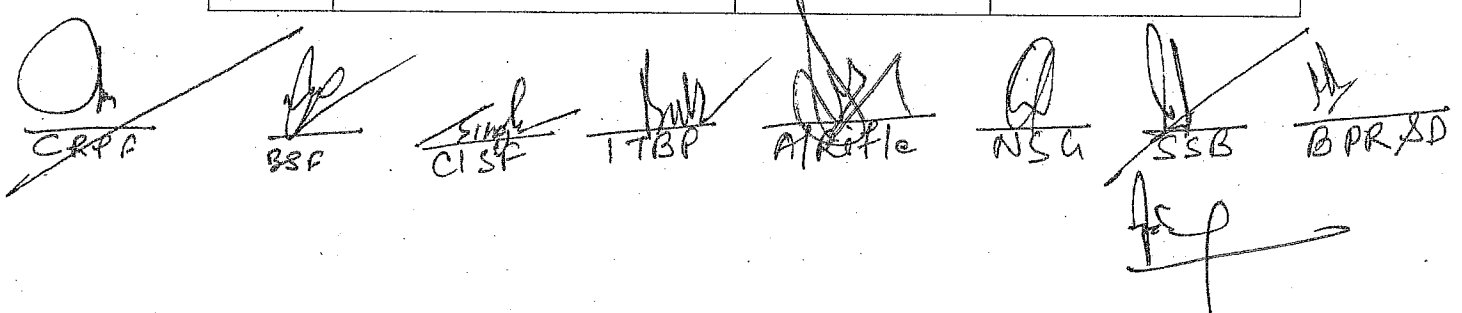
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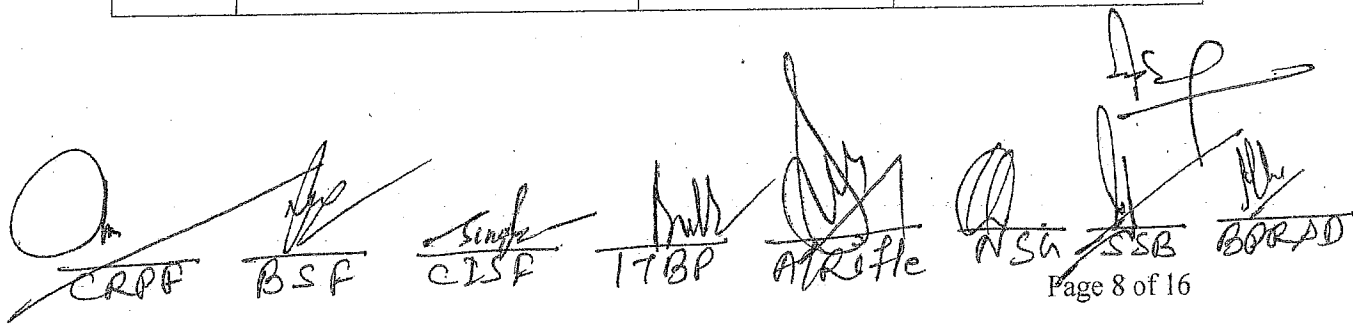
Table 1 : Requirements of Disruptive pattern cloth

Sl. No.	Characteristics	Requirements	Test Method
1	Approximate count of yarn (For guidance only), Ne - Warp - Weft	20s X 2 (2/40 ^s) 16s	IS 3442:1980
2	Composition ,% - Nylon 6 6 - Cotton	50 ± 5 Remainder	AATCC Test method 20 and 20A
3	End/dm (minimum)	400	IS 1963:1981
4	Picks/dm (minimum)	180	IS 1963:1981
5	Width, cm	150 ± 2	IS 1954:1990
6	Mass, gm/m ²	220 ± 10	IS 1964 : 1970
7	Breaking strength, Newton (Minimum) - Warp-wise - Weft-wise	1200 650	IS 1969:1985
8	Elongation at break, % (Minimum) - Warp-wise - Weft-wise	35 20	IS 1969:1985
9	Tearing Strength, Newton (Minimum) - Warp-wise - Weft-wise	35 35	IS 6489:1993
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/ISO105 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



 CRPA BSE C/SF ITBP A/Rifle NSG SSB BPRSD

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	4 or better 4 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	1	IS 2977:1967
18	Dimensional stability to dry heat, both directions, percentage, maximum	2	IS 12170: 1987 (Temperature:150 ±2°C)
19	pH value of aqueous extract	6.0-8.0	IS 1390 (Cold method) :1983
20	Pilling (after 5 hours of test), Minimum	4	IS 10971:1984
21	Wrinkle Recovery (after 24 hours), Minimum	3	AATCC 128-2009
22	Air permeability, cc/sec/cm ² , Minimum	3	IS 11056:1984
23	Water vapour permeability (water method), g/m ² /day, Minimum	1400	ASTM E-96/E 96M-05, (Water method, Temperature: 32±2°C, RH 50±2%, Upright Method, Air velocity 0.02-0.3m/Sec)
24	Colour difference (for all colours)(ΔE)	≤ 3.0	See Table 2



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TABLE – 2 Disruptive Print –Colour specification
Table-2A: Specification of colour of Disruptive Pattern Uniform- Green
(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
		4.385	4.766	3.826
LCH	:	L	C	H
		26.057	6.933	104.977
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

CRDF BSF CSF TUBP ALP NSH PSB BRAD

Table 2B: Specification of colour of Disruptive Pattern Uniform- Brown
(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
		5.262	5.192	4.030
LCH	:	L	C	H
		27.275	8.731	61.138
CMC (l: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.

~~OPDF~~ ~~BSF~~ ~~Singh~~ ~~CDSP~~ ~~ITBP~~ ~~APRille~~ ~~NSG~~ ~~SSB~~ ~~BORSD~~

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

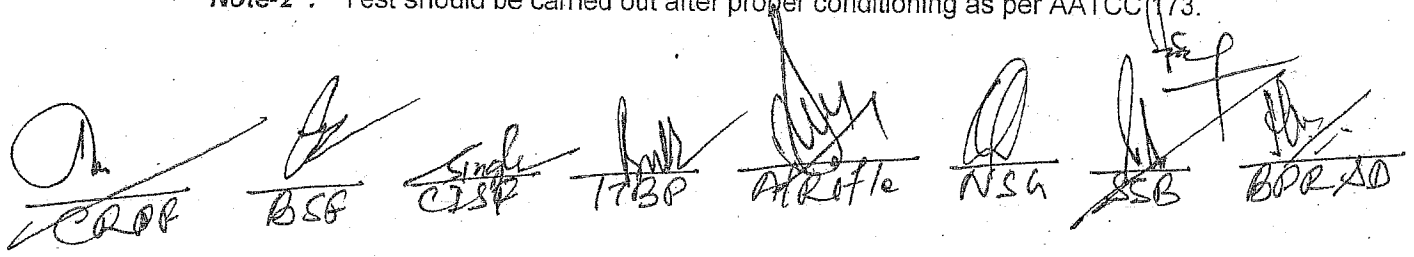
Colour	:	Khaki		
System	:	CIE LCH		
Illuminant Observer	:	D 65		
Standard Observer	:	10 Degree		
Tristimulus Values	:	X	Y	Z
		19.478	19.974	12.295
LCH	:	L	C	H
		51.808	19.983	81.959
CMC (l:c)	:	2:1		
Colour difference, ΔE_{cmc}	:	≤ 3.0		

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.



 CRP BSB CISP TBP ARifle NSG SSB BPR SD

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

Lot size (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

~~CRPF~~ ~~BSP~~

~~Singh~~
~~CRSP~~

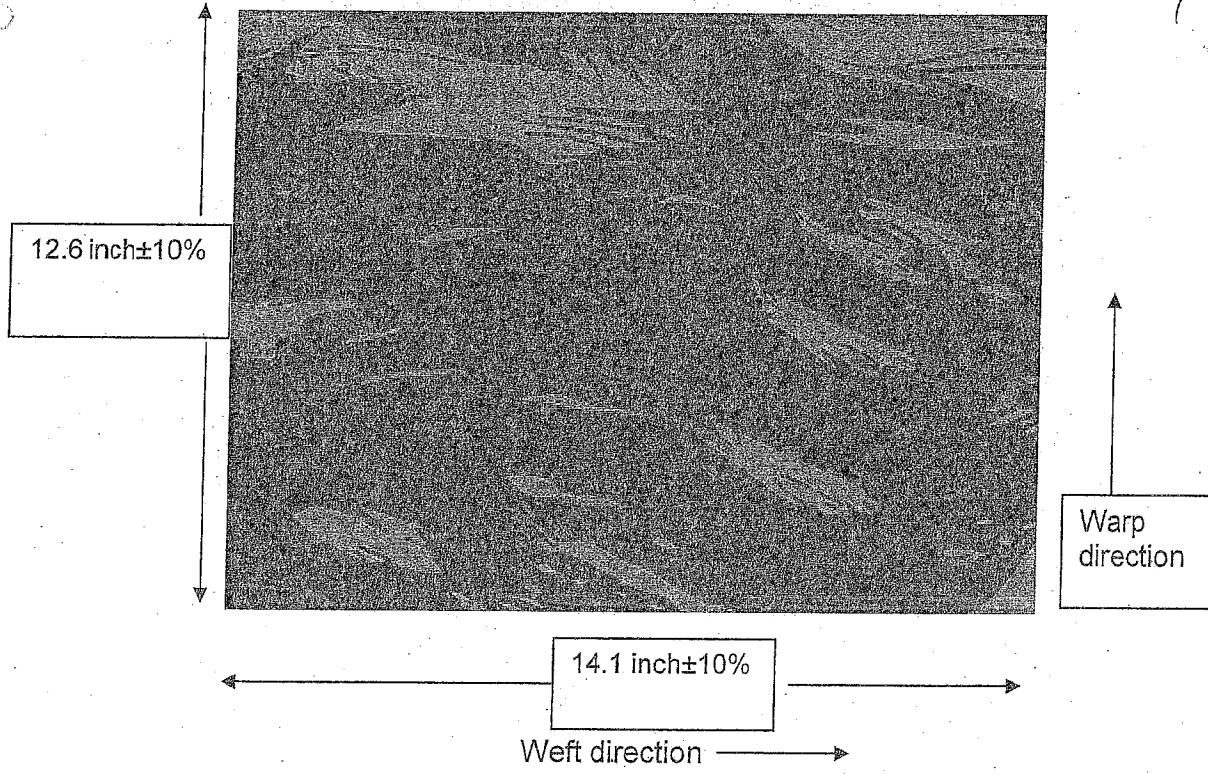
~~IRBP~~

~~ARIF~~

~~NSG~~

~~SSB~~ ~~BPR SO~~

(19)



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

~~Q~~ ~~CRP~~ ~~BSP~~ ~~single~~ ~~CSP~~ ~~ITBP~~ ~~ALHe~~ ~~NSH~~ ~~SSB~~ ~~BPRSD~~

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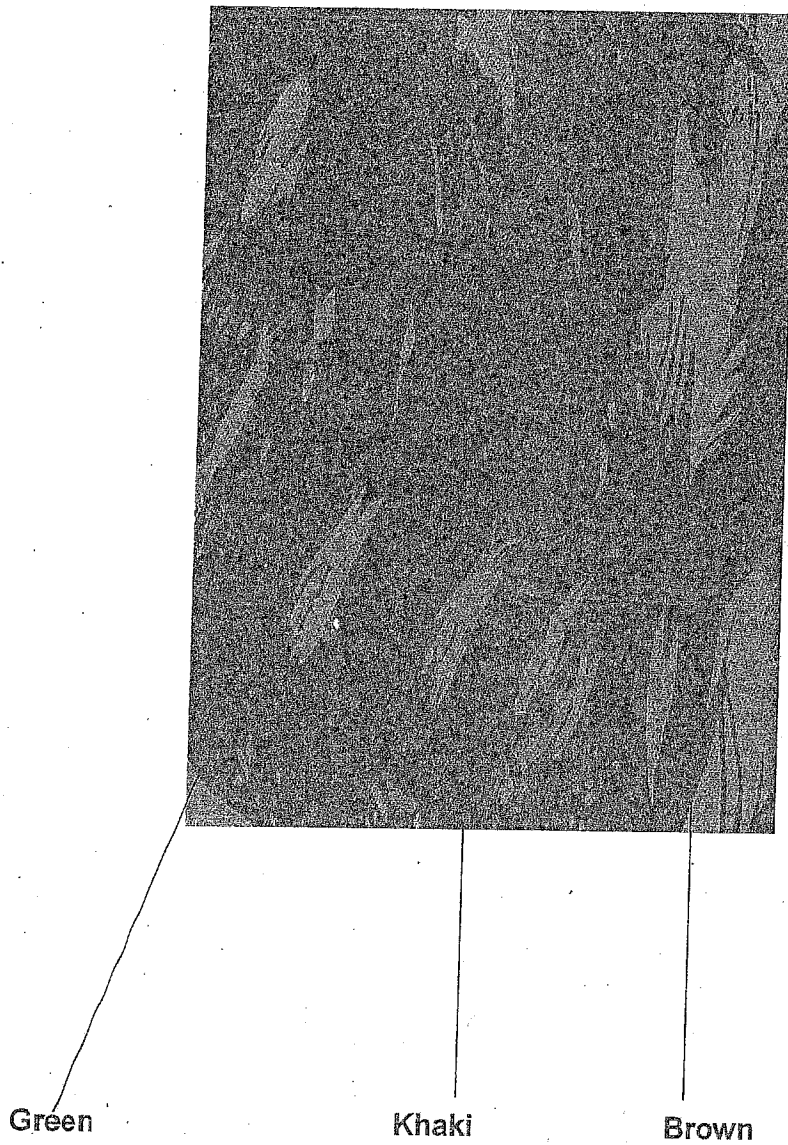

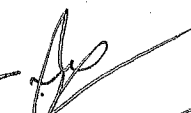




Fig. 2 : Disruptive Print –LIGHT COLOUR (For colour identification only)

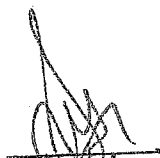
(For true colours refer sealed fabric sample)



 CDF

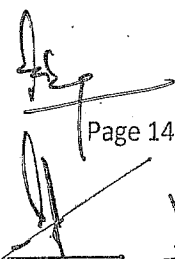

 BDF

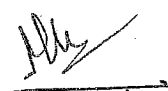

 CDF


 TDF


 ADF


 NSW


 SSB


 BORSO

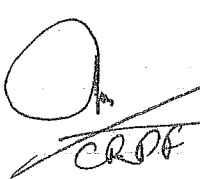
8.0 REFERENCES

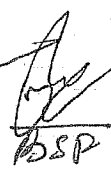
8.1 The list of referred standards is given below :

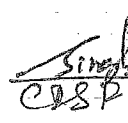
LIST OF REFERED STANDARDS

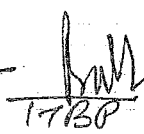
Sl. No.	Method/Spec. number	Title
1	IS:397(Part I) : 2003	Method for statistical quality control during production : Part I Control charts for variable
2	IS:3596 : 1967 (RA 2004)	Glossary of terms relating to hosiery
3	IS:14452:1997 (RA 2006)	Textiles-Care Labeling code using symbols
4	IS:397 (Part II): 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:9543:1980 (RA 2004)	Spun polyester sewing threads
8	IS:10789:2000 (RA 2007)	Classification and terminology of stitch types used in seams
9	IS:11161:2000 (RA 2007)	Textiles-seam types-classification and terminology
10	IS:3442:1980 (RA 2004)	Methods for identification of crimp and count of yarn removed from fabric
11	IS:1963:1981 (RA 2004)	Method for determination of thread per unit length in woven fabric
12	IS:1964:1970 (RA 2006)	Methods for determination of weight per square meter and weight per linear meter of fabric
13	IS: 1954:1990 (RA 2007)	Determination of length and width of woven fabric
14	IS:1969:1985, (RA 2006)	Method for determination of breaking strength and elongation of woven fabrics
15	IS:6489:1993, (RA 2006)	Textiles-woven fabrics-determination of tear resistance by the falling pendulum method

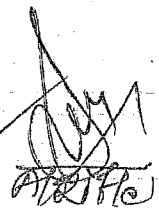
16	IS:12673:1989, (RA 2005)	Textile fabrics-Abrasion resistance-method for determination
17	IS:110971:1984, (RA 2006)	Method for determination of pilling resistance of fabrics
18	IS:11056:1984, (RA 2006)	Method for determination of air permeability of fabrics
19	IS:12170:1987	Method for determination of dimensional stability of textile fabrics to dry heat
20	IS/ISO 105 C10: 2006	Method for determination of colour fastness of textile material to washing
21	IS 971:1983, Reaffirmed 2004	Method for determination of colour fastness of textile material to perspiration
22	IS 689:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to hot pressing
23	IS 766:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to rubbing
24	IS 690:1988, Reaffirmed 2004	Method for determination of colour fastness of textile material to sea water
25	IS 2454:1985, Reaffirmed 2006	Method for determination of colour fastness of textile material to artificial light (Xenon lamp) pressing
26	IS 1390 : 1983 (RA 2004)	Method for determination of pH value of aqueous extract of textile materials
27	AATCC Test method 173 : 2009	CMC: Calculation of small colour differences for acceptability
28	AATCC Evaluation Procedure 7 : 2009	Instrumental assessment of the change in colour of a test specimen
29	AATCC Test method 20:2010	Fibre analysis: qualitative
30	AATCC Test method 20A: 2010	Fibre analysis: quantitative
31	AATCC test method 128:2009	Wrinkle recovery of fabrics: Appearance method
32	ASTM E-96/E 96M-05	Standard test methods for water vapor transmission

 CRDF

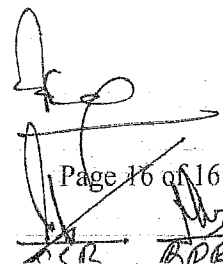
 BSP

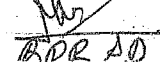
 CSP

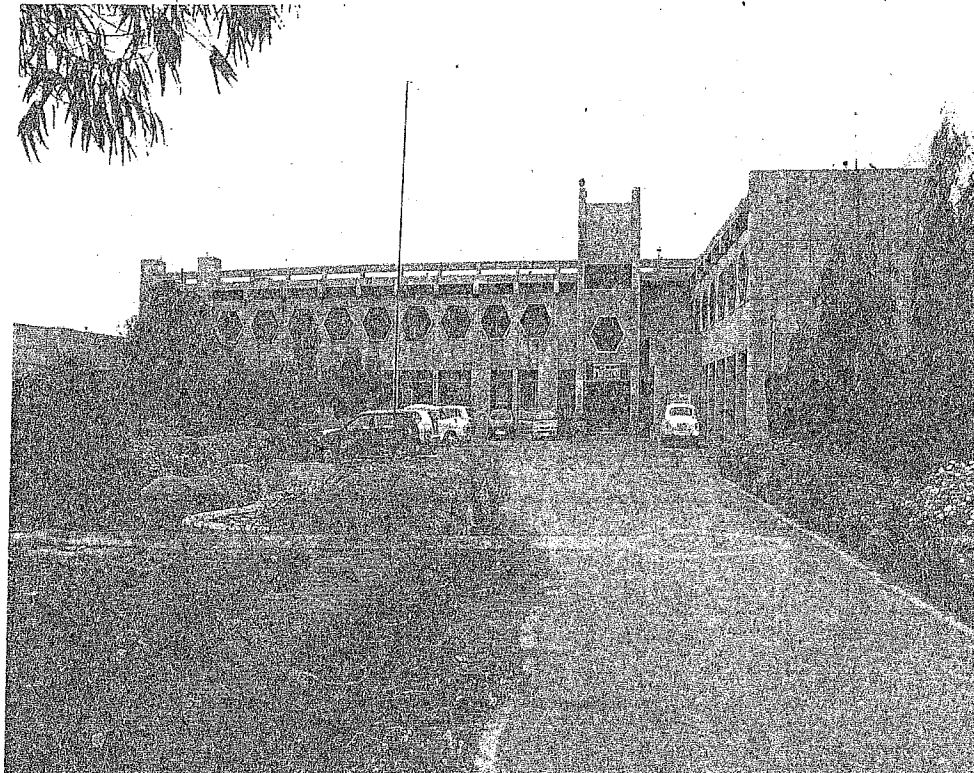
 TBS

 AIT

 NCA

 ADR

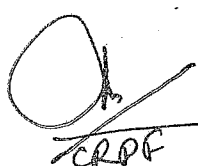
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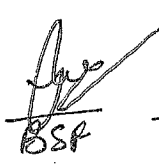


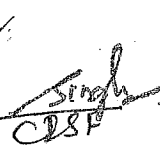
NORTHERN INDIA TEXTILE RESEARCH ASSOCIATION

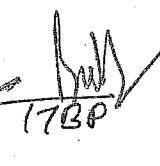
Sector-23, Raj Nagar, Ghaziabad (U.P.)

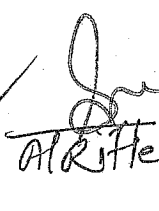
Email: mail@nitratextile.org Fax: 0120-2783596

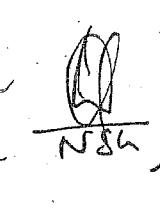

 CRPF

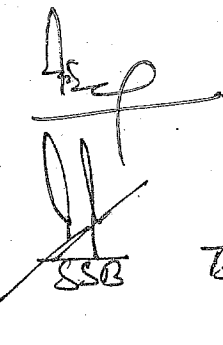

 BSP

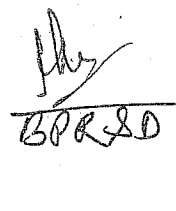

 CSBP


 17BP


 AlRitte


 NSB


 SSB


 BPR&D

The sub-group has deliberated over the matter. It finds that the changes would only help to procure better cloth and without unnecessary complications. The sub- group noted that the performance of the CoBRA cloth being used by men of 10 Bns has been found to be entirely satisfactory without any complaints. In view of this the sub-group recommends that the draft QRs as submitted by the NITRA vide their letter No. NITRA/RPD-9440 dated 19/02/2013 may be accepted and sent to the MHA for approval.

Member: Sh Raghunath Singh, SO CISF	Member: Shri C Keishing AD, SSB
Member: Shri S K Thakur DC(LO) Assam Rifle	Member: Shri Dinesh Singh SC(Prov)/ DC, NSG
Member: Shri Balbir Singh DC, ITBP	Member: Shri M Shahid, SSO(T) BPR&D
Member: Shri Yineet Rao, DC(Prov), BSF	Member: Shri Parveen Kumar, DIG(Prov), CRPF
Member :	Dr N.C Asthana, IPS, IG(Prov) CRPF
Chairman :	Shri Pranay Sahay, IPS, DG CRPF