No. IV-21011/3/2010-Prov-I
Government of India
Ministry of Home Affairs

26, Man Singh Road, Jaisalmer House,
New Delhi, 23.2.2010

To
The DG: CRPF

Subject:- QRs/Technical Specifications for the Special Equipments for CoBRA Bns.

The QRs/ Technical Specifications in respect of the following Special Equipments for CoBRA Bns as per Appendix, has been accepted by the Competent Authority in MHA.

(1) Foldable Solar Charger-Appendix-A
(2) Compact light weight stainless steel multi utility tool- Appendix-B
(3) Light Weight ballistic protective eyewear against grenade blasts-Appendix-C
(4) Tactical 3 points sling universal- Appendix-D
(5) Waist belt nylon with buckle and rings for facilitating slithering/rappelling-Appendix-E
(6) Jungle Floppy Hat-Appendix-F
(7) Balaclava with convertible properties as Cap Comforter, Facemask and Cold Weather Muffler-Appendix-G
(8) Nylon Life Jacket with expandable Ployethylene Foam, Buckle and Whistle Plastic-Appendix-H

2. Henceforth, CRPF should procure the above equipments required by them strictly as per the laid down Technical Specifications/QRs.

23/2/10
(R.S.Sharma)
Director (Prov)

महानिदेशक सचिव डायरी संख्या
DG's Sectt. Diary No. 378 (Mishra)
महानिदेशक / Director General
अ. महानिदेशक / Add. D.G.
तिथि / Date 05 MAR 2010
म.नि. कार्मिक / परि० / प्रशि. / संभरण / प्रशा. / निर्माण
वि.सं. / निदेशक (चिकित्सा)
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# CENTRAL RESERVE POLICE FORCE (CoBRA) STANDARD

# "WAIST BELT NYLON WITH BUCKLE AND RINGS FOR FACILITATING SLITHERING/RAPPING"

***Submitted to :***

**Office of the Inspector General of police, CoBRA Sector**
**CRPF, Sector –IV, PUSHP VIHAR,**
**New Delhi-110017**

***Prepared by :***

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# SPECIFICATION FOR "WAIST BELT NYLON WITH BUCKLE AND RINGS FOR FACILITATING SLITHERING/RAPPING"

## RECORD OF AMENDMENTS

| Amendment No. and Date | Amendment pertains to Sl.No./Para No./Column No. | Authority | Amended by Name and Appointment (in block letter) | Signature and Date |
|---|---|---|---|---|
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# PREAMBLE

The Inspector General of Police (CoBRA Sector), CRPF, has asked NITRA to prepare technical specifications for specification for “Belt-nylon with buckle and rings” . The specification describes the performance requirements and material 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, 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 18 pages which describe the technical specifications of “Belt-nylon with buckle and rings” for CRPF (CoBRA).

Whenever a reference to any other standard occurs in this specification, it shall be taken as reference to the latest version of that standard existing at the time of finalization of a contract.

This technical specification will enable the CRPF (CoBRA) to prepare tender documents (technical details) at the time of placing orders for “Belt-nylon with buckle and rings” and final inspection as well.

# SPECIFICATION FOR “WAIST BELT NYLON WITH BUCKLE AND RINGS FOR FACILITATING SLITHERING/RAPPING”

## C O N T E N T S


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## 0.0 FORWARD

0.1. This specification has been prepared by Office of the Inspector General of Police, CoBRA sector, CRPF on the authority of The Inspector General of Police, CoBRA sector.

0.2. This specification is for use by the CRPF - CoBRA.

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, CoBRA Sector, 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:

Office of the Inspector General of Police, CoBRA Sector
CRPF, Sector –IV, PUSHP VIHAR,
New Delhi-110017

0.5. Copies of the specification can be obtained from:

Office of the Inspector General of Police, CoBRA Sector
CRPF, Sector –IV, PUSHP VIHAR,
New Delhi-110017

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.

## 1. 0 SCOPE

1.1 The specification prescribes the requirement of “Waist Belt nylon with buckle and rings for facilitating slithering/rapping” herein referred as “Belt”.

## 2.0 MATERIAL AND MANUFACTURE

2.1 All the components of “Belt” shall be manufactured to the shape, design and dimensions as per Fig. 1, 2, 3 and 4.

2.2 The components of the “Belt” shall be as described in the following sub-classes.

2.2.1 The “Belt” shall be made from 100% Nylon 6 6 webbing of double woven plain weave using a needle loom. For guidance following Nylon filament yarns may be used for the manufacture of Nylon webbing:

| **Particular** | **Resultant Denier of yarn (Approx.)** | **Tenacity of single ply yarn, gpd** |
|---|---|---|
| Warp | 840 x 3 | 5.0 |
| Weft | 840 | 5.0 |
| Binding end | 840 | 5.0 |
| Locking end | 350 | 2.0 |

2.2.2 The webbing shall be cut to the exact length and both the ends shall be heat sealed properly to avoid fraying during its use. The sealed ends shall be smooth and round shaped for easy and smooth passage through the buckle.

2.2.3 The metallic buckle of the “belt” shall conform IS 4274: 1981 for all features except the shape and dimensions. The dimensions of the buckle are given in the Fig. 2 and 3. The material of buckle shall conform “O” grade steel as per specification IS 1079: 1994. Back side of the buckle **“THIS SIDE TOP”** shall be written as shown in the Fig. 2. The height of the letter shall be 4mm. For more information see the sample held in the custody of CRPF (CoBRA).

2.2.4 For appearance and finish the buckle shall match the sealed sample held in the custody of CRPF (CoBRA). The mode of attaching the buckle to the webbing shall be as given in Fig. 2 and 3.

2.2.5 The dimensions, position and attaching hook and loop fasteners to the belt webbing shall be as per Fig. 4.

2.2.6 Belt shall also have a Loop (ring) as shown in the Fig. 1. The loop shall be made from nylon tape of 13mm (1.3 cm) width. The total length of the tape used in the loop formation shall be of 11 cm. For making loop, both ends of the tape are joined together by stitching, which makes the length of the loop around 5.2 cm.

## 3.0 STITCHING:

3.1 All components used in the “Belt” shall be machine stitched with nylon sewing thread. Lock stitch having 3 to 4 stitches per cm shall be used wherever stitching has to be carried out. The stitching shall be done with even tension and all loose ends shall be securely fastened off. The finished “Belt” shall be free from missed stitches.

3.2 Nylon sewing thread of green shade (match with webbing colour) confirming variety no. H1 of IS: 4229: 1992, RA 2003 shall be used.

**4.0 WORKMANSHIP AND FINISH:**

The “Belt” shall be free from dyeing defects. The metal component shall be free from burrs, cracks, sharp/rough edges and any other defect. The surface of the metal fittings shall be finished smooth. The “Belt” shall be free from any other defect which may significantly mark the appearance or serviceability. The “Belt” shall be visually examined. In appearance, shape, workmanship, finish and in all other respects not defined in this specification, “Belt” shall conform to the sealed sample held in the custody of the CRPF – CoBRA.

**5.0 SEALED SAMPLE:**

In order to illustrate or specify the indeterminable characteristics such as general appearance, luster, feel and design of the “Belt”, a sample has been agreed upon and sealed; the supply shall be conformity with the sample in such respects.

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

## 6.0 MARKING

The "Belt" shall be legibly and indelibly marked with the following information:

(a) Category number, if any

(b) Manufacturer's name, initials or trade-mark;

(c) Date & year of manufacture; and

(d) Any other information required by the law in force And /or by the buyers.

## 7.0 PACKAGING & PACKING

The "Belt" shall be delivered in a clean and dry condition. Ten such belts shall be made into unit pack (bundle) by suitably folding, placing one over the other and then suitably tying them with three ply twine jute (IS: 1912).

Sixteen such bundles (packs) shall form one bale. The bale shall be packed in such a way that it ensures full protection to the contents of the bale. Hessian cloth shall be used to cover the bale. This cloth shall be securely sewn around the bale. The bale shall be stitched with a pair of three ply jute twine with minimum twelve stitches per dm, taking care not to pierce the inner wrapping while stitching. Sufficient Hessian cloth shall be pulled out to form 'ears' of about 15 cm in length. The bale shall be suitably secured by fastening with 12 mm polypropylene strapping.

Each bale/package shall be legibly marked by stencil showing the following information:

i) Nomenclature and Category number of the store

ii) Quantity packed in the bale/package

iii) Serial number of the bale/package

iv) Month & year of packing

v) Name/Trademark of the Manufacture

vi) Gross weight of the bale/package in Kg.

vii) Name & Address of the consignee

viii) Inspection note number and date

## 8.0 SAMPLING AND CRITERIA FOR CONFORMITY

8.1 The sampling procedure detailed in 8.2 and 8.3 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 "Belt" tendering by him for inspection to comply with the requirements of this standard in all respects.

8.2 The manufacturer should offer the stores serially numbered and arranged in such a way that the entire lot is accessible to the inspecting officer. The conforming of a lot to the requirement of this specification shall be determined on the basis of the tests carried out on the samples selected from it. The number of samples shall be selected at random in accordance with Table-1.

8.3 The number of test samples and the criterion for conformity for various characteristics shall be as given in Table- 2:

8.4 **Lot:** For the purpose of conformance inspection and test sampling, a lot is defined as all the completed "Belt" of the same size and type, with same assemblies, produced in

one facility, using the same production processes and materials, and being offered for delivery at one time to buyer against a dispatch note.

8.5 The CRPF (CoBRA) reserves the right to carry out inspection of bigger lot sizes, even to the extent of 100% inspection, if considered necessary.

## 9.0 REQUIREMENTS

9.1 The "Belt" shall conform to the requirements given in Table 3.

9.2 Specification for colour of the Nylon webbing used in "Belt" shall be as given in Table 4.

9.3 The metallic buckle used in the "belt" shall conform IS 4274: 1981 (except shape and dimension) and material shall be "O" grade steel as per specification IS 1079: 1994.

9.4 The hook and loop fastener (50 mm width) shall be green in color and shall meet the requirements as given in IS 8156: 1994 RA 2004. Specification for colour of the Hook and loop fastener used in "Belt" shall be as given in Table 5.

9.5 The 13 mm (1.3 cm) nylon tape used in the loop shall meet the requirements as given in DMSRDE/T&GS/92/403.

**Table 1: Belt to be selected from a lot and permissible number of non-conforming belts**

| Lot size | Non – Destructive Testing | | Destructive Testing | |
|---|---|---|---|---|
| | No. of Belt(s) to be selected | Permissible number of non-conforming Belt(s) | No. of Belt(s) to be selected | Permissible number of non-conforming Belt(s) |
| (1) | (2) | (3) | (4) | (5) |
| Less than 300 | 10 | 1 | 2 | 0 |
| 301 - 500 | 20 | 2 | 3 | 0 |
| 501 – 1000 | 30 | 3 | 5 | 0 |
| 1001 – 3000 | 50 | 5 | 8 | 1 |
| 3001 and above | 80 | 5 | 13 | 2 |

**Table 2: Criterion for conformity**

| Characteristics | Number of test samples | Criteria for conformity |
|---|---|---|
| Dimensions, Number of ends and picks and freedom from defects | All the Belt(s) selected according to the column 2 of Table-1 | Non-conforming Belt(s) not to exceed the corresponding number given in column 3 of Table-1 |
| Mass linear per meter | All the Belt(s) selected according to the column 2 of Table 1 | Each observed value satisfies the relevant requirement |
| Breaking load, nature of fibre/filament, Dimensional change, pH value, colour fastness to various agencies etc. | All the Belt(s) selected according to the column 4 of Table 1 | Non-conforming Belt(s) not to exceed the corresponding number given in column 5 of Table-1 |

**Table 3: Requirements of "Belt-nylon with buckle and rings"**

| Sl. No. | Characteristics | Requirements | Test Method |
|---|---|---|---|
| 1 | Nature of filament yarn | Nylon 6.6 | AATCC : 20 and AATCC 20A 20007 |
| 2 | Number of warp ends in full width | 300 ± 5% | IS 1963:1981 |
| 3 | Picks/dm | 200 ± 5% | IS 1963:1981 |
| 4 | Width, mm | 48-52 | IS: 1954 : 1990 |
| 5 | Length, mm | 1330 ± 20 | IS: 1954 : 1990 |
| 6 | Thickness, mm | 3.0 ±0.25 | IS: 7702 |
| 7 | Mass per linear meter of webbing, (g) | 125 ± 5% | IS: 4727:1968 |
| 8 | Colour fastness to Light | 5 or better | IS 2454:1985 |
| 9 | Colour fastness to Rubbing<br>- Dry<br>- Wet | <br>4 or better<br>4 or better | IS 766:1988 |
| 10 | Colour fastness to Washing<br>- Change in colour<br>- Staining on adjacent fabric | <br>4 or better<br>4 or better | IS 764 : 1979 |
| 11 | Dimensional Change due to relaxation, both directions, percentage, maximum | 2.0 | As per guidance of IS 2977:1989 |
| 12 | pH value of aqueous extract | 6.0-8.0 | IS 1390 (Cold method) :1983 |

**Table 4: Specification of colour of "Belt-nylon with buckle and rings" (Nylon Webbing)**

(AATCC Test method 173 : 2005 & AATCC Evaluation Procedure 7 : 2003)

| | | | | |
|---|---|---|---|---|
| **Colour** | : | **Green** | | |
| **System** | : | **CIE LCH** | | |
| **Illuminant Observer** | : | **D 65** | | |
| **Standard Observer** | : | **10 Degree** | | |
| **Tristimulus Values** | : | **X** | **Y** | **Z** |
| | | **8.980** | **9.933** | **7.172** |
| **L C H** | : | **L** | **C** | **H** |
| | | **37.722** | **12.032** | **107.539** |
| **CMC (l:c)** | : | **2:1** | | |
| **Colour difference, $\Delta E_{cmc}$** | : | **≤ 1.5** | | |

**Interpretation of Results:**

i) If $\Delta E_{cmc}$ is less than or equal to 1.5, then sample is acceptable.

ii) If $\Delta E_{cmc}$ is greater than 1.5, 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 5: Specification of colour of "Belt-nylon with buckle and rings" (Hook & Loop Fastener)**

(AATCC Test method 173 : 2005 & AATCC Evaluation Procedure 7 : 2003)

| | | | | |
|---|---|---|---|---|
| **Colour** | : | **Green** | | |
| **System** | : | **CIE LCH** | | |
| **Illuminant Observer** | : | **D 65** | | |
| **Standard Observer** | : | **10 Degree** | | |
| **Tristimulus Values** | : | **X** | **Y** | **Z** |
| | | **4.587** | **4.787** | **2.400** |
| **L C H** | : | **L** | **C** | **H** |
| | | **26.119** | **16.293** | **87.640** |
| **CMC (l:c)** | : | **2:1** | | |
| **Colour difference, $\Delta E_{cmc}$** | : | **≤ 3.0** | | |

**Interpretation of Results:**

iii) If $\Delta E_{cmc}$ is less than or equal to 3.0, then sample is acceptable.

iv) If $\Delta E_{cmc}$ is greater than 3.0, 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.

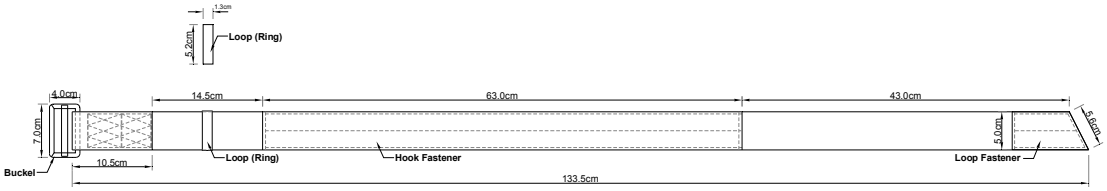


**Fig.-1 Dimensions of Belt**

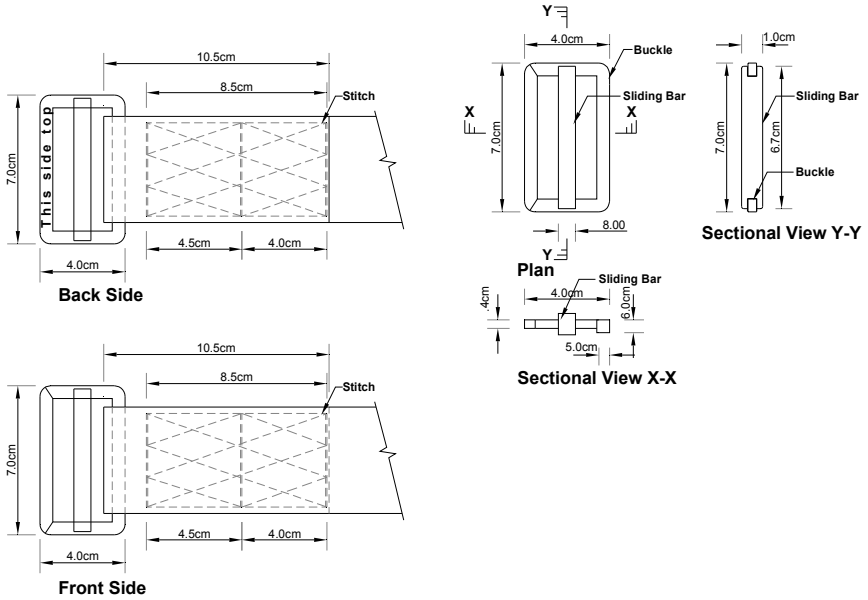


**Fig.-2 Attaching buckle to belt**



Back view

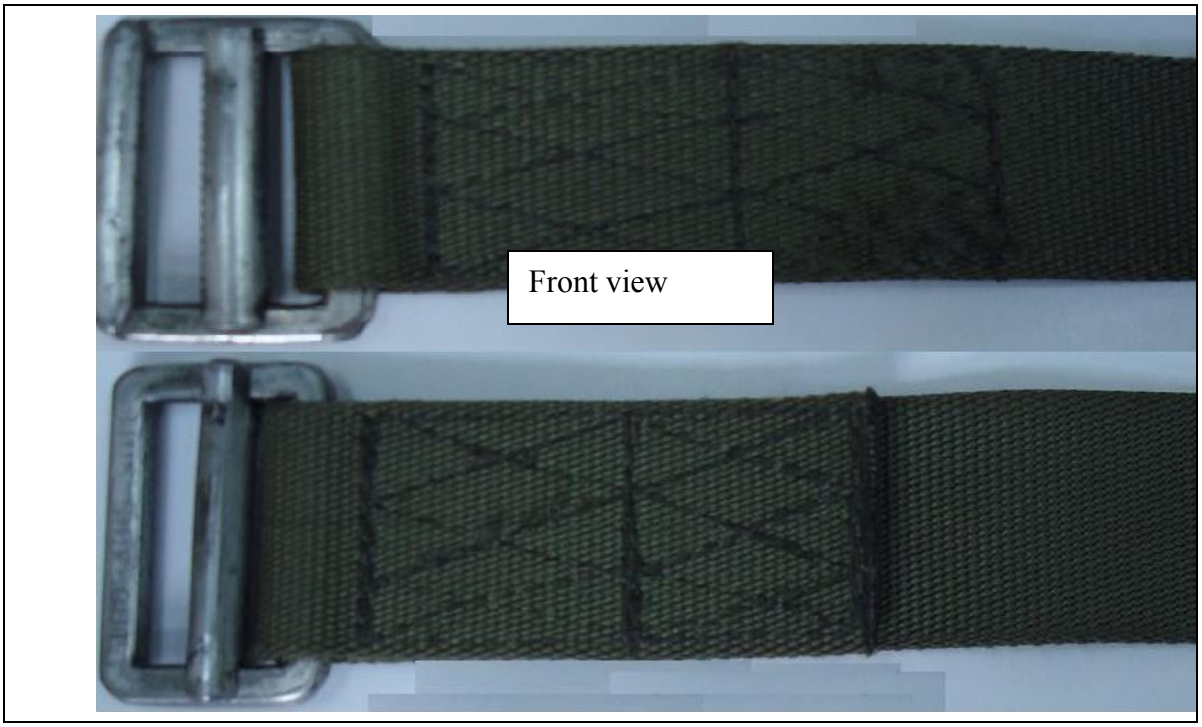


**Fig. 3 Front & Back view of buckle attachment**

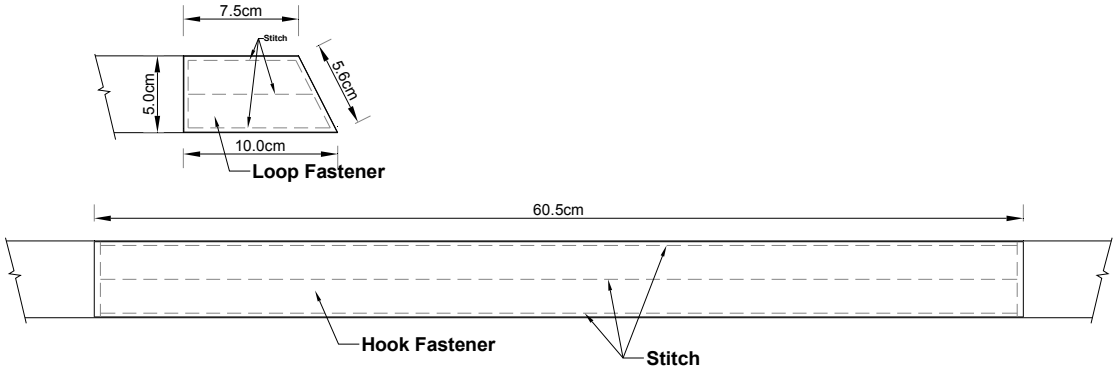


**Fig.-4 Attaching loop & hook fastener to belt**

## 10.0 REFERENCES

### LIST OF REFERED STANDARDS

| Sl. No. | Method/Spec. number | Title |
|---|---|---|
| 1 | IS:397(Part I) : | Method for statistical quality control during |

| | | |
|---|---|---|
| | 2003 | production : Part I Control charts for variable |
| 2 | IS:397 (Part II): 2003 | Method for statically quality control during production: Part 2 Control charts for attributes and count of defects |
| 3 | IS:4274 : 1981 | Specification of buckles |
| 4 | IS: 1079: 1994 | Hot Rolled Carbon Steel Sheets and Strips-Specification |
| 5 | IS:6359: 1971 (RA 2004) | Method for conditioning of Textiles |
| 6 | IS:10789:2000 (RA 2007) | Classification and terminology of stitch types used in seams |
| 7 | IS:1963:1981 (RA 2004) | Method for determination of thread per unit length in woven fabric |
| 8 | IS 764 : 1979, Reaffirmed 2008 | Method for determination of colour fastness of textile material to Washing-Test 3 |
| 9 | IS 971:1983, Reaffirmed 2004 | Method for determination of colour fastness of textile material to Perspiration |
| 10 | IS 766:1988, Reaffirmed 2004 | Method for determination of colour fastness of textile material to Rubbing |
| 11 | IS 2454:1985, Reaffirmed 2006 | Method for determination of colour fastness of textile material to artificial Light (Xenon lamp) pressing |
| 12 | IS 1390 : 1983 (RA 2004) | Method for determination of pH value of aqueous extract of textile materials |
| 13 | AATCC Test method 173 : 2005 | CMC: Calculation of small colour differences for acceptability |
| 14 | AATCC Evaluation Procedure 7 : 2003 | Instrumental assessment of the change in colour of a test specimen |
| 15 | AATCC Test method 20:2007 | Fibre analysis: qualitative |
| 16 | AATCC Test method 20A: 2007 | Fibre analysis: quantitative |
| 17 | DMSRDE/T&GS/92/403 | Specification of Nylon webbing and nylon tapes |