

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

26, Man Singh Road, Jaisalmer House,
New Delhi, 10.3.2010

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) Durable combat rucksack made of 'Cordura' which is highly abrasive resistant and lighter than web (40 Ltr capacity)
- (2) Multi purpose light weight load bearing frame with carrier facilities and convertibility as stretcher (Made of aluminum)
- (3) Pouches for Ammunition and Grenades made of disruptive pattern cordura material
- (4) Light weight ridge tactical boots
- (5) Light weight running shoes
- (6) Light Weight Ground Sheet

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

(R.S.Sharma)
Director (Prov)

IGP (P & W P) / DV: No
Date... 6.00... 13.03.10

महानिदेशक सचिव डायरी संख्या.....	459/10000
DG's Sectt. Diary No.	
महानिदेशक / Director General.....	
अ. महानिदेशक / Add. D.G.	
तिथि / Date	12 MAR 2010
य.नि. कार्मिक / परि० / प्रशि. / संमरण / प्रशा. / निर्माण.....	
वि.सं. / निदेशक (चिकित्सा).....	
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रि. निदेशक (Medical).....	

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Convey to S.A.F. 4.5/3

CENTRAL RESERVE POLICE FORCE (CoBRA) STANDARD



SPECIFICATION FOR “MULTIPURPOSE LIGHT WEIGHT LOAD BEARING FRAME WITH CARRIER FACILITIES AND CONVERTIBILITY AS STRETCHER (MADE OF ALUMINUM)”

Submitted to :

**Office of the Inspector General of police, CRPF-CoBRA Sector
New Delhi-110017**

Prepared by :

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**SPECIFICATION FOR MULTIPURPOSE LIGHT WEIGHT LOAD
BEARING FRAME WITH CARRIER FACILITIES AND
CONVERTIBILITY AS STRETCHER
(MADE OF ALUMINUM)**

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

PREAMBLE

The Inspector General of Police (CoBRA Sector), CRPF, has asked NITRA to prepare technical specifications for specification for “Multipurpose light weight load bearing frame with carrier facilities and convertibility as stretcher (made of aluminum)”. The specification describes the performance requirements and material properties – Ends/dm, picks/dm, weave, weight, yarn count, fibre composition, dimensions, color fastness to light, washing, and crocking; dimensional change due to relaxation, flexing, cold cracking etc. Bureau of Indian Standards (BIS) and American Association of Textile Chemists and Colorists (AATCC) test methods are considered to draw this specification.

This report contains 36 pages which describe the technical specifications of “Multipurpose light weight load bearing frame with carrier facilities and convertibility as stretcher (made of aluminum)” 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 “Multipurpose light weight load bearing frame with carrier facilities and convertibility as stretcher (made of aluminum)” and final inspection as well.

**SPECIFICATION FOR “MULTIPURPOSE LIGHT WEIGHT LOAD
BEARING FRAME WITH CARRIER FACILITIES AND
CONVERTIBILITY AS STRETCHER (MADE OF ALUMINUM)”**

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0.0 FORWARD

0.0 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.

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

0.2 This specification would be used for manufacture, quality assurance and procurement of the item.

0.3 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
Sector –HQ. (Old sect.), Near I.S.B.T, Civil Line Thana,
Delhi

0.4 Copies of the specification can be obtained from:

Office of the Inspector General of Police, CoBRA Sector
Sector –HQ. (Old sect.), Near I.S.B.T, Civil Line Thana,
Delhi

0.5 This specification holds good only for the supply order for which it is issued.

0.6 The Quality Assurance Authority reserves the right to amend or modify this specification as and when required.

0.7 The Quality Assurance Authority is the competent authority to grant concessions, if any, in respect of any clause contained in this specification

- 0.8 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 “Multipurpose light weight load bearing frame with carrier facilities and convertibility as stretcher (made of aluminum)” herein referred as “Load bearing frame”.
- 1.2 This specification does not specify the general appearance, lusture, feel, type of finish of “Load bearing frame”
- 1.3 This specification covers one type and size of “Load bearing frame”.

2.0 MATERIAL AND MANUFACTURE

- 2.1 The design and shape of the “Load bearing frame” shall be as per Fig.1- 13.
- 2.2 Following are the items used in the manufacture of “Load bearing frame”:

Item No.	Name of the item	Description
1	Aluminum tubing	1. Outer diameter: 25±1 mm 2. Wall thickness: 2.5 ±0.1mm 3. Conforming to Alloy 64430 condition W.P of IS : 1285
2	Base fabric	1. Nylon 6 6 multifilament texturised yarn shall be used. 2.For guidance i) warp count: 900 Denier, ii) weft count: 600 Denier 3. Weave: Plain (1 up 1 down) 4. Water proof & Water repellent (face side water repellent and back side PU Coated fabric) 5. The fabric shall be 'Heat set' and fully shrunk. 6. Green Colour

3	Nylon Tape 45±2 mm wide	1. Nylon multifilament yarn shall be used. 2. For guidance: i) Warp count: 3550 Denier ii) Weft count 850 Denier, 3. Total ends (full width): 150 Picks per dm: 150 4. Weave: Pointed twill, Refer Fig. 12. Needle loom shall be used for the manufacture. 5. Green Colour
4	Nylon Tape 25±2 mm wide	1. Nylon multifilament yarn shall be used. 2. For guidance i) Warp count: 1850 Denier ii) Binding yarn (Warp): 1850 Denier, iii) Weft count 1000 Denier 3. Total ends(full width): 123 (104 warp ends + 19 binding warp ends), Picks per dm: 320 4. Weave: Refer Fig. 13. Needle loom shall be used for the manufacture 5. Green Colour
5	Foam	1. Polyethylene foam 2. Thickness: 12.5±5% mm
6	Side release (Quick release) buckle (SRB)-male	1. Made out of Nylon, 2. For dimensions refer Fig. 11. 3. Black Colour
7	Side release (Quick release) buckle (SRB)- female (For chest & waist strap)	1. Made out of Nylon, 2. For dimensions refer Fig. 11. 3. Black Colour
8	D-ring and Tape length adjuster	1. Made out of Nylon, 2. For dimensions refer Fig. 11. 3. Black Colour
9	Ladder lock	1. Made out of Nylon, 2. For dimensions refer Fig. 11. 3. Black Colour
10	Sewing Thread	1. Nylon sewing thread conforming variety no. H₁ of IS: 4229. 2. Green Colour

2.3 Using the items referred in section 2.2, the following components (A to D) shall be manufactured:

Component	Description	
A		
B		
C		
D		

2.3.1 Component-A: Aluminium tube shall be used to manufacture component-A of “Load bearing frame”. Suitable jigs shall be used for shaping and bending the tubes. The finished component shall be smooth and free from sharp edges and welding defects. Suitable welding shall be used to join the tubes. The finished component shall be spray painted. Green colour epoxy paints shall be used for this purpose.

2.3.2 Component-B: The dimensions of Component-B are shown in the Fig. 3. Base fabric, 25 mm wide nylon tape, polyethylene foam and D-ring shall be used to manufacture component-B. One side of the Component-B shall be made of

two layers of base fabric while the other side shall be made of two layers of base fabric and one layer of Polyethylene foam. The polyethylene foam shall be placed between the two layers of base fabric. The assembly of the items are shown in Fig. 4.

2.3.3 Component-C: The “Load bearing frame” shall have two pieces of Component-C as shown in Fig.1. each of these pieces shall be made of three layers (top layer, middle layer and bottom layer) as shown in Fig. 6. The top layer shall be made of base fabric, the middle layer shall be made of polyethylene foam while the bottom layer shall be made of Nylon Tape 45 ± 2 mm wide. For correct positioning of shoulder pad and ladder lock refer Fig.5.

2.3.4 Component-D: Fig. 7A and 7B show the dimensions of the Component D of the “Load bearing frame”. It shall have two distinct parts- D1 and D2 as shown in Fig. 9A and 9B. D1 shall be made out of two layers of base fabric while D2 shall have three layers; top and bottom layers shall be made out of base fabric while polyethylene foam shall be the middle layer. The details are shown in Fig. 10. D1 and D2 shall stitch together as shown in Fig. 8. For further clarification, sealed sample held in the custody of CRPF (CoBRA) may be consulted.

2.4 Base fabric: The base fabric shall be uniformly coated on back side with polyurethane. The face side of the base fabric shall be finished with water repellent finish. The coating shall be smooth and it should firmly adhere to the fabric. The coated fabric shall be pliable and free from tackiness, stains, pinholes, surface irregularities, wrinkles, patches and all other coating defects. The coating shall not have any objectionable odor.

2.5 Nylon tapes: 25 ± 2 mm wide and 45 ± 2 mm wide nylon tapes used in the “Load bearing frame” shall be manufactured using Needle loom. The cut ends of the tapes shall be heat sealed and shall be smooth for easy passage through respective buckles and ladder locks. The 45 ± 2 mm wide nylon tape shall be

used for making waist straps of “Load bearing frame”. The straps shall be attached with quick release buckles. The positioning of straps and quick release buckles (male and female) to adjust the dimensions of “Load bearing frame” to suit the wearer are shown in Fig. 7A and 7B. The dimensions of the buckle, D-ring and ladder lock used in the straps are shown in the Fig. 11

3.0 STITCHING

3.1 All components used in the “Load bearing frame” 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 “Load bearing frame” shall be free from missed stitches.

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

4.0 WORKMANSHIP

The base fabric and tapes used shall be free from defects such as yarn, fabric and dyeing defects. There shall be no defect due to stitching.

5.0 REQUIREMENTS

- 5.1 Aluminum tubing of 25 ± 1 mm outer diameter and 2.5 ± 0.1 mm wall thickness conforming to Alloy 64430 condition W.P of IS : 1285 shall be used for making frame.
- 5.2 The base fabric used in the “Load bearing frame” shall conform to the requirements as in Tables 3. Specification for colour shall be as given in Table 4.
- 5.3 Polyethylene foam shall meet the requirement as given in the Table 5.
- 5.4 The 25 mm and 45 mm wide nylon tapes used in the “Load bearing frame” shall comply with the requirements given in the Table 6. The colour of these Components shall be green. Specification for colour shall be as given in Table 7.
- 5.5 The buckle, D-ring and ladder lock shall be black in colour. They shall be made out of Nylon. They shall meet the requirements as given in Table 8. Specification for colour of buckles shall be as given in Table 9. The colour of D-ring and ladder lock shall visually match with buckles.

6.0 SEALED SAMPLE

For appearance, shape, general workmanship, finish and for other aspects, not defined in this specification, “Load bearing frame” shall conform to the sealed sample held in the custody of the CRPF-CoBRA. The custody of sealed sample shall be a matter of prior agreement between the buyer and the seller.

7.0 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 Manufacturers must satisfy themselves that the stores are in accordance with the requirements of the buyer and fully conform to the required specification by carrying out a thorough pre-inspection of each lot before actually tendering the same for inspection to the inspecting officer nominated by the CRPF-CoBRA. A declaration by the manufacturer that necessary pre-inspection has been carried out on the store tendered, will be submitted along with the *CHALLAN*. The declaration will also indicate the method followed in carrying out pre-inspection showing the feature checked/tested and will have the test certificate attached to the *challan*/declaration.

7.2 The sampling procedure given below shall give desired protection to the buyer and the seller provided the lot submitted for inspection is homogeneous. To achieve this, manufacturer shall maintain a system of process control at all stages of manufacture and shall ensure that the “Load bearing frame” tendered by him for inspection comply with the requirements of this standard in all respects.

7.3 In any consignment, all the “Load bearing frame” of the same size and colour delivered to a buyer against a dispatch note shall constitute a lot.

7.3.1 The conformity of the lot to the requirements of this specification shall be determined on the basis of the tests carried out on the samples selected from it.

7.4 Unless otherwise agreed to between the buyer and the seller, the number of “Load bearing frame”, depending upon the size of the lot, shall be selected at random in accordance with the col 2 Table 2.

7.5 The sample size and the criteria for conformity for various characteristics shall be as per Table-1.

Table-1: Criterion for conformity

Characteristics	Number of test samples	Criteria for conformity
Dimensions and freedom from defects	All the “Load bearing frame” selected according to the column 2 of Table 2	Non-conforming “Load bearing frame” not to exceed the corresponding number given in column 3 of Table 2
Dimensional change, pH value, weight, colour fastness to various agencies	All the “Load bearing frame” selected according to the column 4 of above Table 2	Non-conforming “Load bearing frame” not to exceed the corresponding number given in column 5 of Table 2

Table-2: Number of “Load bearing frame” to be selected from a lot and permissible number of non-conforming “Load bearing frame”

No. of Load bearing frame in the lot	Non – Destructive Testing		Destructive Testing (Chemical Testing)	
	No. of “Load bearing frame” to be selected	Permissible number of non-conforming “Load bearing frame”	No. of “Load bearing frame” to be selected	Permissible number of non-conforming “Load bearing frame”
(1)	(2)	(3)	(4)	(5)
Up to 300	10	1	2	0
301 – 500	20	2	3	0
501-1000	30	3	5	0
1001 – 3000	50	5	8	0
3001 & above	80	5	13	1

8 MARKING AND LABELLING

Before dispatch each bale shall be legibly marked by stencil showing:

- a) Nomenclature and category no. of the store
- b) Quantity packed in the bale
- c) Serial number of the bale
- d) Manufacturer's name or trade-mark, if any; and
- e) Month and Year of manufacture
- f) Gross weight of the bale in Kg.
- g) Name & address of the consignee
- h) Inspection note no. and date

9. PACKAGING & PACKING

- 9.1 The "Load bearing frame" shall be packed in clean and dry condition.
- 9.2 Each "Load bearing frame" shall be delivered in new, clean and dry condition & packed properly. Ten "Load bearing frame" shall form a unit pack (bundle) by placing one over the other and then suitably tying them with three ply twine jute (IS: 1912:1984 RA 2007)). The unit pack shall be wrapped with polyethylene film of 0.04 mm thickness (IS 2508). Four unit packs (bundles) shall then be wrapped in laminated Hessian cloth to form a complete bale of rectangular shape. The overlaps of the outer layer of Hessian cloth shall be such that it can be properly and securely sewn around the bale. The bale shall be stitched with double three ply jute twine with not less than twelve stitches per dm; taking care not to pierce the inner wrapping during stitching. Sufficient Hessian cloth shall be pulled out at each corner to form 'ears' of about fifteen cms in length. The bale shall be suitably secured by fastening with polypropylene strapping 12 mm thickness.

Table-3 : Requirements of Base fabric of “Load bearing frame”

S. No.	Parameters	Requirements	Method of Testing
1	Nature of filament	Nylon-6 6	AATCC 20 and AATCC 20A
2	Nature of Coating	Polyurethane	See Annexure 1
3	Dimensional Change (due to relaxation), percentage, Maximum	2.0	As per guidance of IS 2977:1989
4	Ends/dm, (minimum)	180	IS 1963:1981
5	Picks/dm, (minimum)	120	IS 1963:1981
6	Mass, g/m ² (Coated Fabric)	325±10	IS 1964 : 1970
7	Mass of de-proofed fabric, g/m ²	280±10	IS 1964 : 1970
8	Tear strength, g, (minimum) - Warp - Weft	12000 6000	IS:7016 Pt III Method A-I
9	Colour Fastness to 1). Light (on blue wool Standards) 2). Washing - Change in colour - Staining on Nylon - Staining on cotton 3) Crocking - Dry - Wet	4 or better 4 or better 4 or better 4 or better 4 or better 4 or better	IS 2454:1985 IS 687:1979 IS 766:1988
10	pH Value of aqueous extract	6.0 to 8.0	IS 1390:1983 (Cold method)
11	Water proofness	No percolation of water through the fabric or wetting of the outer surface	IS: 7016 Pt VII: :1986-Method A-2 Low pressure method (water columns height 30 cm for 30 minutes)
12	Separation of Polyurethane (PU) film	On fraying threads in warp and weft directions up to 5 mm after cutting the fabric from any portion, there shall not be a continuous PU film on the areas where from where the threads have been removed.	

13	Resistance to accelerated ageing at 70°C±1°C for 168 hrs in hot air circulating oven	No sign of cracks, wrinkle or flaking should be observed	IS: 7016 Pt. VIII: :1975
14	Resistance to damage by flexing (after 30,000 cycle)	No sign of cracks, softening or signs of brittleness should be observed	IS: 7016 Pt. IV: :1987
15	Colour specification (ΔE_{cmc})	≤ 1.5	See Table 4
16	Colour of Nylon sewing thread	Matching with <i>base fabric</i>	Visual

Table-4: Colour specification of base fabric used in “Load bearing frame”
(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
		12.950	14.195	9.705
L C H	:	L	C	H
		44.511	14.941	102.795
CMC (l:c)	:	2:1		
Colour difference, ΔE_{cmc}	:	≤ 1.5		

Interpretation of Results :

- i) If ΔE_{cmc} is less than or equal to 1.5, then sample is acceptable.
- ii) If ΔE_{cmc} is greater than 1.5, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristics feature 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: Requirements of Polyethylene Foam material used in components
B, C and D of "Load Bearing Frame"**

Sl. No.	Characteristics	Requirements	Test Method
1	Nature of foam	Low density Polyethylene	Annexure 2
2	Thickness, mm	12.5±5%	IS 7888:1976
3	Density, kg/ m ³	17.0±5%	IS 7888:1976
4	Compression strength at 25% , kPa (Minimum)	16.0	ISO 12402-9 & ISO 3386-1

Table 6 : Requirements of *Nylon Tapes (25mm and 45 mm wide)* of “Load bearing frame”

Sl. No.	Characteristics	Requirements	Test Method
1	Nature of fibre/filament	Nylon-6 filament	IS: 667 & IS 2005
2	Mass per linear meter, g -25 mm wide -45 mm wide	25±10% 40±10%	IS 1964 : 1970
3	Breaking strength, N (Minimum) -25 mm wide (full width x 10cm gauge length) -45 mm wide	4000 7000	IS 1969:1985
4	Colour fastness to Washing - Change in colour - Staining on adjacent fabric	4 or better 4 or better	IS 687 : 1979
5	Colour fastness to Crocking - Dry - Wet	4 or better 4 or better	IS 766:1988
6	Colour fastness to Light	4 or better	IS 2454:1985
7	Dimensional Change due to relaxation, percentage, maximum -Lengthwise -Widthwise	2.0 4.0	As per guideline of IS 2977 :1989

Table-7: Colour specification of Tapes (25mm and 45 mm wide) used in “Load bearing frame” 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
		8.924	9.716	7.106
L C H	:	L	C	H
		37.328	11.302	102.271
CMC (l:c)	:	2:1		
Colour difference, ΔE_{cmc}	:	≤ 3.0		

Interpretation of Results :

- i) If ΔE_{cmc} is less than or equal to 3.0, then sample is acceptable.
- ii) If ΔE_{cmc} is greater than 3.0, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristics feature 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 8 : Requirements of ““Load bearing frame” – Plastic Buckle (Male & Female), Ladder lock and D-ring

Sl. No.	Characteristics	Requirements	Test Method
1	Nature of material	Nylon	-Nylon is Soluble in formic acid -Melting point of Nylon is 215°C to 220°C
2	Resistance to accelerated ageing	No apparent change of aged samples in comparison to the original sample in respect of softening, brittleness, colour, tackiness etc.	Keep sample in hot air circulating oven at 70±1°C for 24 hrs.
3	Resistance to low temperature	No apparent change of test samples in comparison to the original sample in respect of brittleness & crackness when bent at 180° and back.	Keep sample in deep freezer at -10°C for 24 hrs.
4	Colour fastness to light	4 or better	IS 2454:1985
5	Pull load, Kgf. (Min)	45 (The male and female part shall not in any case come out due to slippage or breakage)	Annexure 3

Table-9: Colour specification of buckles “Load bearing frame”
(AATCC Test method 173 : 2005 & AATCC Evaluation Procedure 7 : 2003)

Colour	:	Black						
System	:	CIE LCH						
Illuminant Observer	:	D 65						
Standard Observer	:	10 Degree						
Tristimulus Values	:	<table border="1"> <tr> <td>X</td><td>Y</td><td>Z</td></tr> <tr> <td>7.571</td><td>8.005</td><td>8.739</td></tr> </table>	X	Y	Z	7.571	8.005	8.739
X	Y	Z						
7.571	8.005	8.739						
L C H	:	<table border="1"> <tr> <td>L</td><td>C</td><td>H</td></tr> <tr> <td>33.993</td><td>0.504</td><td>252.075</td></tr> </table>	L	C	H	33.993	0.504	252.075
L	C	H						
33.993	0.504	252.075						
CMC (l:c)	:	2:1						
Colour difference, ΔE_{cmc}	:	≤ 3.0						

Interpretation of Results :

- i) If ΔE_{cmc} is less than or equal to 3.0, then sample is acceptable.
- ii) If ΔE_{cmc} is greater than 3.0, then sample is unacceptable.

Note-1 : Absorbance/reflectance/ transmittance are affected by surface characteristics feature 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.

10. RELATED TEST METHODS & SPECIFICATIONS

Sl. No.	SPEC. /TEST METHOD No.	DESCRIPTION
(a)	AATCC Test method 20:2007	Fibre analysis: qualitative
(b)	AATCC Test method 20A	Fibre analysis: quantitative
(c)	IS 1390: 1983, RA 2004	Methods of testing of pH value of aqueous extract
(d)	IS 2454: 1985, RA 2006	Methods for determining of colour fastness of textile materials to artificial light (xenon lamp)
(e)	IS 2500 (Part 2): 1965, RA 2006	Sampling inspection tables
(f)	IS 687: 1979, RA 2004	Method for determination of colour fastness of textile material to washing
(g)	IS 4905: 1968, RA 2006	Method of random Sampling
(h)	IS 766: 1988 RA 2004	Method for determination of colour fastness of textile material to Rubbing (dry & wet)
(i)	IS 690:1988, RA 2004	Method for determination of colour fastness of textile material to sea water
(j)	IS : 2977:1989, RA 2005	Method for determination of dimensional changes on soaking in water
(k)	IS 6359:1971, RA 2004	Method for Conditioning of Textiles
(l)	IS: 2005:1988, RA 2004	Method of quantitative analysis of binary mixture of Nylon and other fibres
(m)	AATCC Test method 173 : 2005	CMC: Calculation of small colour differences for acceptability
(n)	AATCC Evaluation Procedure 7 : 2003	Instrumental assessment of the change in colour of a test specimen

Female Buckle



**Nylon Tape-
45mm**

D

A

**Nylon Tape-
25mm**

C

B

**Fig.1: “Load Bearing Frame”
(Component wise description)**

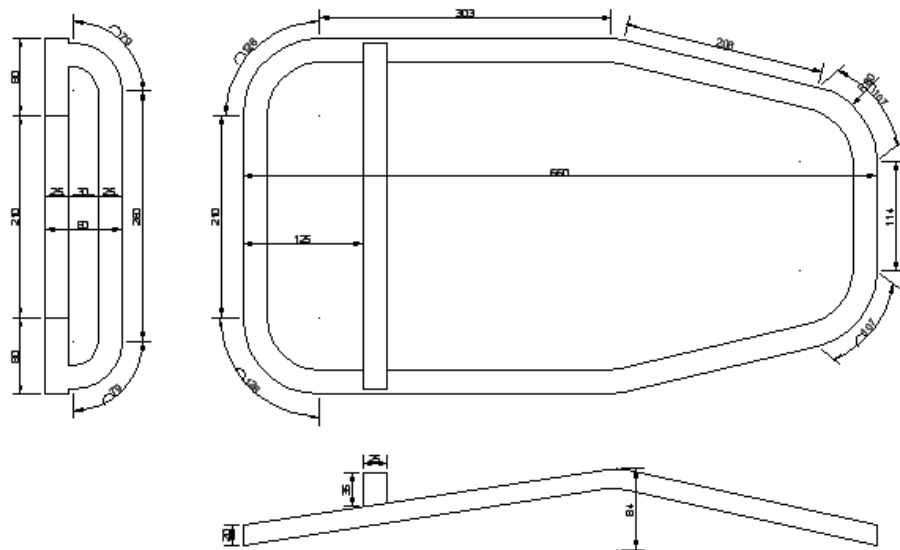


Fig-2 Aluminium Frame / (Component-A) dimensions of load bearing frame
(All the dimensions are in mm)



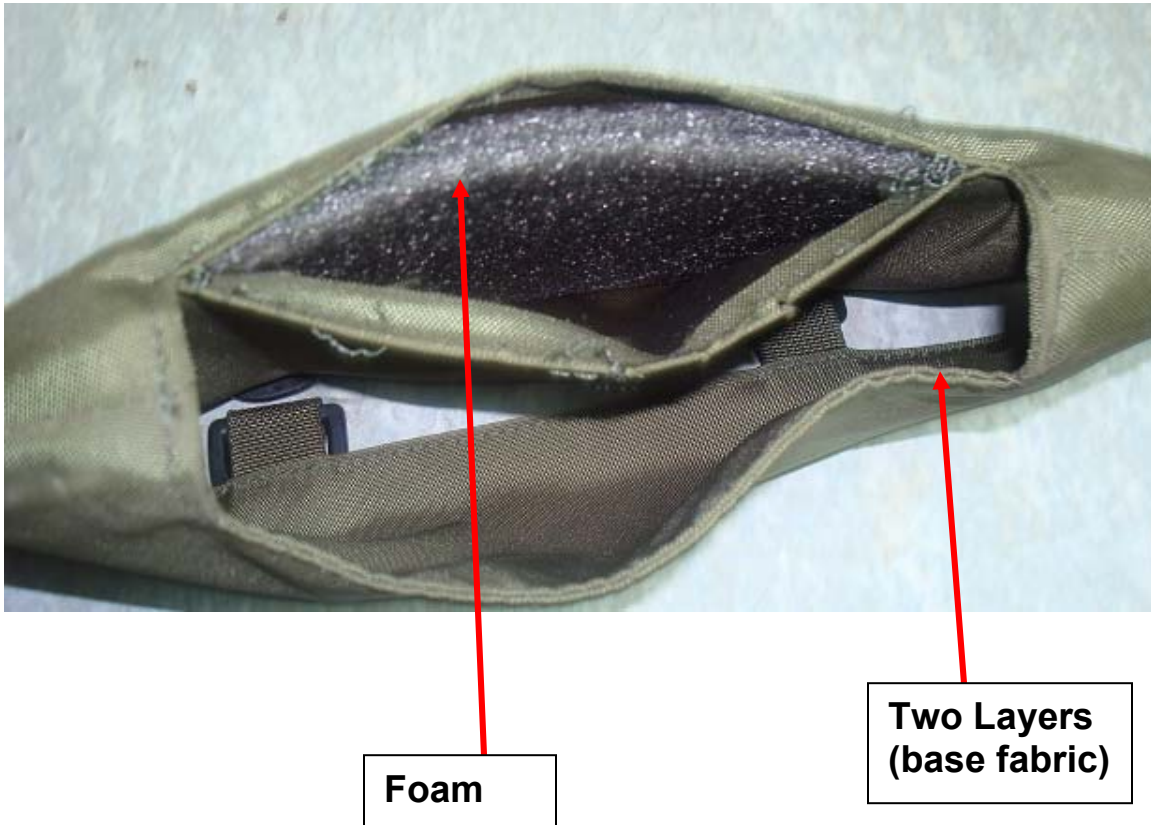


Fig.4: Assembly of Component- B

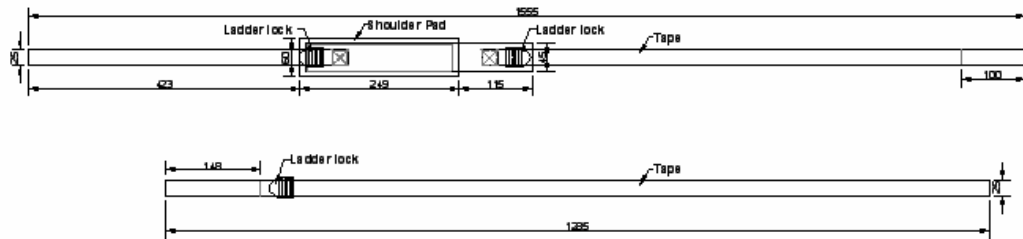


Fig-5 Component-C
(All the dimensions are in mm)

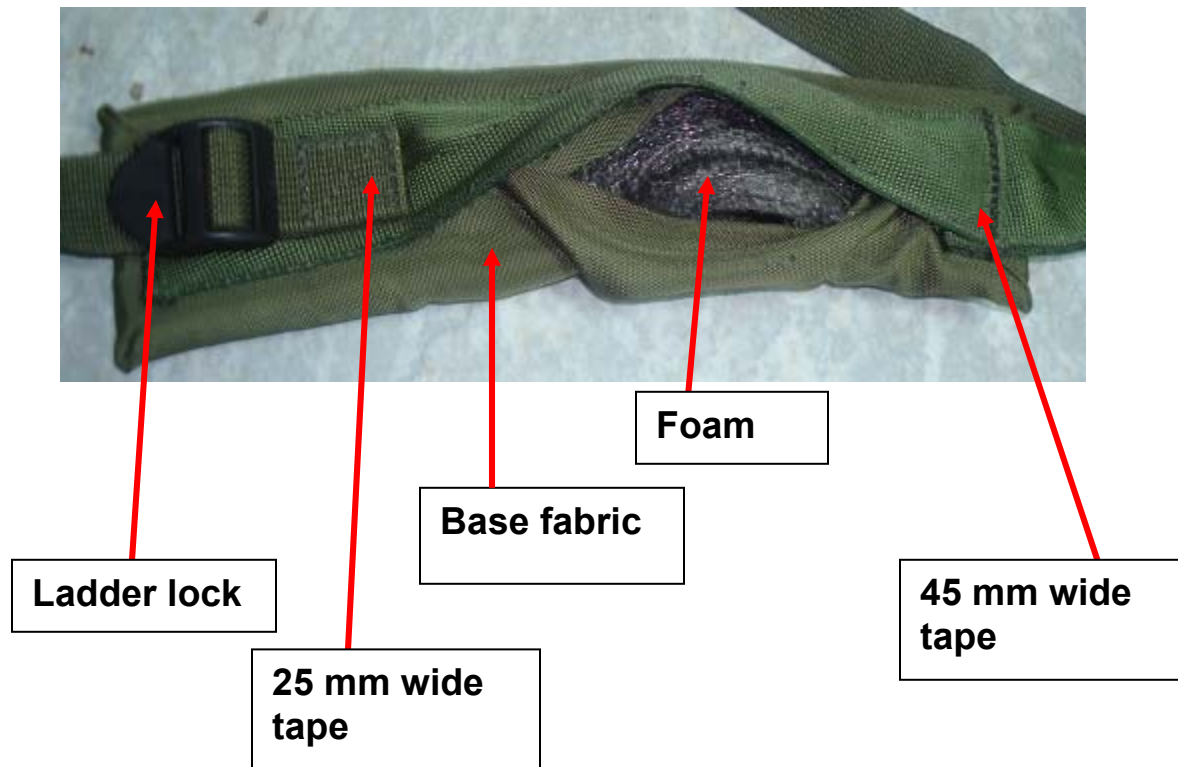


Fig. 6: Assembly of Component- C

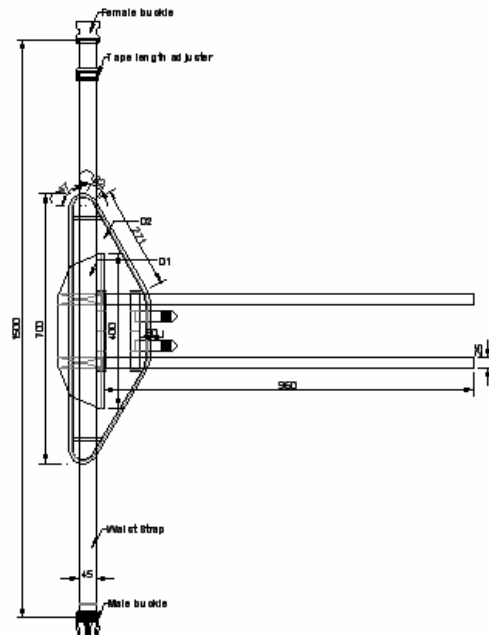


Fig.-7A Component-D
(All the dimensions are in mm)



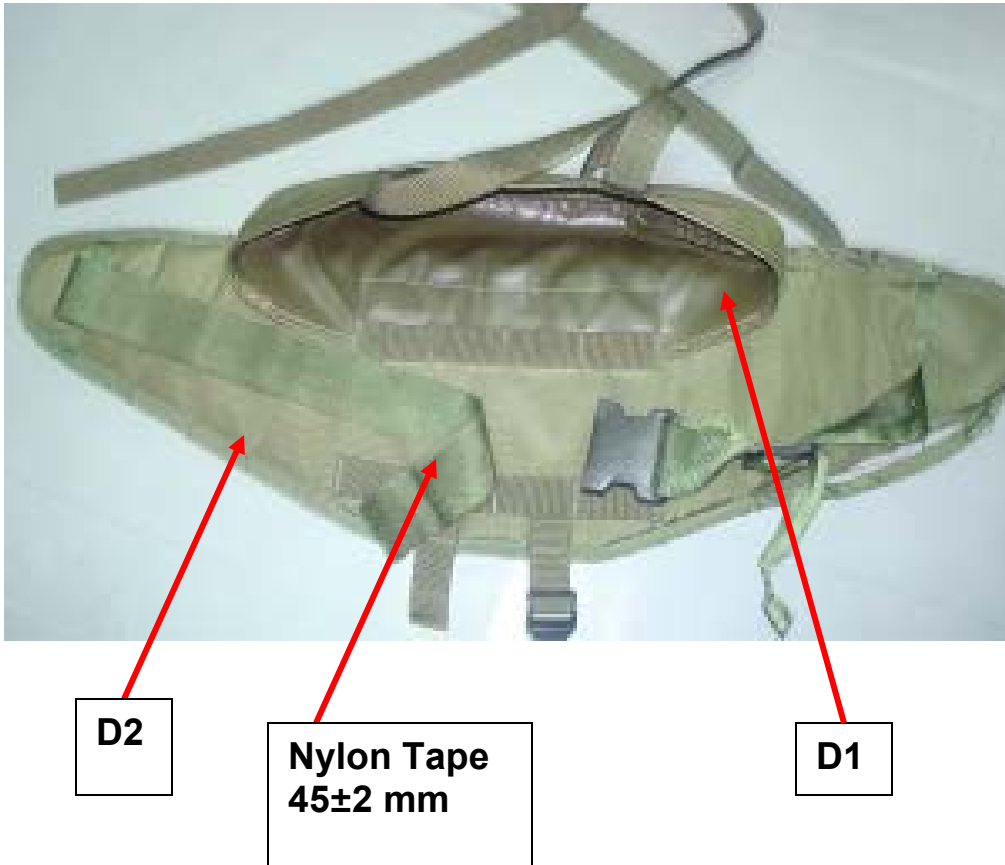


Fig. 8: Assembly of Component- D

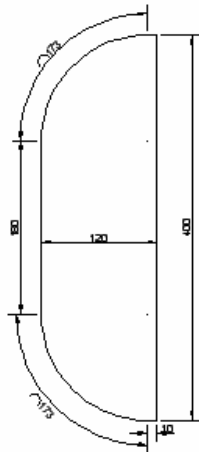


Fig-9A D 1 of Component-D
(All the dimensions are in mm.)

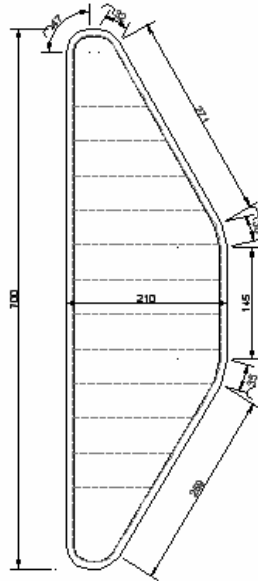


Fig-9B D2 of Component-D
(All the dimensions are in mm)



Foam

Fig. 10: Placement of foam in D2 of component D

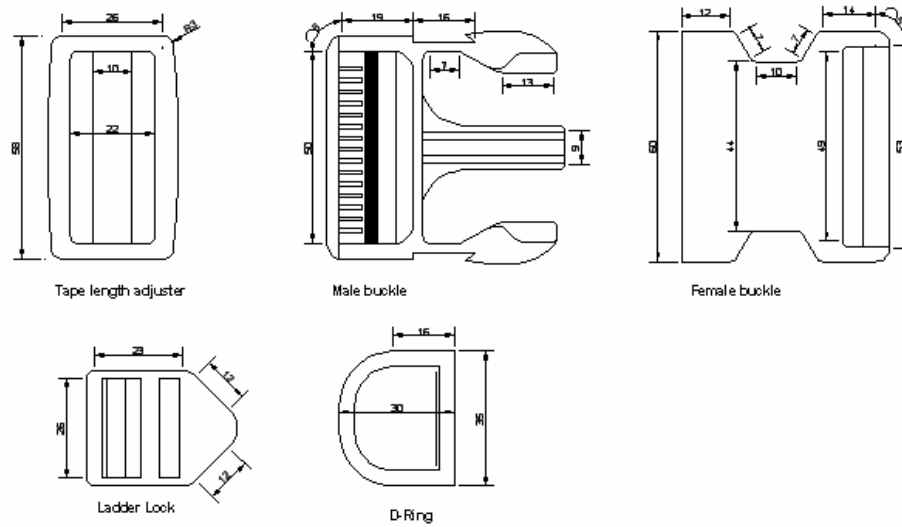


Fig-11 Dimensions of buckle, ladder lock & D-Ring
(All the dimensions are in mm)

B			X	X
F		X	X	
B	X	X		
F	X			X
	F	B	F	B

Fig -12 Nylon Tape 45mm wide - Weave repeat
(F-Face, B-Back)

- Note:**
- The weave repeat completes on 151 ends and 4 picks.
 - The weave is based on 2/2 twill as shown above which is repeated 19 times and then reversed.
 - One pick in the weave repeat represents two picks in the fabric.
 - The fabric to be woven on needle loom.

B	X	X	X			X
F			X			X
B	X		X	X	X	
F	X				X	
	F	B	F	B	b	b

Fig -13 Nylon Tape 25mm wide - Weave repeat
(F-Face, B-Back, b-Binding)

Note:

- One pick in the weave repeat represents two picks in the fabric.
- One end in the weave repeat represents two ends in the fabric.
- The fabric to be woven on needleloom.

Annex-1

Identification of polyurethane coating

Take approximately 5 g of the coated fabric. Treat it with 50 ml glacial acetic acid .by warming for several minutes. To this add 0.1 g p-dimethamino benzaldehyde. The solution is further heated for 2-3 minutes. The solution turns yellow indicates presence of polyurethane.

Annex-2

Identification of low density polyethylene foam

Low density polyethylene foam can be identified by the following tests:

- It shall float in water
- It shall dissolve in hot toluene and hot benzene
- Its melting point shall be in between 109°C and 125°C.

Annex-3

Determination of pull load of quick release Buckle plastic

The buckle shall be tested for pull load by applying load between male and female part of the buckle at a speed of 100 mm/minute.