

‘EXPRESSION OF INTEREST ‘

CRPF is in process to purchase of Full Body Protector for its CRPF Units.

2. The QRs/Specification of said item is attached herewith.

3. The firms/parties dealing in subject matter are invited to submit their views by 28/11/2016.

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REVIEW OF QRs/SPECIFICATION & QUALITATIVE REQUIREMENT OF FULL BODY PROTECTOR

Sl. No.	Nomenclature	QRs/ Specifications approved by MHA vide letter No.L.VII-54/10-12-Prov-R dated 13/11/2013	Revised QRs/ Specification proposed by Sub Group members of CAPFs
A	B	C	D
1	Full body Protector	Full body Protector	<p><u>Full Body Protector</u> (With consist of Chest protector, Shoulder guard, Upper Arm guard, Elbow & Fore Arm guard, Thigh/Pelvic guard, Groin guard and Shin guard)</p>
2	Material	Cloth jackets of fire retardant drill cloth is required colour and required camouflage/e pattern	<p>Cloth jackets of fire retardant drill cloth:</p> <ul style="list-style-type: none"> • Outer fabric shall be made of Flame retardant (FR) 100% cotton cloth. The mass (GSM) shall be $230 \pm 5\%$ • The flame retardant fabric shall pass the following criteria when tested in accordance to ISO 15025 (Method A: Surface ignition and Method B Edge ignition). <p>Test of Method as per ISO 15025 will be as follows:</p> <p><u>ISO 15025- Method A:</u></p> <ul style="list-style-type: none"> • No specimen shall suffer flaming to the top or either side edge. • No hole formation • No flaming or molten debris • The mean value of after flame and afterglow time shall be ≤ 2 s <p><u>ISO 15025- Method B:</u></p> <ul style="list-style-type: none"> • No specimen shall suffer flaming to the top or either side edge, • No flaming or molten debris • The mean value of after flame and after glow time shall be ≤ 2 s

3	Colour	As required-plain/disruptive/ camouflage pattern	As required plain/disruptive/camouflage/CRPF pattern /RAF pattern.
4	Weight	5.950 kg \pm 10 %	\leq 6.5 kg (Total weight of all parts)
5	Size	Small/ Large/ Extra Large (The description is given here for large size)	Sizing : Medium size can be made 10% smaller than the “prescribed size” and the extra large can be made 25% larger (applicable to all measurements except the total weight).
6	Life	6 Years	06 Years already authorized by MHA vide Dy. No. 88095/Fin.III/II dated 24/08/2011.
7	No. of Sample	-	02 Nos samples are require for physical test and field trial.
8	Properties	<p><u>Properties</u></p> <ul style="list-style-type: none"> Physical protection against brick batting cane/knife/acid attacks Molotov cocktails and projectiles encountered in Riot situation and other policing functions. Special fire retardant, high impact resistance rubber inserts. Protective sheets for front and back pouches with trauma pads. <p>Sweat absorbing mesh fabric(detachable & Washable) in lined elbow and shin guards ergonomically formed to protect limbs during riot/mob situation.</p> <ul style="list-style-type: none"> Impact attenuation(reduction) above 80%. Ergonomic design for maximum wearing comfort. Thoroughly tested by leading NABL laboratories engaged in research in physiology and bio-engineering with certificate to that effect. Design ensures restraint free movement long shelf life, light weight with excellent Protection capability. 	<ul style="list-style-type: none"> Physical protection against brick batting/ cane/knife/acid attacks Molotov cocktails and projectiles encountered in Riot situation and other policing functions. The test standard is to be covered in VPAM KDIW, 2004: Edition-18/05/2011 Impact attenuation (reduction) above 80%. Lab test as per W5 level of VPAM KDIW, 2004: Edition-18/05/2011 Ergonomic design for maximum wearing comfort Adjustable straps fastening with durable elastic &Hook & Loop fastener Material should have number of small holes for proper ventilation. (To be checked/tested by Board of Officers). <p>1) Anti Stab:- Specification should include specific Stab or Puncture agent. The specification as per VPAM KDIW 2004:18/05/2011 Level K-3 as per Section 5 to 7.</p> <p>2) Anti Puncture:- (Hypodermic Syringe Needles).Test will be follow as per VPAM KDIW 2004:18/05/2011 Section-7 (Class-1).</p> <p>Vendors should produce the Certificate of Compliance to Test Norms from the labs under mentioned.</p>

A	B	C	D
			<p>3) Anti Impact : Anti impact resistance for 100 Jule as per VPAM KDIW 2004 Edition 18/05/2011 class-W5 (stone/ brick, hard cane, hockey stick.).</p> <p>Angular missiles cover of VPAM KDIW 2004 Edition 18/05/2011 (Section-8)</p> <p>4) Fire Resistant Test : The test in accordance to ISO 15025 , Method A: Surface ignition and Method B: Hedge ignition.</p> <p>5) Temperature:- The suit should be able to with stand temperature of - 20°C to + 55°C ($\pm 5^\circ\text{C}$) and relative humidity below 95% atleast for 05 hours.</p> <p>The vendors should produce the Certificate of Compliance to Test Norms.</p> <p>This test is performed by various LABORATORIES that can be DONE by the vendors, e.g.:</p> <ul style="list-style-type: none"> i) Centre for Fire, Explosives and Environment Safety, DRDO, Lucknow Road, Delhi-54. ii) IIT, Delhi. iii) ATIRA, Ahmedabad iv) NITRA Delhi and any other NABL approved laboratories having scope for parameter above.

9	CHEST PROTECTOR		<p>STANDARD</p> <p><u>Front plastic shield (Ref . Fig. 01)</u> Length : 40 cms \pm 5% & width : 39 cm \pm 5%,</p> <p><u>Back plastic shield (Ref . Fig. 02)</u> Length: 42 cms \pm 5% & width : 31 cm \pm 5%,</p> <p><u>Front padding (Ref . Fig. 03)</u> Length(with groin pad) : 60 cms \pm 5% Width : 43 cm \pm 5%,</p> <p><u>Rear padding : (Ref . Fig. 04)</u> Length : 50 cms \pm 5% & width : 55 cm \pm 5%,</p> <p><u>Neck pad – Size</u> Diameter outer: 30 cms \pm 5%, Circumference : 92.5 cms, \pm 5%, Thickness : 2.5 to 3.5 cms</p> <p><u>Weight Standard / Large size: 2.820 kg \pm 5%</u> (with neck pad and shoulder pad) Thickness of front & Back plastic shield 4 mm \pm 5%</p>
		<p>a) Up to 4.5 mm\pm 10% thick poly foam.</p> <p>b) Inner lining made of mesh fabric (Detachable & washable) with sweat absorbing lining 2mm\pm10% thick foam with specified (16-22) shore a hardness and engineered plastic certified from a NABL lab.</p> <p>c) Weight:- Less than 3.00 kg</p> <p>d) Material- High quality unbreakable engineered plastic for front and back pouches with trauma pads.</p> <p>e) High impact resistant rubber insert to absorb trauma.</p> <p>f) All sandwiches paddings of soft plastic with EVA (Ethylene and vinyl Acetylene based polymer) foam or any other technically better test proven material, should have number</p> <p>g) Inter stitchable so as to remain in place and not slip.</p>	<p>a) Shore hardness “A” (16-22), thickness of poly foam 4.5 mm \pm 5%. To be tested in NABL laboratory, report to be submitted.</p> <p>b) Inner lining made of anti microbial sweat absorbing cloth.</p> <p>c) 2 mm \pm 5% thick foam with specified (16-22) shore hardness and good quality plastic between sandwich padding.</p> <p>d) Material- High quality breakage resistance plastic shield.</p> <p>e) All sandwiches padding’s have minimum 4 layers of soft plastic and EVA. (Ethylene and vinyl Acetylene based polymer),foam.</p> <p>f) Inter stitchable so as to remain in place and not slip</p> <p>g) Neck protection /Collar Fire Resistant fabric.</p>

A	B	C	E
10	Elbow & Fore arm Guard	<p>a) High protection engineered soft plastic outer shell or any other NABL proven superior material should provide flexibility required for forearm and elbow.</p> <p>b) Shock absorbing poly foam with minimum specified (Minimum 5mm) thickness an black mesh (detachable & washable fabric) lining which offers comfort and breathability.</p> <p>c) Adjustable straps fastening with durable elastic and Velcro.</p> <p>d) High protection engineered soft plastic of minimum specified standard thickness (Preferably 2.5-3.5 mm) so that it does not lose its flexibility with higher padding or any other NABL proven superior material.</p> <p>e) Inter stitchable so as to remain in place and not slip.</p> <p>f) All sandwiches paddings of soft plastic with EVA (Ethylene and vinyl Acetylene based polymer) foam or any other technically better test proven material should have number of small holes for free movement of air.</p>	<p>Length : 37 cm \pm 5%, (<u>Ref . Fig. 08</u>)</p> <p>Width : 27 cm, \pm 5%,</p> <p><u>Elbow shield :</u></p> <p>Elbow shield : length -13 cm & width: 18 cm \pm 5%, (<u>Ref . Fig. 05</u>)</p> <p>Forearm guard plastic shield outer length : 17.0 cm & width: 16 cm \pm 5% (<u>Ref . Fig. 06</u>)</p> <p>Forearm guard plastic shield Inner: (length: 17 cm & width – 9.5 cm \pm 5% (<u>Ref . Fig. 07</u>)</p> <p>a) Poly foam , EVA upto 5 mm Thickness</p> <p>b) Inter stitchable so as to remain in place and not slip</p> <p>c) Plastic with matt surface of 3 – 4 mm thickness</p> <p>d) Upper Arm guard should be flexible for easy wearing.</p> <p>e) Elbow guard attached with fore- arm guard should be flexible for easy movement.</p> <p>f) Hook & Loop fasteners</p>

A	B	C	D
11	SHIN GUARD	<p>a. Made of soft engineered plastic or any other NABL proven superior material</p> <p>b. Elastic stripes for easy wearing</p> <p>c. Velcro closure</p> <p>d. Sweat absorbing mesh fabric Poly foam 10 mm \pm 10% hardness</p> <p>e. Inter stichable os as to remain in place and not slip.</p> <p>f. All sandwiches paddings of soft plastic with EVA (Ethylene and Vinyl Acetylene based Polymer) foam or any other technically better test proven material, should have number of small holes for free movement of air.</p> <p>g. The fabric should be detachable & washable.</p>	<p>Length : 55 cms \pm 5%. (<u>Ref . Fig. 11</u>)</p> <p>Width: 27 cms \pm 5%.</p> <p>a. Made of soft plastic and EVA, Foam.</p> <p>b. Elastic stripes for easy wearing</p> <p>c. Hook & Loop fasteners closure</p> <p>d. Outer Lining : Fire retardant cloth and thickness of Poly foam , EVA not less than 8 mm</p> <p>e. Inter stitchable as to remain in place and not slip.</p> <p>f. Knee plastic length from outside 14 cm \pm 5%, Width from outside 25.0 cm \pm 5% (<u>Ref . Fig. 09</u>)</p> <p>g. Shin Plastic length from outside 26 cm \pm 5%, Width from outside 27 cm \pm 5%. (<u>Ref . Fig. 10</u>)</p> <p>h. Design for optimum movement, fit and comfort suitable to human body parts shape.</p> <p>i. Thickness of shin plastic shield 3.5 mm \pm 5%.</p> <p>j. Thickness of Knee plastic shields 5 mm \pm 5%.</p>

A	B	C	E
12	UPPER ARM	<ul style="list-style-type: none"> a. High protection engineered soft plastic or any other NABL proven superior material with Sweat absorbing mesh fabric (Detachable & Washable) inner protection with a unique flexible design for optimum movement, fit and comfort suitable to human body parts shape. b. Velcro fixed. c. Inter stichable so as to remain in place and not slip. d. All sandwiches paddings of soft plastic with EVA(Ethylene and vinyl Acetylene based polymer) foam or any other technically better test proven material, should have number of small holes for free movement of air. 	<p>Length: 17 cm \pm 5% (Ref fig.12 for plastic shield dimension) Width: 22 Cms\pm 5%,</p> <ul style="list-style-type: none"> a. High protection soft plastic inner protection with a unique flexible design for optimum movement, fit and comfort Suitable to human body parts shape. b. Hook & Loop fasteners closure c. Inter stichable so as to remain in place and not slip. d. Soft plastic with EVA(Ethylene and vinyl Acetylene based polymer) , foam.
13	SHOULDER PAD	<ul style="list-style-type: none"> a. Velcro fixed b. High protection engineered soft plastic or any other NABL proven superior material with a unique flexible design for optimum movement, fit and comfort c. Poly foam preferably 3mm thickness with specified (35-40) Shore A harness and black mesh fabric that covers the chest and back. d. High protection engineered soft plastic with shock absorbing EVA Polyfoam cushioning the shoulder. e. Inner lining made of mesh sweat obsorbing fabric (detachable & washable). f. Inter stichable so as to remain in place and not slip. g. All sandwiches paddings of soft plastic with EVA (Ethylene and vinyl Acetylene based Polymer) foam or any other technically better test proven material, should have number os small holes for free movement of air. 	<p><u>Plastic shield (Ref . Fig. 14)</u> Length : 11 cm \pm 5 % & width : 19 cms \pm 5% (weight included with chest protector)</p> <ul style="list-style-type: none"> a. Hook & Loop fasteners closure b. Soft plastic design for optimum movement, fit and comfort. c. Poly foam above 8 mm thickness with specified 16-22 Shore harness. d. outer lining fire retardant cloth e. Soft plastic with shock absorbing EVA , Poly foam Cushioning the shoulder. f. Inter stichable so as to remain in place and not slip. g. Thickness of plastic shield 3 mm \pm 5%

A	B	C	E
14	GROIN	<p>a. Section has an outer shock absorbing Sweat absorbing mesh fabric (detachable & Washable) padding (plastic/EVA/ poly foam) along with hard shell cap or any other NABL proven superior material.</p> <p>b. The protection attachment should cover the groin area from all ricocheted projectiles and allow a comfortable sitting.</p> <p>c. Inter stichable so as to remain in place and not slip.</p> <p>d. All sandwiches paddings of soft plastic with EVA (Ethylene and vinyl Acetylene based Polymer) foam or any other technically better test proven material, should have number of small holes for free movement of air.</p>	<p>Length : 20 cms \pm 5% & width : 40 \pm 5% cms (Ref. Fig.19)</p> <p>a) Padding section : shock absorbing : Plastic / EVA/ Poly foam.</p> <p>b) Shell cap : Hard shell cap.</p> <p>c) Making : The protection attachment should over groin in area from all ricocheted projectiles & allow comfortable sitting.</p> <p>d) Inner stitch : Stitched as to remain in place and not slip.</p> <p>e) Groin guard : Groin guard must have segmented shall be attached with chest protector.</p> <p>f) Inter stitch so as to remain in place and not slip. The groin guard will be attached with chest protector with Velcro. (Drawing attached with chest protector inner pad)</p>
15	THIGH GUARD AND PELVIC GUARD	<p>a. Thigh guard must be supported by kamarbandh to avoid slippage while running and during movement.</p> <p>b. High protection engineered unbreakable plastic of 2.5 to 04 mm thickness on thigh section.</p> <p>c. EVA (Ethylene and vinyl Acetylene based Polymer) foam or any other technically better test proven material with minimum 4.5 mm thickness and mesh lining (detachable & washable fabric) for comfort and breathability.</p> <p>d. Adjustable straps fastening with durable elastic and Velcro.</p> <p>e. Length – 146.5\pm10%</p> <p>f. Inter stichable so as to remain in place and not slip. A fire retardant drill cloth (detachable & washable fabric) jacket with fire retardant and polycarbonate inserts in front and back pouches. Two shin guards having high resistant unbreakable plastic inserts.</p> <p>g. All sandwiches paddings of soft plastic with EVA (Ethylene and vinyl Acetylene based Polymer) foam or any other technically better test proven material, should have number of small holes for free movement of air.</p>	<p>a) Length : 50 cm \pm 5%, (Ref . Fig. 18)</p> <p>b) Waist: 85 to 110 cms.</p> <p>c) Must be supported by kamarbandh to avoid slippage while running & during movement.</p> <p>d) Material: High protection unbreakable plastic.</p> <p>e) Adjustable straps: Adjustable straps fastening with durable elastic & Hook & Loop fasteners</p> <p>f) Thickness of plastic material 3 mm \pm 5%</p> <p>g) Thickness of EVA , foam : 5 mm minimum.</p> <p>h) Material : Outer fire retardant fabric</p> <p>i) Inter stitch : stitch as to remain in place and not slip</p> <p>j) Thigh guard & pelvic guard : Thigh guard & pelvic guard should be attached and flexible & easy to wear / movement.</p>

TRIAL DIRECTIVE OF FULL BODY PROTECTOR

Sl. No.	QRs/ Specifications approved by MHA vide letter No.L.VII-54/10-12-Prov-R dated 13/11/2013	Revised QRs/ Specification proposed by Sub Group members of CAPFs																																			
1	<p><u>TRIAL WILL BE CONDUCTED ON THE FOLLOWING TEST</u></p> <p>01. PHYSICAL TEST : The dimension will be measured physically as per tender enquiry and mentioned in the following table.</p> <table border="1" data-bbox="352 505 1039 1040"> <tbody> <tr> <td rowspan="3">Chest protector</td> <td>Length</td> <td></td> </tr> <tr> <td>Thickness</td> <td></td> </tr> <tr> <td>Weight</td> <td></td> </tr> <tr> <td rowspan="3">Elbow pad</td> <td>Length</td> <td></td> </tr> <tr> <td>Thickness</td> <td></td> </tr> <tr> <td>Weight</td> <td></td> </tr> <tr> <td rowspan="3">Shin guard</td> <td>Length</td> <td></td> </tr> <tr> <td>Thickness</td> <td></td> </tr> <tr> <td>Weight</td> <td></td> </tr> <tr> <td rowspan="3">Shoulder pad</td> <td>Length</td> <td></td> </tr> <tr> <td>Thickness</td> <td></td> </tr> <tr> <td>Weight</td> <td></td> </tr> <tr> <td rowspan="3">Thigh guard</td> <td>Length</td> <td></td> </tr> <tr> <td>Thickness</td> <td></td> </tr> <tr> <td>Weight</td> <td></td> </tr> </tbody> </table>	Chest protector	Length		Thickness		Weight		Elbow pad	Length		Thickness		Weight		Shin guard	Length		Thickness		Weight		Shoulder pad	Length		Thickness		Weight		Thigh guard	Length		Thickness		Weight		<p>01. <u>TRIAL METHODOLOGY</u></p> <p>Physical Test : The dimension will be measured physically as per appendix-C.</p> <p>a) Troops in the field are likely to be hit on their trunk by the same missiles which hit their shields. Hence the body protector must also be able to protect against the same stones. A man who is wearing the body protector must be assured that his floating ribs shall not break should a stone hit him there. Even in a game like cricket when one dons the pads, it is assured that the shinbone shall not fracture even if a 100 mph delivery were to hit it.</p> <p>b) When objects are thrown to test the protection offered by the body protector, we cannot make a man wear it because he runs the risk of getting injured by glass pieces etc. Hence testing in respect of missiles shall be done by making a man sized dummy wear it and missiles thrown at it from the ranges prescribed for the shields. Body Protectors will therefore be tested by throwing various objects from 45 yards, 25 yards and sticks wielded with two hands from a close distance.</p> <p>c) The dummy shall be weighted to make its weight about 70 kg to bring it close to an average man. After throwing the missiles, the dummy shall be observed closely to assess the effect of the impact.</p>
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<p><u>Trial Methodology</u> Troops in the field are likely to be hit on their trunk by the same missiles which hit their shields. Hence the body protector must also be able protect against the same stones. A man who is wearing the body protector must be assured that his floating ribs shall not break should a stone hit him there. Even in a game like cricket when one dons the pads, it is assured that the shinbone shall not fracture even if a 100 mph delivery were to hit it.</p> <p><u>Trial parameters</u> When objects are thrown to test the protection offered by the body protector, we cannot make a man wear it because he runs the risk of getting injured by glass pieces etc. Hence testing in respect of missiles shall be done by making a man sized dummy wear it and missiles thrown at it from the ranges prescribed for the shields. Body Protectors will therefore be tested by throwing various objects from 45 yards, 25 yards and sticks wielded with two hands from a close distance. The dummy shall be weighted to make its weight about 70 kg to bring it close to an average mans. After throwing the missiles, the dummy shall be observed closely to assess the effect of the impact. <u>Resistance to corrosive substances and fire shall be ascertained in the manner prescribed for the PC shield.</u></p>	<p>02. <u>RESISTANCE TO IMPACT TEST:</u></p> <p>a) Anti Stab/Anti puncture Specification should include specific Stab or Puncture agent. The specification as per NIJ (National Institute of Justice) : NIJ Standard 0115.00 level 1 & 2 certified.</p> <p>The body protector should show puncture resistance of individual penetration depth of 0(zero) mm when pierced with impact energy of 24 Joules at surface impact angle of 90° and overlap impact angle 60°. Vendors should produce the Certificate of Compliance to Test Norms.</p> <p>Anti Impact : Angular Missiles/Strike Objects) /Anti wallop (Hard Hitting using stone/brick, hard cane, hockey stick, etc.)</p> <p>To be checked by Board of Officers</p> <p>Fire Resistant Test :To be flame resistant when tested as per PROBAN-95257. It is suggested that the vendors should produce the Certificate of Compliance to Test Norms only from the following accredited organization as mentioned against para-3 properties of appendix-‘A’.</p>
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<p>However, there is one critical parameter for which we will have to make a man wear it. There may be situations in which the rioters come so close as to hit a man with a stick. We avoided testing the stick on the helmet because in the case of failure of the product, the wearer could have been perhaps fatally wounded in the head. But a hit from a stick on the body can be taken even if the product does not perform well. The stick prescribed for the shield shall be used here also. The policeman would wear the body protector and the other policeman would wield the stick on him with two hands in difference parts of the body protector 25 times on each part of the protector.</p> <p>The effectiveness of the concerned part of the body protector will be judged by the pain felt on that part. The pain should be tolerable by a average man.</p> <p>Certificate Test - Any NABL (National Accreditation board for testing and calibration Laboratories) Approved laboratories tests or certificates regarding quality of the standard of materials used and technical parameters may be verified during product delivery as per practice in vogue.</p>	<p>Trial Philosophy : The purpose of the Full body protector is to protect the policeman from the various types of missiles that are thrown at him by the rioters most commonly. Such missiles range from stones or similar pieces of bricks/concrete, pieces of glass and glass bottles, acid bulbs/bottles containing sulphuric acid used in storage batteries and hydrochloric acid used for toilet cleaning purposes and burning rags/bicycle tyres and Molotov Cocktails/firebombs made basically by petrol/diesel/kerosene. The rioters may also attack the policeman with various types of wooden/bamboo sticks and bicycle chains that would not be thrown but would be wielded by hands on coming close to the policemen. The Full body protector must be able to provide him adequate protection from all such threats.</p> <p>Testing Parameters : The FBP shall be done by making a man sized dummy, wear it and then missiles would be thrown on it. In other words, the FBP shall be fitted with the dummy. The structure supporting the device that holds the FBP shall be sufficiently heavy (70 Kg to simulate a man's body weight) so that the impact of the missiles is absorbed largely by the FBP and not transferred to the dummy. A real man cannot be allowed to wear the FBP because in case the device fails or if the thrower misses his mark, the man could be injured.</p>
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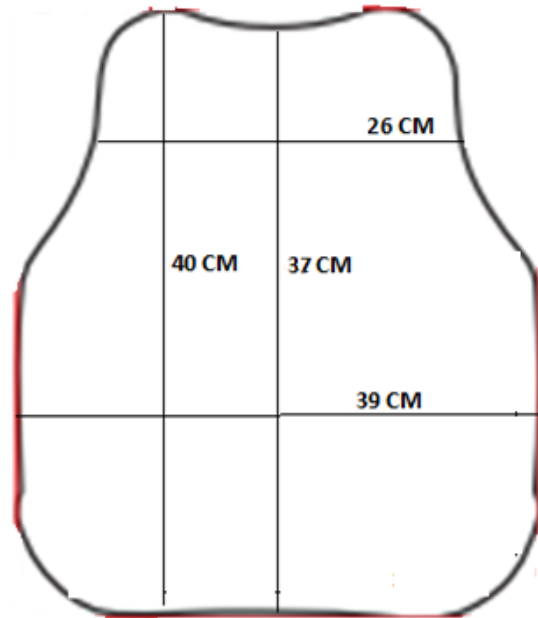
	<p>Stones-Pieces of bricks/concrete : In real life, people throw stones that vary from 100gm to 500gm. For the purpose of this directive, the board has actually weighed pieces of stones and compared them with the pieces that we have collected from those that the unlawful assemblies/rioting have thrown at us at various places in the country. There are photographs available in which they have been found throwing stones that could be as heavy as 8-10 kg. But such stones are usually thrown against vehicles and we may ignore them for personnel. The board finds that pieces weighing above 150 gm are eminently suited by their size to be thrown with maximum speed. A piece of stone weighing 150 gm is typically less than 6cm x4.5 cm x 3.5 cm in size. It fits in the hand so well that it lends itself excellently to be thrown with maximum speed. The rioters, of course, throw bigger as well as smaller pieces also. We will ignore them in the test. But we will use pieces of bricks and concrete of 150 grams.</p> <p>The next question that arises is the speed with which the stones are thrown. Ideally a speed radar must measure speeds but that may be impractical in our circumstance as it would not be easily available to us. However, there are simple ways of estimating speeds with sufficient accuracy. More important for us is to simulate real life conditions. The simplest method for this purpose is range. The board has observed in numerous riotous situations that the rioters are able to throw such stones at up to 75 yards range. But 45 yards range is more common. Stones of 150 grams would therefore be thrown by our men (since all of them uniformly possess a prescribed minimum bodily strength and fitness as determined from various standard tests at 45 yards with two hopping steps run up because the rioters are also seen using this technique most frequently. (to be checked by board of officers))</p>
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	<p>Pieces of glass/glass bottles : The Weight of the pieces of glass/glass bottles would also be limited to 150 grams. They will be made by breaking ordinary plate glass and glass bottles. Since throwing them with bare hands may be risky, the throwers can use leather gloves. (to be checked by board of officers)</p> <p>Acid bulbs/bottles: Since it is potentially dangerous for throwers to use acid bulbs (the rioters are desperados in comparison), the acid resistance of the FBP shall be determined by pouring the acids of the type described above on the FBP and observing the outcome. Time of contact will be 30 minutes because in real life, a policeman who gets attacked by these may not get time up to 30 minutes to withdraw from the scene and clean the Full body protector. (to be checked by board of officers)</p> <p>Burning rags/Bicycle tyres/Molotov Cocktails/Firebombs: Burning rags are thrown by rioters attached on a stick. Burning bicycle tyres or pieces thereof are thrown solo. A Molotov Cocktail or firebomb is a glass bottle with a combustible fluid such as petrol/diesel/kerosene filled inside to some capacity and the rest filled with rags which are lighted and thrown. In India we have so far not encountered the use of gelled fuel and hence we shall not be testing for that. In any case, the purpose is to check fire resistance. The resistance to a bottle or its pieces has already been covered above. Hence the FBP need only to be exposed to the fire of burning rags soaked in petrol/ diesel/ kerosene, and burning bicycle tyres. Since in real life the policeman is supposed to fend it off as soon as possible, the time of contract will be limited to 10 seconds. (to be checked by board of officers)</p>
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DIMENSIONS MEASURED FROM OUTER SIDE

Figure – 1

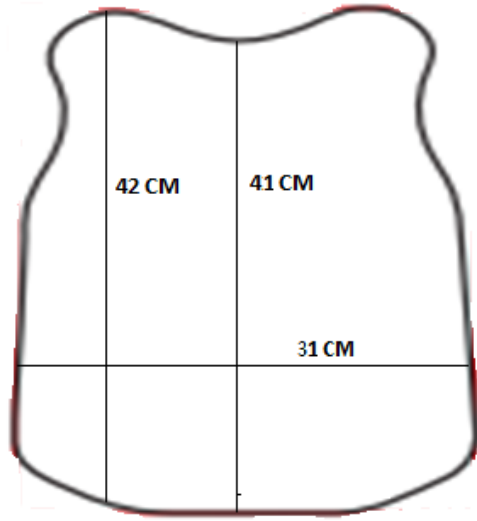
PLASTIC SHIELD (FRONT)



Thickness of Plastic shield - 4 mm \pm 5%

Figure – 2

CHEST GUARD PLASTIC SHIELD (BACK)



Thickness of Plastic shield - 4 mm \pm 5%

Figure - 3

CHEST GUARD INNER PAD (FRONT)

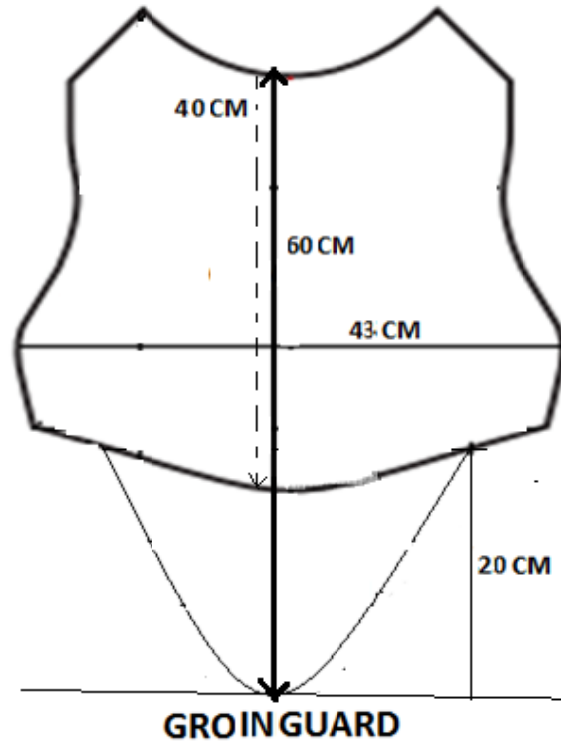


Figure – 4

CHEST GUARD INNER PAD (BACK)

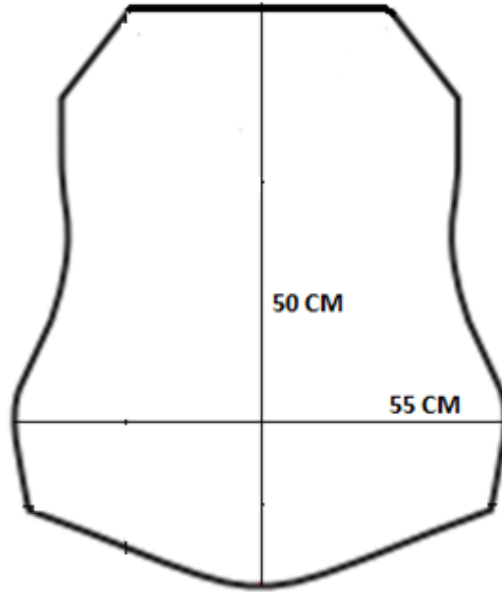
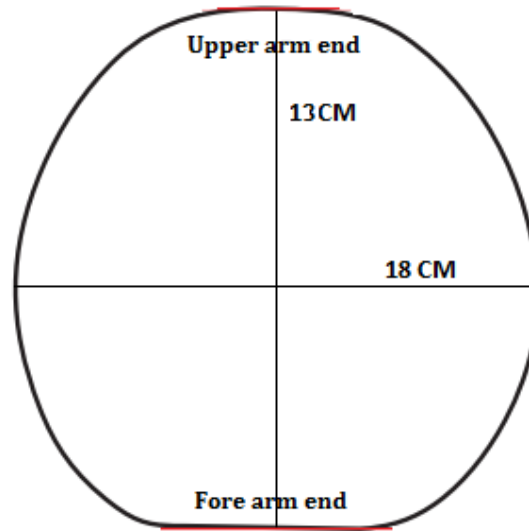


Figure – 5

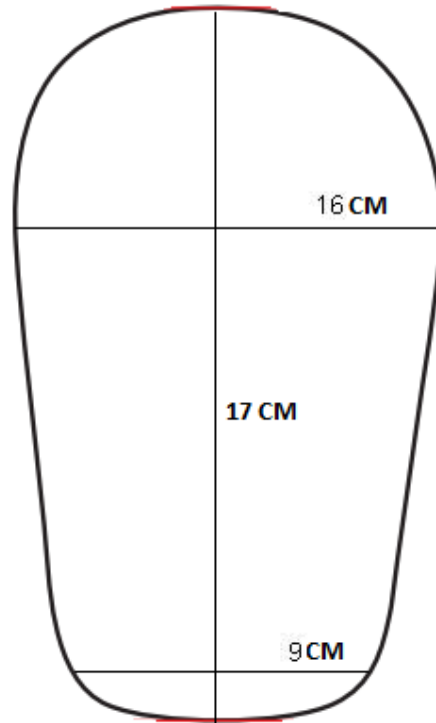
ELBOW GUARD PLASTIC SHIELD (UPPER)



Thickness of Elbow Guard plastic shield - 3 – 4 mm

Figure - 6

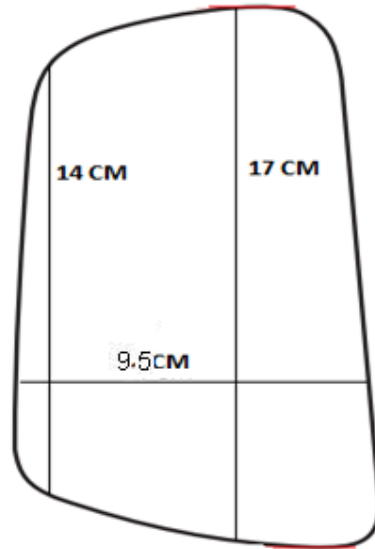
FORE ARM GUARD PLASTIC SHIELD



Thickness of Forearm Guard outer plastic shield - 3 – 4 mm

Figure - 7

FORE ARM GUARD PLASTIC SHIELD (INNER SIDE)



Thickness of Forearm Guard inner plastic shield - 3 – 4 mm

Figure - 8

ELBOW AND FORE ARM GUARD INNER PAD

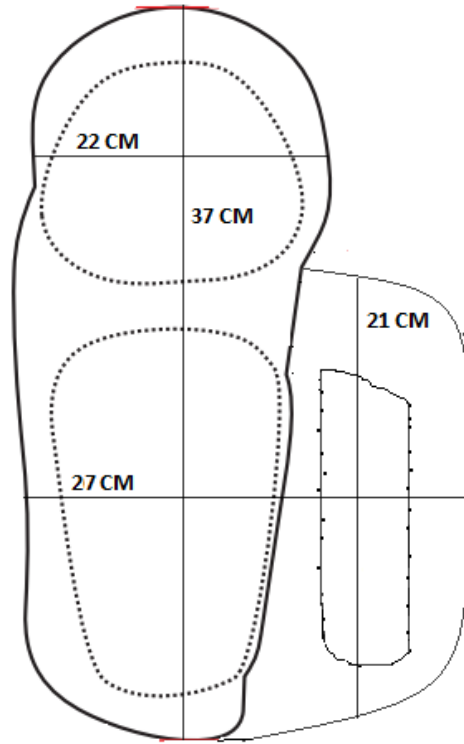
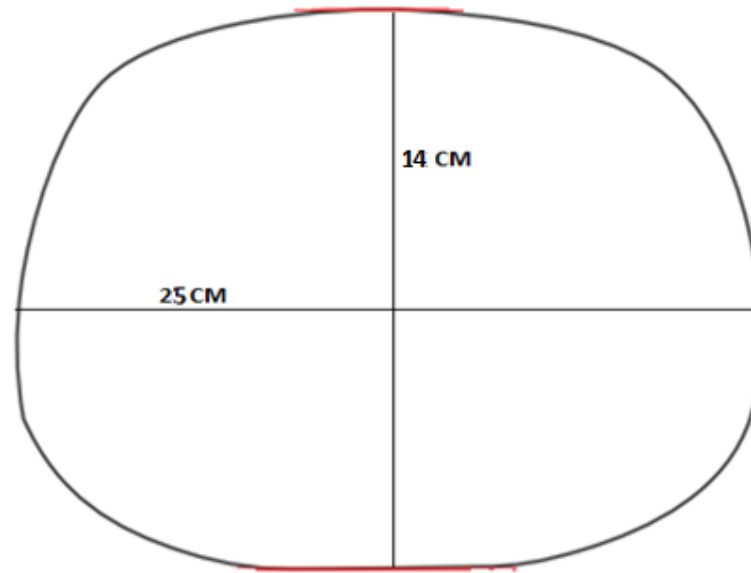


Figure - 9

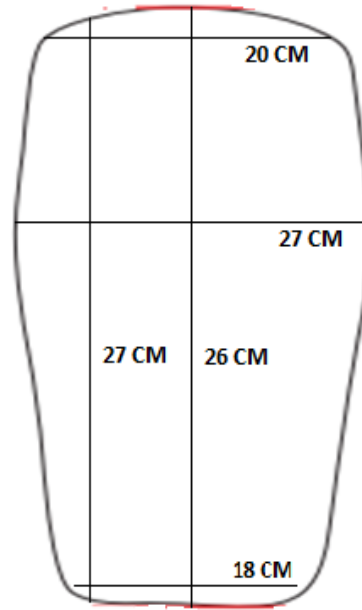
KNEE GUARD PLASTIC SHIELD



Thickness of Knee Guard plastic shield - 5 mm \pm 5%

Figure - 10

SHIN GUARD PLASTIC SHIELD



Thickness of Shin Guard plastic shield – 3.5 mm \pm 5%

Figure - 11

SHIN GUARD INNER PAD

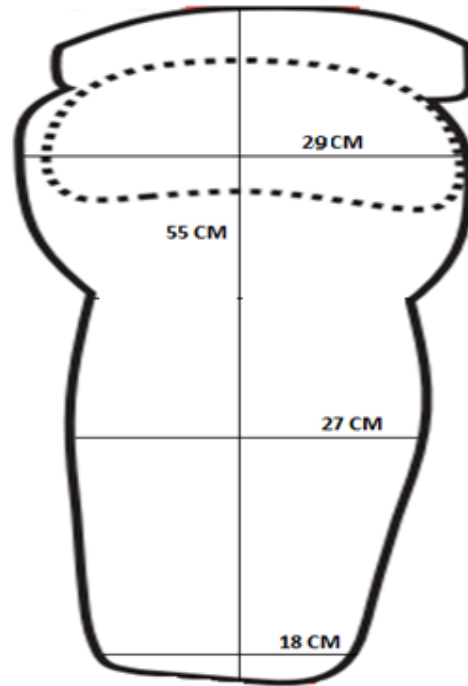


Figure - 12

UPPER ARM PLASTIC SHIELD

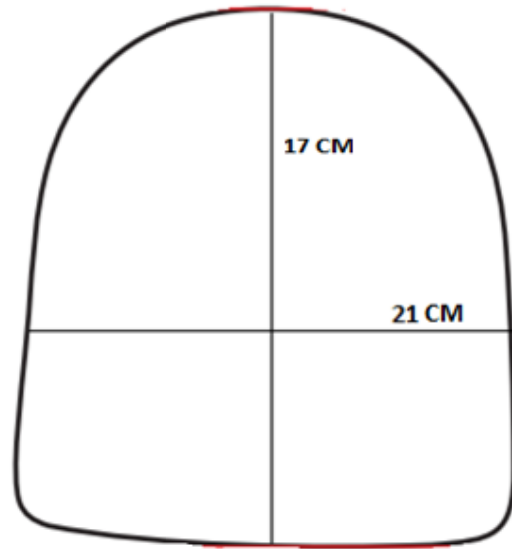


Figure - 13

UPPER ARM GUARD INNER PAD

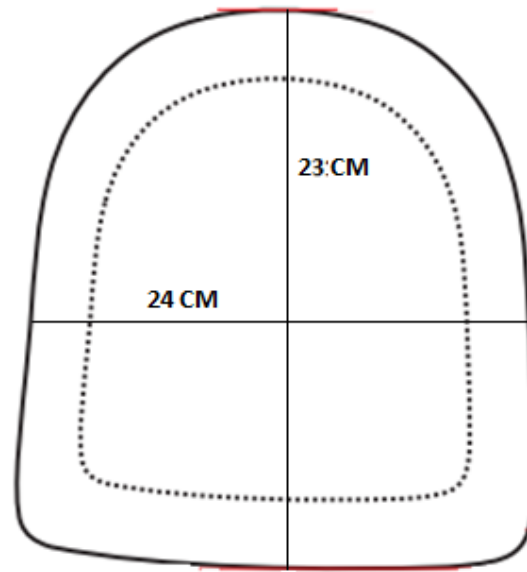
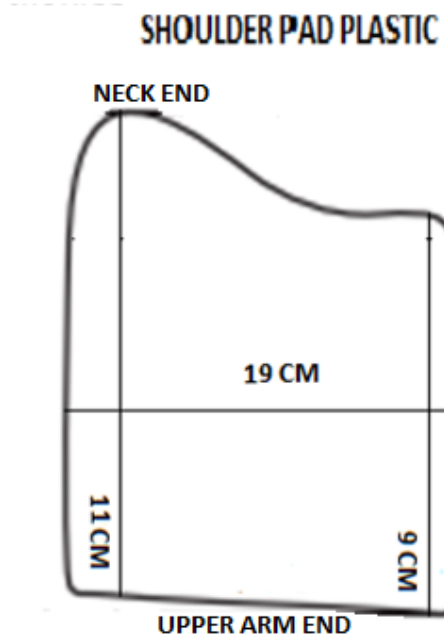


Figure – 14



Thickness of Shoulder pad plastic shield – 3 mm \pm 5%

Figure – 15

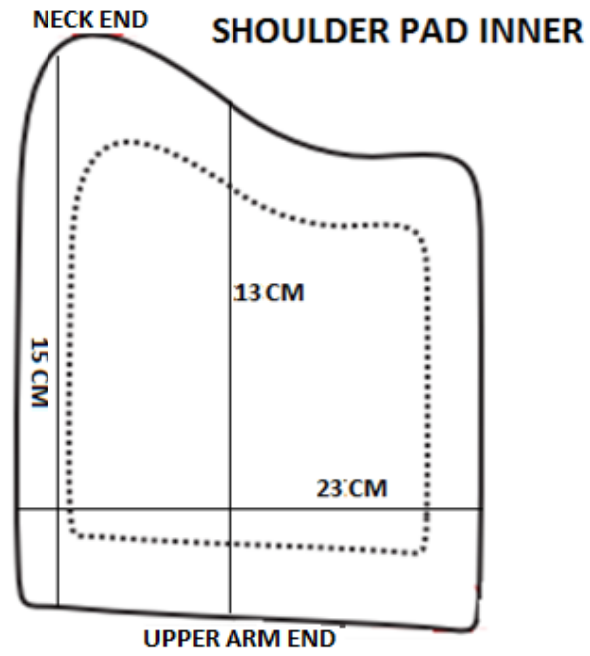
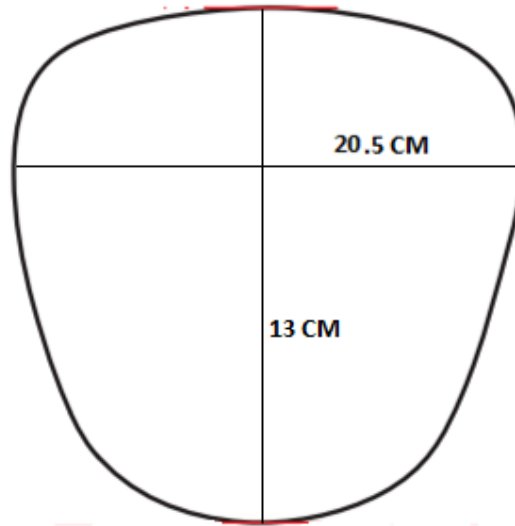


Figure – 16

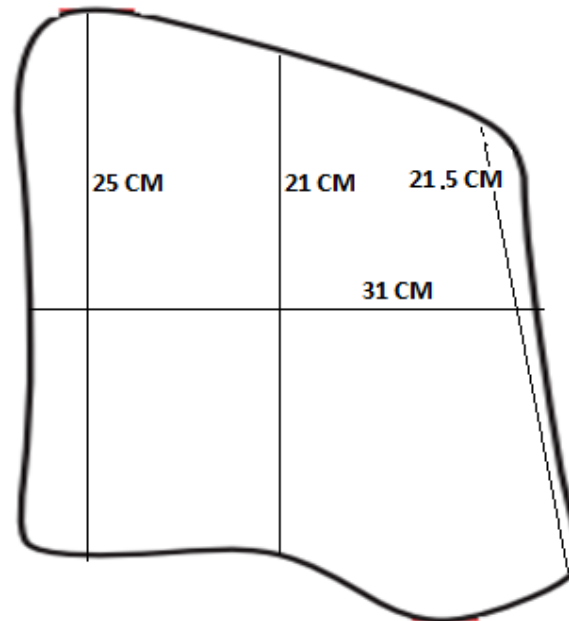
**PLASTIC SHIELD PELVIC GUARD
(THIGH GUARD WAIST)**



Thickness of Pelvic Guard plastic shield – 3 mm \pm 5%

Figure – 17

THIGH GUARD PLASTIC SHIELD



Thickness of Thigh Guard plastic shield – 3 mm \pm 5%

Figure – 18

THIGH GUARD INNER PAD

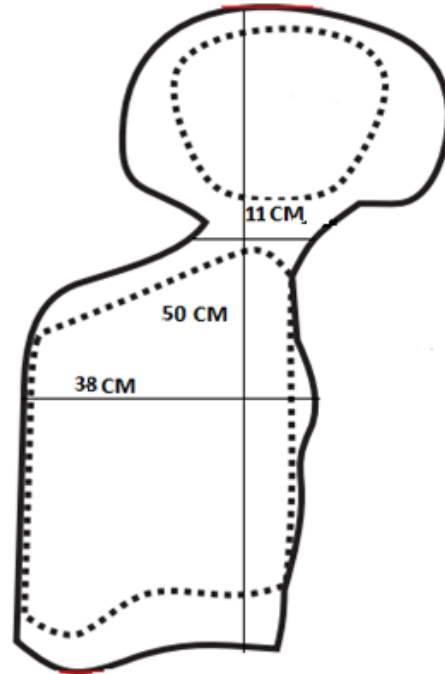


Figure – 19

**CHEST GUARD INNER PAD (FRONT)
WITH GROIN GUARD**

