

‘EXPRESSION OF INTEREST ‘

CRPF is in process to purchase Riot Control Helmet with accessories for its Units

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

3. The firms/parties dealing in subject matter are invited to submit their views by __04/06/2017..

Contract Person:-

RAJEEV KUMAR THAKUR
DY. INSPECTOR GENERAL OF POLICE (Provisioning)
DTE. GENL., CRPF,
LODHI ROAD, NEW DELHI
PH: 011- 24360155
FAX: 24360155
EMAIL: digprov@crpf.gov.in

REVIEW OF DRAFT SPECIFICATION/ QUALITATIVE REQUIREMENT OF RIOT CONTROL HELMET WITH ACCESSORIES

Sl. No.	Nomenclature	MHA Approved QRs	Proposed suggestions by Sub Groups
01	Helmet	<p align="center">-</p> <p>Colour- As required by the user.</p> <ul style="list-style-type: none"> • Glass Reinforced plastic material/or any other Accredited Test Laboratory. • Design based on personal Armour system Ground Troops (PASGT)/totally protective and comfortable to wear • Selectable, adjustable and comfortable • Snap fit and quick release chin strap • Scratch proof, Shatterproof, transparent polycarbonate Visor fitted with retched(Openable)system. • Provides excellent protection against projectiles, blunt hit encountered during riot situation. • Inner fabric should be detachable & Washable. • Designed developed and ballistically tested by any National Accredited Laboratory for calibration and testing. • Wt:- Less than 2.5 Kg including all detachable items. 	<p>1. <u>SCOPE/ INTRODUCTION</u></p> <p>Helmet is the most important protective equipment for a person deployed for handling riotous situation. It is required to protect him/ her when facing crowds during demonstrations/ processions and while dealing with riotous mobs. Helmet have to protect the head, face, neck and eyes from injuries due to impact, blow from blunt objects, brick batting, lathi blow, stone pelting, projectile/missiles, acid bulbs, Molotov cocktails and industrial chemical thrown at them. A high standard helmet is therefore required for policeman.</p> <p>As intensity of such law and order conditions are different in different parts of the country, helmets may also be different degree of protection in different part of country/situations.</p> <p>Helmet for riot police has to be light weight with shock absorption capabilities, flip down visor with clear visibility, neck protection with thick padding good quality fabric/material and fire resistant etc. for handling crowds with varying degree of hostility. Visor is required to be reinforced by wire meshing to deal with intense stone pelting.</p>

	<p>a. PC Visor</p>	<p>a. 2.6mm to 4.5mm thickness, scratch proof/scratch resistant. b. Moveable, Adjustable, Detachable and Comfortable c. Anti-fog visor: 20° - 50° incline d. Light Transmission rate of visor note less than 85% e. Attached Metal net (Detachable): Wt. less than 600gm f. Its life should be upto 50% visibility and not less than 02 years.</p>	<p>In view of above, it is imperative to have one basic helmet shell with visor, without wire mesh, chin strap including fixing mechanism and other items like front and rear neck guard. Wire meshing over visor could be provided for additional protection for intense stone pelting situations. Considering above aspects, QRs of riot control helmets are proposed under following categories :-</p> <p>2. Nomenclature:</p> <p>Following two type of Riot control Helmets will cater to different intensity of operational requirements.</p> <ol style="list-style-type: none"> 1. Riot Control Helmet (Basic) with (visor without wire mesh). 2. Riot Control Helmet (Advanced) with (visor with wire mesh). <p>The only difference between these two helmets will be on specifications of Visor.</p>
	<p>b. Shell</p>	<p>a) Material: ABS (anti buta-di-ene poly-styrene)/Fibre reinforced plastic (FRP) or any other NABL proven superior material b) Round shape shell with comfortable interior cushion padding about 2 cm ± 10% with breathe-holes for air circulation. c) Adjustable and comfortable harness should be detachable & washable.</p>	<p>3. Basic parts of Riot Control Helmet(as per drawing)</p> <p>a) Shell : This includes chin strap, visor without wire mesh including fixing mechanism, Front and Rear neck protection, rubber beading at the edge of helmet and protective as well as comfort padding.</p> <ol style="list-style-type: none"> 1. Shape – Round shape Open face . 2. Weight – 1600 grams Maximum (For weight purpose Shell includes padding, PC Visor without wire mesh, Chin strap, Rubber beading , Front and Rear Neck Protection).
	<p>c.EAR Guard</p>	<p>d) Top Thickness: 5mm ± 10% e) Side Thickness: 04mm ± 10% f) Weight: 1.60kg ± 10%</p> <p>a) PC/ABS/Fibre reinforced plastic or any other NABL proven superior material with air circulation.</p>	<p>3. Size - Medium - 48 to 57 Cms Large – 58- 62 Cms</p> <p>4. Thickness- Not less than 03 mm with negative tolerance of 5%.</p> <p>5. Padding Thickness:</p> <ol style="list-style-type: none"> i) Protective padding thickness not less than 10 mm and the Weight cannot be less than 150grams.

	d. Chin Strap	<p>b) Side thickness: 3.5mm \pm 10%</p> <p>a) Sung/Snap/Strip fit and quick release chin strap. b) Soft and comfortable on skin.</p>	<p>ii) Material-Virgin EPS iii) Comfort padding thickness - not less than 10 mm, Material – GSM - 100 \pm 5%, Fabric 100 % polyester, Circular knitted and anti bacterial, Fire retardant.</p> <p>6. Colour - As per requirement 7. Life - 06 Years 8. The shell should confirm to following tests as per IS 9562-1980 :</p> <p>i) Shock Absorption Test ii) Penetration Resistance: iii) Rigidity test iv) Water absorption test v) Flammability resistance vi) Firing Test</p>
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	MISCELLANEOUS	<p>A) Anti-bacterial Cloth(Treated) or any other NABL proven superior material should be used for inner lining. A certificate to this effect will be provided from a govt. accredited laboratory.</p> <p>B) PE(Poly Ethylene) inner layer against cutting and stabbing</p> <p>C) Quick release buckle</p> <p>D) Design based on personal Armour System Ground Troops (PASGT)/totally protective and comfortable to wear.</p> <p>E) Side holes to make hearing easier and back holes for better ventilation.</p> <p>F) Provides excellent protection against projectiles encountered during RIOT situation with comfortable Swat absorbing, Mess Fabric head padding or any other NABL proven superior, material.</p> <p>G) Additional & Essential Features: Protection of Neck- A semi-circular fire and water resistant pad to provide cover protection to sides of the neck and back protection of cervical from stones and projectile attacks.</p> <p>H) Neck curtain should be fire resistant fabric/artificial</p>	<p>b) <u>P.C. Visor (Without wire mesh) as per drawing:</u></p> <p>It should be made Concave at the bottom for easy lifting and proper air ventilation and the upper edge of the visor should have rubber beading to prevent any tickle down of harmful chemical etc on the face. The length of visor should cover the chin of the wearer while the width should cover the whole frontal face.</p> <p>1. Thickness - Not less than 02 mm with a negative tolerance of 5%</p> <p>2. Weight - 300 gram Maximum (includes the weight of fixing mechanism). This weight will be applicable only when Visor is procured separately for replacement.</p> <p>3. Visibility - 85% Minimum with a negative tolerance of 5%</p> <p>4. Life - 02 years.</p> <p>It should conform to following tests:-</p> <p>1) Impact strength (As per IS 9995-1981,Appendix-A.1.5) 2) Flammability (As per IS 9995-1981,Appendix-A.1.9)</p>
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		leather of EPF (Expanded Polythene Padding Foam)/ Polyfoam that can avoid smell and fungal infection or any other NABL proven superior material.	3) Light Transmission(As per IS 9995-1981, Appendix-A.2.5) 4) Penetration test as per IS standard 9562-1980.
		A) Capable of protecting personnel against brick batting, stone pelting Molotov cocktails, acid bottles and cane attack etc. B) Ventilation should be proper. C) Designed to connect with ear/head phone and gas mask. D) Tested by leading NABL certified laboratory for its parameters and material used in construction/fabrication. E) Shatter proof, transparent PC Visor, Scratch resistant fitted with ratchet (Openable)system F) Rust proof metal pivot for opening and closing of visor.	c) <u>P.C. Visor (With wire mesh):</u> It should be made Concave at the bottom for easy lifting and proper air ventilation. Visor will have same specification as indicated at 'b' above. However, it will have additional wire mesh fixed on this visor as per following specifications. <ol style="list-style-type: none"> 1. Diameter of wire - 02 – 03 mm 2. Uniform Gap between visor and wire mesh -1.5 cm \pm 0.2 cm wire mesh should not be more than 25 mm X 20 mm 3. Weight of wire mesh – Maximum 400 grams.(weight is inclusive of fitment mechanism) 4. Life – 03 Years. Weight of Riot Control Helmet (Advance) will be accordingly 2000 grams as it will have additional 400 grams for wire mesh on visor and strength of fixing mechanism.
			d) <u>Chin strap</u> <ol style="list-style-type: none"> 1. Thickness - Not less than 1.5mm\pm 0.15 mm 2. Width - 21 \pm 0.5 mm 3. Length - Not less than 300 mm(including the tensioning and adjusting device) 4. Breaking load - above 500 kg. 5. Buckle/ Chin strap should confirm to strength of

			retention system and dynamic retention test (IS 9562 – 1980)
			<p>e) Neck Protector(as per drawing).</p> <ol style="list-style-type: none"> 1. Neck protections (front and rear) should be of such measurement so as to cover the gap between helmet and body protector to provide protection to the neck, collar bone and the cervical area of the wearer. 2. Front Protector - Depth from the bottom of the shell it should cover the chest. 3. Rear Protector- Depth from the bottom of the shell it should cover the cervical area
			<p>4. Material :</p> <p>a) Shell:</p> <ol style="list-style-type: none"> i) Material of shell should be high impact virgin ABS with IZOD impact strength (at 6.4 mm notching) of 43 kg cm/cm at 23°C and 29 kg cm/cm at - 30° C. or material of parallel impact strength at other notching. ii) It should have appropriate air/sound vent. Conforming to audibility test of 10db over a frequency of 250 to 2000 Hz. iii) Provision for proper ventilation. iv) Rubber beading material shall be 100% EPDM (Ethylene Propylene Diene Monomer) with a tensile strength of 60 Kg f/cm², hardness 70-72 shore 'A', and the ask content should be 15% max. v) Protective padding of shell should be as under : <ol style="list-style-type: none"> a) Should b able to sustain impact and provide thermal Insulation. b) Should be soft and comfortable. c) Should be made of virgin material EPS.

			<p>vi) Comfort padding should be soft comfortable, sweat absorbing anti bacterial & flame retardant with following foam specification :</p> <ul style="list-style-type: none"> a) Density- 32 Kg / meter³ ± 2 b) Cell size - ≥ 70 PPI c) Tensile strength - ≥ 0.85 KgF / cm square d) % of elongation - ≤ 150 e) Hardness value @ 50% compression = 26 kg/323 cmsqre ± 5% <p>vii) It should be made of following material specification:</p> <ul style="list-style-type: none"> a) Weight of PVC cotton coated fabric should be 570 GSM ± 5% and breaking load warp 18 kg /5cm and weft 11kg/5cm. b) EVA padding thickness should be 10mm (+ 0.8/-0.5) c) Hardness - 29 ± 3 (Shore A) d) Density – 100 ± 8% kg/ m³
			<p>b) PC Visor without wire mesh</p> <p>Material - Virgin polycarbonate</p> <ul style="list-style-type: none"> i) Should be scratch resistant from outside and anti fog from inside. ii) Should be movable adjustable and comfortable. iii) Incline 20° – 50°. iv) Light transmission rate not less than 85% with negative tolerance -5% v) Should be bubble free and dust free.

			<ul style="list-style-type: none"> vi) Pivot kit should be rust proof, corrosion resistant and should have locking system for closing and opening. vii) Rubber beading material of the upper edge shall be 100% EPDM with a tensile strength of 60 Kg f/ cm², hardness 70-72 shore 'A', and the ash content should be 15% max.
			<p>c) <u>PC Visor with wire mesh</u></p> <ul style="list-style-type: none"> i) Material of P.C Visor will be similar as given (b) above. However, Material of wire mesh fixed on PC visor will be stainless steel with powder coated for anti rusting and anti reflection. ii) The weight of complete helmet with visor fixed with wire mesh will be 2000 gm (Max.)(1600 + 400 gm).
			<p>d) <u>Chin Strap:</u></p> <ul style="list-style-type: none"> i) Adjustable chin strap with two point support and comfortable fit. Buckle should be quick release type. ii) Locking mechanism of the strap should be skin friendly and rugged. iii) Should be made of flame retardant PVC cotton coated fabric and should be washable. iv) Material suited to all extreme weather conditions. v) Locking between the thread should be present

			<p>e) <u>Neck protection front and rear :</u></p> <ul style="list-style-type: none"> i) Material should be able to withstand heavy impact and should provide thermal insulation, and should be comfortable. ii) The material for outer cover should be of virgin material(PVC). iii) The material used for neck protector should be virgin material (EVA). iv) The protector should be detachable. v) The protector should have appropriate cushioning for shock/ impact absorption. vi) Rear neck protector should be attached with the helmet with mil standard CFC Zip. vii) The front neck protector should have an additional support of strap with same specification as chin strap. viii) Front neck protector should be attached with Shell of helmet by appropriate fitting snap fastener (Brass). ix) It should be water resistant, fire retardant and the fabric used should be PVC cotton coated material with sufficient cushioning. x) All stitching on the neck protector (Rear and Front) should be done by fire retardant thread.
			<p>5. Various tests shown in the QR are done at following laboratories. However, tests carried out by NABL certified labs will also be accepted :</p> <ul style="list-style-type: none"> i) ATIRA, Ahmedabad ii) NITRA, Ghaziabad iii) DIPAS/DRDO, New Delhi-54 iv) CIPET, Chennai/ other CIPET Labs. v) Forensic Science Laboratory, Gandhinagar. vi) DMSRDE, Kanpur and any other NABL approved laboratories.

TRIAL DIRECTIVE OF RIOT CONTROL HELMET WITH ACCESSORIES,

Sl. No.	QRs/ Specifications approved by MHA vide letter No.L.VII-54/10-12-Prov-R dated 13/11/2013	Revised TDs proposed by Sub Group members of CAPFs
1	<p><u>Helmet</u></p> <p><u>Trial Philosophy</u></p> <p>We have already discussed the type of missiles which the rioters throw at the police. The same missiles which are supposed to be blocked by the shield can still hit the policeman if thrown simultaneously by more than one rioter from two different directions. His helmet is intended to protect him from serious head injury from such missiles. It may also be noted that rioters may actually come close to a policeman and so close that it would not be possible to wield the shield with enough dexterity to ward off all the blows and the missiles. Hence the protection standards of a helmet have to be necessarily higher and much more stringent than those for the shield.</p>	<p>1. <u>TRIAL PHILOSOPHY:-</u></p> <p>The purpose of the helmet is to protect the policeman from the various types of missiles that are thrown at him by the rioters. 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 tires 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.. Therefore, the helmet must be able to provide adequate head protection from all above threats. It may also be possible that rioters may come close to policemen or policeman may fall on the ground and may not be able to use shield for protection. In such circumstance, protection standard of helmet has to be better than shield.</p>

PHYSICAL TEST

The dimensions will be measured physically as per tender inquiry and mentioned in the following table.

P.C. VISOR WEIGHT	
P.C. VISOR THICKNESS	
SHELL THICKNESS	
SHELL WEIGHT	
EAR GUARD THICKNESS	

Trial Methodology

The Helmet shall be tested primarily in accordance with IS 9652: 1980(reaffirmed 2002 read with IND/GS/1684(b) for non-metal helmet for police force and use the same terminology as used there.

Testing Parameters

- (a) Shock Absorption Test- Helmets shall be tested for shock absorption by the method described below within one minute after subjecting them to conditions specified in Or (b) or (c) given below:

02. Physical Test :

- a) The dimension will be measured physically as per QRs by Board of Officers :

i) Shell

- a) Shape.
- b) Weight.
- c) Thickness.
- d) Rubber beading.

ii) Protective padding

- i) Thickness
- ii) Weight

iii) Comfort padding

- i) Thickness
- ii) Weight

iv) P.C. Visor without wire mesh

- i) Shape
- ii) Ventilation
- iii) Rubber beading
- iv) Length
- v) Thickness
- vi) Weight

- a) A Temperature of $65 \pm 2^{\circ}\text{C}$ for 4 hours in an oven:
- b) A Temperature of $-10 \pm 2^{\circ}$ for 4 hours in a refrigerator: and
- c) Water flowing over the whole outer surface of the shell for 4 hours at room temperature.

Wooden Headform: Conforming to IS: 7692 – 1975.

A Gauge and Recording Apparatus for Measuring Force: The gauge and the associated recording apparatus shall have proper time constant to be able to measure the impact loading up to 40 kN (4000 kgf) independent of the time of application of the force and a slow application of the load required for its calibration. The gauge shall have a minimum stiffness of 5000 kN/mm (50000 kgf/mm). The headform be mounted on the gauge so that its vertical axis coincides with the vertical axis of the gauge.

Accuracy: The over all error of the whole set up including the load measuring and recording system shall be not more than 10 percent.

V) P.C. Visor with wire mesh

- i) Shape
- ii) Ventilation
- iii) Rubber beading
- iv) Length
- v) Thickness
- vi) Weight
- vii) Dia of wire
- viii) Uniform gap between visor and wire mesh, weight including fixing mechanism.

vi) Chin strap

- i) Length
- ii) Width
- iii) Thickness

vii) Neck Protector (Front and Rear)

BOO will check that the neck protection is in conformity with the QRs.

Concrete of similar monolithic block having a minimum height of 1 m length m and width 0.6m, mass 1 ton, shall be used to support the gauge headform, the block shall be bedded on dry sand on a solid floor.

A striker shall be in the form of a rectangular block of wood weighing 4.5 ± 0.0 kg and having a horizontal striking face 180 mm square. The striker shall slide freely and without oscillation down, with two vertical guide wires so positioned that the centre of gravity of the striker lies on the vertical axis of the gauge and both lie in the place of the guide wires.

Method: The helmet shall be placed on the headform. The striker shall be raised to a clear height of $1.8 \text{ m} \pm 5 \text{ mm}$ above the point of contact with the helmet and allowed to fall freely. A photographic or other high speed record of the force transmitted during impact shall be made.

No single helmet shall, however, be subjected to more than one of these conditions and neither of the maximum values of transmitted force obtained shall exceed 20 kN (2000 kgf) and shell shall remain intact, with no cracks extending as far as the edge and through the thickness of the shell.

03. Tests as mentioned in QR for each type of resistance :

Following tests will be carried out by labs.

a) For Shell

1. **Shock absorption test** – As per IS 9562-1980, Appendix-A (Clause 9.1)
2. **Penetration Resistance test**– As per IS 9562-1980, Appendix-B(Clause-9.2)
3. **Rigidity test** - As per IS 9562-1980 Appendix-D (Clause 9.4)
4. **Water Absorption test** - As per IS 9562-1980 Appendix-E (Clause-9.5)
5. **Flammability resistance test** - As per IS 9562-1980 Appendix-F (Clause 9.6)
6. **Firing Test**- As per IS 9562-1980 Appendix-G (Clause 9.7) by Board of Officers or AWS.
7. Buckle/ Chin Strap should be confirm to strength of retention system and dynamic retention as per IS 9562 : 1980

Penetration Resistance: The helmet shall be subjected to the following tests for resistance against penetration within one minute after subjecting to the conditions specified above which has given worst result in shock absorption.

- a) Plate test- When tested in accordance with the method described below, no integral part of the helmet shall fail or stretch permitting the helmet to be forced down over the headform. The shell shall not be dented or pierced though to touch the wooden headform or the cradle.
- b) Plumb-Bob test- When tested by the method described below, no integral part of the helmet shall fail or stretch permitting the helmet to be forced down over the headform. The static measurement of the depth of penetration or dent shall not exceed 10 mm.

Method for Plate Test:

Mount the helmet on wooden headform (See IS: 7692- 1915) and then drop a steel plate 300 mm square and 6 mm in thickness with its place vertical from a clear height of 3.0 m so that one side of the square strikes the top of the crown of the helmet. Examine the helmet for denting or piercing, failure of any integral parts, etc.

b) For Visor without wire mesh

1. **Impact Strength test** – As per IS: 9995-1981, Appendix-A (Clause-3.1 A-1.5)
2. **Flammability test** – As per IS 9995-1981, Appendix-A, (Clause-3.1 A-1.5)
3. **Light Transmission test** – As per IS 9995-1981, Appendix-A (Clause-3.1 A-1.5)

04. Certification:

Certification should be done by laboratories mentioned in **para No.5 of QRs/** specification Appendix-A or NABL (National Accreditation Board for testing and calibration Laboratories) approved laboratories. In case laboratories mentioned are not able to carry out these tests for vendors and NABL are not available, vendors will carry out testing in house/ other reputed labs of above parameter. However, indenter will carry these lab tests from above labs/ NABL lab only.

Method for Plump Bob test

Mount of the helmet on the headform and drop freely cylindrical steel striker weighing 2 kg, 32 mm in diameter and having at its lower end a conical point with an included angle of 36° maximum tip radius of 0.5 mm, from a clear height of 1 meter to strike the top of the crown of helmet Examine the helmet for piercing, denting of failure of any integral parts.

Strength of Retention Systems: Helmet shall be tested for their retention system by the method given below and it shall not fail under the maximum loading of 0.5 kN (50kgf) and the total extension as measured between the preload of 0.25 kN (25 kgf) and the maximum load of 0.5 kN (50kgf), shall not exceed 10 mm.

Method for test:

The helmet is placed on the appropriate headform with the chin strap fastened over a device approximating to the shape of the bony structure of the lower jaw.

This shall consist of two metal roller each 12.5 ± 0.5 mm in diameter and at 76 ± 0.5 mm centres apart. The helmet shall be supported on the head form so that the points of attachment of the chin strap to the shell will be subjected to the same test as the strap itself.

After applying a preload of 0.25 kN (25 kgf) for not less than 30 seconds an additional load of 0.25 kN (25 kgf) shall be applied to the device retained by the chin strap at a uniform rate of 1 kN (100kgf) per minute. After 2 minutes at the maximum load the elongation of the retention system is determined by measuring the vertical distance between reference point on the device and on top of the helmet shell, and comparing this distance with that obtained under preload at 30 seconds interval.

Rigidity Test: Helmet when tested by the method prescribed below the maximum deformation shall not exceed the initial deformation by more than 40 mm and the residual permanent deformation shall not exceed 15 mm.

Method for Rigidity Test

Apparatus for press with two parallel Metal Plats: They are arrange so that the distance between them could be determined within \pm 1 mm.

One helmet shall be tested along its longitudinal axis and the other along its transverse axis. In both cases the helmets shall be positioned between the two parallel plated by means of which the initial load of 30 N (3 Kgf) shall be applied to the helmet shell. After 2 minutes, the distance between the plates shall be measured. The load shall then be increased to 630 N (63 kgf) by increment of 100N (10 kgf) every 2 minutes and maintained at that level for e minutes, after which the distance between the plates shall be measured again. The load applied to the plates shall then be reduced to 30 N (3 Kgf) and maintained at this level for 5 minutes.

The distance between the plates shall be measured again. The difference in distance between the plates when the load was increased from 30 to 630 N (3 to 63 Kgf) and the . difference in distance between the plated when the initial load of 30 n (3 Kgf) was applied and the final load of 30 N 3(kgfd) was applied shall be reported for both the longitudinal and transverse direction.

Water Absorption Test: Helmet shall be tested for water absorption in accordance with the method specified below. They shall not absorb water more than 5 percent of their mass.

The sample which have been used for shock absorption ((a) above therein) shall be used for carrying out his test. Cut three pieces, 25 X 50 from the shell. Coat the cut edges of each with wax or sealing compound weigh th specimens and then immerse them for 24 hours in water at a temperature of $27 \pm 2^{\circ}$ C. Remove them form the water, dry the surfaces by wiping them, and weigh the pieces gain. Report the average gain in mass as a percentage.

Flammability Resistance: When tested by the method described below, there shall be no flaming or visible evidence of flame penetration to the inside of the helmet.

Method for flame Test:

The helmet shall be supported, crown uppermost, on a headform (See IS: 7692:1975). A barthel burner conforming to the requirements given below, is to be brought into contact with the outer surface of the helmet with the flame at right angles at a point of 12 cm below the crown, measured externally, whilst it is rotated steadily through one complete revolution at a speed of 2 rev/Min.

The test shall be carried out with barthel burner conforming to A-1 of IS:4355-1967. The following accessories shall be used with the burner:

- a) Reservoir,
- b) Connecting tube of polyethylene or soft rubber,
- c) Absolute alcohol(ethanol),
- d) Bare copper wire 0.71 mm diameter having a free length of not less than 100 mm, and
- e) Stand to help the reservoir.

The absolute alcohol shall be filled in the reservoir and the tube, air bubbles entrapped in the tube shall be removed by pressing the tube several times. Cotton waste soaked in spirit shall be kept in the cup on the burner and lighted. After a few minutes when the burner is sufficiently heated the regulator of burner shall be turned to allow the spirit to flow in the form of vapour. Burner shall be operated with the value so as to get a flame height of 150 mm. Level of the fuel shall be 760 ± 75 mm above the base of the burner. Satisfactory operation of burner shall be checked by inserting in the flame the bare copper wire of 0.71 mm diameter having a free length of not less than 100 mm in position normally occupied by lower edge of the test piece, that is, 50 mm above the burner and reaching farther edge of the flame. The wire should not take more than 6 seconds to melt

Firing Test: When tested by the method described below, none of the pellets shall penetrate the inner surface of the shell and there shall be no bulging of the inner surface of more than 5 mm.

Method for Firing Test:

Each helmet shall be mounted on a head form (see IS :7692 : 1975) except that it shall be without plates), tightly fastened to securely hold the helmet. Head form shall be firmly secured to the base support or planted securely in a firm ground.

The helmet shell shall be struck by one round of 12 bore, 4 buck cartridge of AF Kirkee fired from a distance of 10 meters front side being the target while aiming horizontally. The gun shall be tested in front and back and another sample for sides.

3. Certification Test- Any NABL (National Accreditation board for Testing and Calibration Laboratories) Approved laboratories tests or certificated regarding quality of the standard of materials used and technical parameters may be verified during product delivery as per practice in vogue.

DIMENSIONS OF RIOT CONTROL HELMET WITH ACCESSORIES

Figure – 1: Para-3

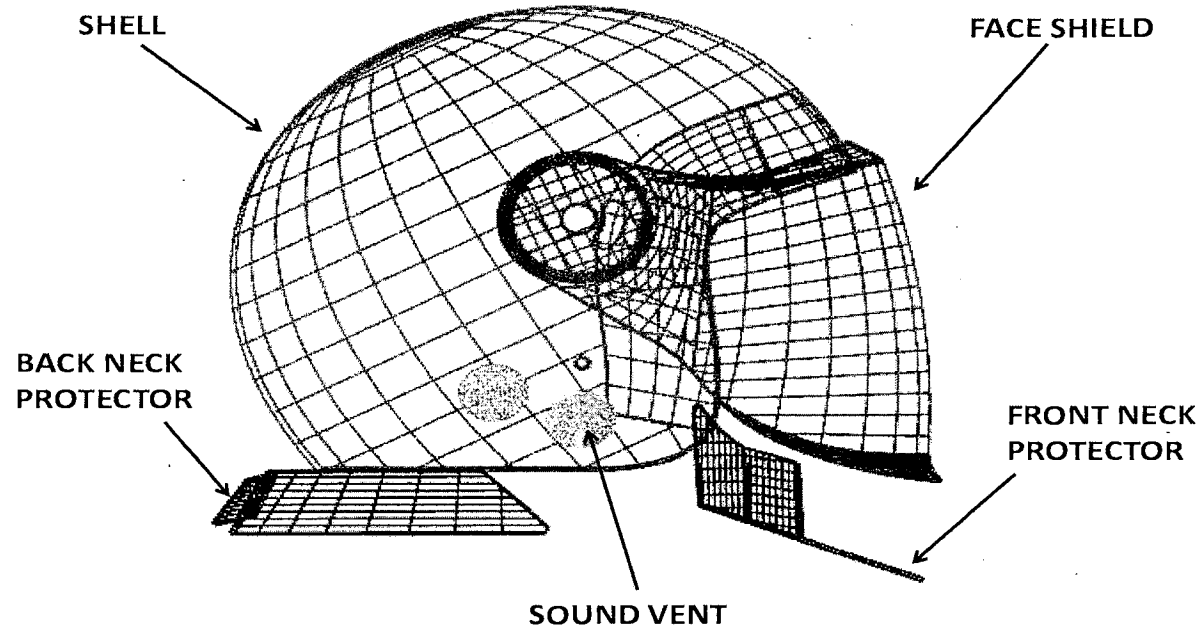


Figure – 2 Para-3(b)

POLYCARBONATE VISOR (WITHOUT WIRE MESH) QRs Para-3(b)

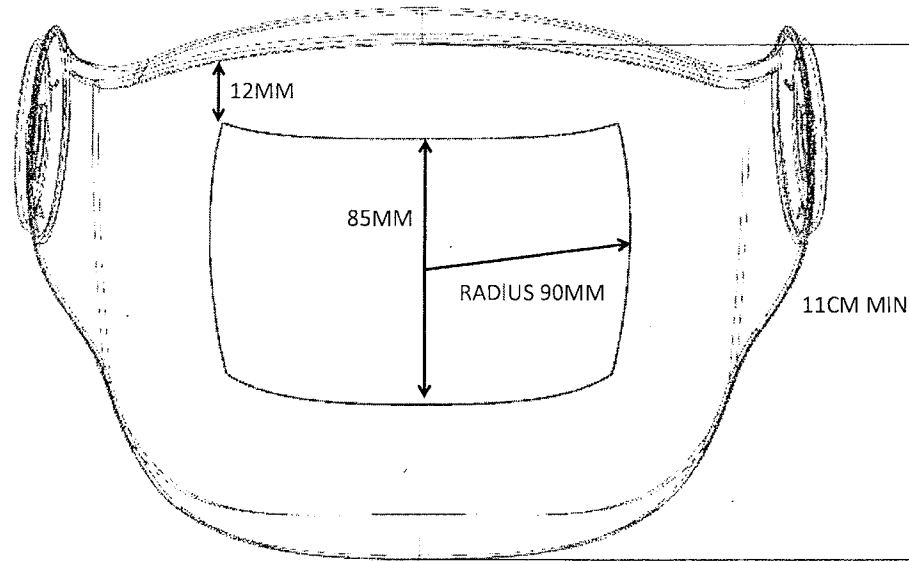
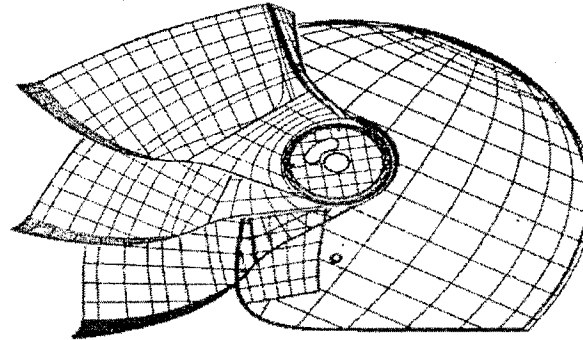


Figure – 3
Concaved shape of visor for easy lifting



CONCAVED SHAPE VISOR PROFILE FOR EASY LIFTING

Figure-4

FRONT NECK PROTECTOR

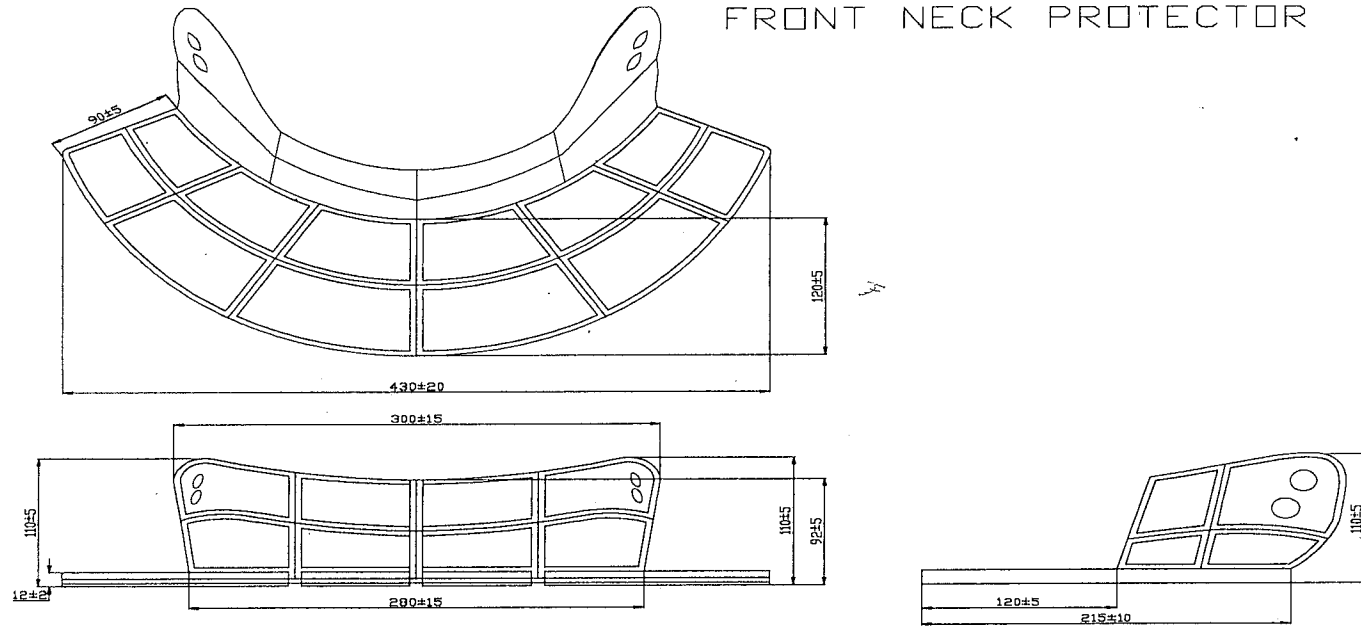


Figure-5

BACK NECK PROTECTOR

