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## EXPRESSION OF INTEREST

Bureau of Police Research & Development, New Delhi is in the process of '**Formulating the Qualitative Requirements (QRs) and Trial Directives (TDs) for Ballistic Shield**'. Based on the various discussions and consultation with representatives of Industries, Academia and users, Bureau has prepared draft QRs & TDs attached as under.

Bureau is looking for valuable comments/suggestions, the interested law enforcement agencies, experts, vendors/raw material suppliers/ suppliers may send their comments/suggestion latest by 11.02.2019 (1200 hrs) at following address :

Director (Modernization), BPR&D,  
National High way-8, Mahipalpur,  
New Delhi-110037

The comments/suggestion may be sent through E-mail ([igmod@bprd.nic.in](mailto:igmod@bprd.nic.in), [digmod@bprd.nic.in](mailto:digmod@bprd.nic.in), [psoweapons@bprd.nic.in](mailto:psoweapons@bprd.nic.in)) or registered post.

For any additional information/clarification on subject matter, the below mentioned officer may be contacted on any working day (0930 to 1800 hrs)

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# QUALITATIVE REQUIREMENTS (QRs) AND TRIAL DIRECTIVES OF BALLISTIC SHIELD

## 1. General

1.1 Ballistic shields are used primarily by law enforcement agencies in situations where there is an expected ballistic threat, including high-risk warrant entry, tactical entry, barricaded subject response, officer/victim rescue, active shooter response, and negotiations. The shield is carried until the ballistic threat is eliminated, and then the shield is discarded, due to its weight, until the mission is completed. Ballistic shields are also routinely used during explosive breaching entry to protect from secondary fragments, such as door and structure fragments, resulting from the explosion. Ballistic shields are sometimes used in suicide bomber approach and explosive device perimeter activities; however, it is suggested/advisable, not to use ballistic shield to get the protection against fragmentation or blast overpressure from an explosive device.

1.2 This standard prescribe the minimum performance requirements of ballistic shields for protection against small arms ammunitions. The scope of these QRs are limited to physical and ballistic evaluation of ballistic shields against in service small arms ammunition used by the Indian Armed Forces, Centre Armed Police Forces (CAPFs) and other Law Enforcement Agencies (LEAs).

1.3 The specifications covers only the basic design of ballistic shields and provide guidelines for its evaluation. Specific requirements in terms of design, protection area, additional attachments, storage arrangements etc. are to be defined by the user organizations.

## 2. Material

2.1 Ballistic shields are usually made from Aramid, Polyethylene, En (steel) material or Composite Materials (with various types of ceramic/steel/steel alloy). If the shield incorporates a view port, the lens is usually made from transparent polycarbonate, acrylic, or similar plastic and bullet resistant glass. In modern ballistic shields, high resolution camera (with recording system), display screen is also being provided to get the frontal view under varied functional and climatic conditions.

*(Note: The manufacturers/suppliers/vendors must submit a declaration of construction of ballistic shield to the user organization during tendering process).*

2.2 The signed declaration (sample) as given below to be submitted to the user organisation

(Insert Company Name here) hereby declare that all ballistic shield produced as model number \_\_\_\_\_ as a result of successful Compliance Testing to (Name of the organization floated the tender) standards will be of the same construction, using the same materials (from the same manufacturers/suppliers) and fabricated patterns as the test sample/s listed above is in accordance with qualitative requirements of (Name of the organization floated the tender).

2.3 *The declaration must be on company-headed paper. In addition a full technical file for the ballistic shield must be submitted detailing the carrier (if required), any handles, fixings and any other accessories. The shield must have a permanently fix label containing the following information*

- Name and legal address of the supplier.
- Address of manufacturing location (city, state/province, country).
- Date of manufacture (i.e., month and year).
- Model number.
- Level of protection.
- Serial number.
- List of components and required accessories provided with the shield.
- Availability of replacement parts.
- Instructions for assembly and precautions regarding installation of attachments or modifications to the shield.
- Mark of conformity indicating certification by an accredited certification body.
- Warranty period.

### 3. Physical/Functional Evaluation

(Table-1)

S.No	Description and Qualitative Requirements	Trial Directives
1.	<p><b>Ergonomics</b></p> <p>(a) The total weight and weight distribution of the shield must not negatively impact the user's ability to perform tasks required during tactical operations.</p> <p>(b) Grips and supports must allow the user to comfortably hold and position the shield.</p>	<p>Board of Officers (BOO)/Committee select five personnel of different ranks and body stature for holding the ballistic shield and undertake them for various tactical positions/movements.</p> <p>Views/comments be obtained from each individual. Based on their comments, BOO/Committee will draw the inferences that shield is not negatively impacting the user's ability while undertaking the various tactical positions/movements.</p>
2.	<p><b>Design Parameters</b></p> <p>(a) Ballistic shield should have an ambidextrous design.</p> <p>(b) Ballistic shield should provide physiologically designed shock absorbing support system with quick release attachment.</p> <p>(c) Ballistic shield should have a quick detachable carry and load bearing integrated system for easy</p>	<p>Board of Officers to check.</p> <p>Board of Officers to check the grips, supports, carrying straps, padding etc. BOO/Committee to ensure all handles and fixing mechanism are securely attached, not damaged and fully functioning.</p> <p>Board of Officers/Committee to check physically and ensure that the ballistic shield does not</p>

	<p>movement and allow the user to keep the hands free for holding and firing the weapon without any discomfort to the user.</p> <p>(d) Ballistic shield should provide on both side weapon barrel resting port to help soldier fire actively while having other hand holding the shield.</p> <p>(e) Solider should be able to change the ammuniton magazine from weapon without losing the ballistic shield protection in front.</p>	<p>rattle when shaken.</p> <p>BOO/Committee to check physically.</p> <p>BOO/Committee to check physically.</p>
<b>3.</b>	<p><b>Workmanship</b></p> <p>Ballistic shield should be free from wrinkles, blisters, cracks or fabric tears, crazing, chipping or sharp corners or other evidence of inferior workmanship.</p>	<p>Board of Officers (BOO) should examine the quality of workmanship of ballistic shield on a large flat clean surface with adequate lighting.</p> <p>If any tear or deformity found, Board of Officers reject the sample.</p>
<b>4.</b>	<p><b>Dimensions &amp; Weight</b></p> <p>As per Appendix 'A'</p>	<p>BOO/Committee will check.</p>
<p><i>Note: The design and dimensional parameters suggested in this QRs may be used by the Law Enforcement Agencies as guidelines. However, user organization may define their own parameters considering their functional/operational requirements.</i></p>		

#### 5. **Operational Aids: Ballistic Shield**

- (a) Should have the provision of High resolution camera with capability to function effectively during day and night.
- (b) Should have display screen on the rear side of the ballistic shield facing the user/soldier to get the real time frontal view.
- (c) Camera should have the facility to record the real time video with storage capacity for 45 minutes.
- (d) Should have the provision of infrared illuminator (**optional**).
- (e) Should have the self-standing capability (eg. Shield with kick stand) (**optional**).

*Note: The design and specifications for camera and other operational aids mentioned above may be defined by the user organizations /Law Enforcement Agencies considering their functional/operational requirements.*

#### 4. **Protection Level**

(Table-2)

Ser No.	Ammunition	Bullet Weight (g)	Bullet type	Impact Velocity (m/s)	Distance of impact (m)
1.	5.56 x 45 mm	3.5- 4.0	FMJ (SI+Pb)	890±15	10±0.5
2.	7.62 x 39 mm	7.45-8.05	HSC	700±15	10±15
3.	7.62x 51 mm	9.4-9.6	FMJ/Pb	840±15	10±15

*Note: FMJ: Full Metal Jacket, MSC: Mild Steel Core, HSC: Hard Steel Core Pb: Lead Core, SI: Steel insert*

#### 5. **Radiographic/Thermographic Test**

X Ray images are to be taken to inspect cracks, delamination or any other defects on the surface of ballistic shield by the testing agency. If any crack or defect found on the surface, Testing Agency will declare the spot as weak point and one shot must be fired on this weak point during ballistic testing. This test will ensure that ceramic layer, if any, is provided evenly up to the edges.

6. **Ballistic Testing (Single Shot Test)**

(Table-3)

Ser No.	Ammunition	Minimum no. of shots (in Nos) at 0°	Minimum range (in Meters)	Impact Velocity (m/s)	Shot to Shot and Edge to Shot Distance (in mm)
1.	5.56 x 45 mm	06	10±0.5	890±15	50
2.	7.62 x 39 mm	06	10±15	700±15	
3.	7.62x 51 mm	06	10±15	840±15	

**Fair hit or Strike:** A fair hit is that which adheres to all the rules set out below:-

- Shots must be a minimum of 50 mm from the edges of the panel for all ammunitions.
- All shots must be a minimum of 50 mm from any other shots.
- The velocity must be within the tolerances set out in Table.

If a shot does not meet these criteria, it will be classed as an unfair hit or strike. Unfair hits or strikes may be accepted according to the criteria for “accepted hit or strike”; otherwise they will be repeated.

**Accepted hit or strike:** An accepted hit or strike will conform to the criteria for a “fair hit or strike”. Unfair hits or strike will also be accepted if;

- The shot is closer than 50 mm to the edges and the bullet is held by the Ballistic Shield but not perforated/ pierced.
- The impact velocity is above the specified test limits and the bullet is held by the Ballistic Shield but not perforated/pierced.
- The impact velocity is below the specified test limits, resulting in a perforation/ pierced.

Any shots that do not meet these criteria will be classed as rejected and must be repeated.

*Notes:*

- *The testing agency should be selected by the user organization/Law Enforcement Agencies.*
- *Discontinuities or Points of apparent weakness must be identified by the testing agencies before ballistic testing, vendors/manufacturers/suppliers must submit a build sheet and diagram/drawing of construction for the shield sample. Testing agency will ensure that any attachments and attachment points of the shield must be tested and demonstrate that protection is not reduced nor any secondary projectile produced.*
- *In view of the above, the pattern of shots shall be defined by the testing agency prior to ballistic testing and the specified pattern of shot must be uniformed for all the samples submitted by vendors/manufacturers/suppliers.*

7. **Ballistic Testing (Multi Shots Test)**

(Table-4)

Ser No.	Ammunition	Minimum no. of shots (in Nos) at 0°	Minimum range (in Meters)	Reference Velocity (m/s)	Shot Pattern
1.	7.62 x 39 mm	10	10±15	700±15	Burst of 2-3 rounds

*Note: The clause of shot to shot and edge to shot shall not be applicable in case of multi shot test. All the shots should be held by the ballistic shield, in case of any perforation/pierced the sample will be considered as failed.*

8. **Wet Test (Optional, and tested against 7.62 x 39 mm, HSC, Multi Shot Test)**

Before the sample is tested it shall be fully submerged in water (at 15° C to 20° C) for a period of one hour. It shall then be removed and allowed to dry for three minutes in a room held at a temperature of approximately 21±5° C, and 50 per cent to 70 per cent humidity. The first burst shall impact within five minutes of the completion of the drying period, and the final burst fired within one hour.

9. **Extreme Temperature Test (Optional, and tested against 7.62 x 39 mm, HSC, Multi Shot Test)**

Before the sample is tested it shall be heated to 50° C±3° C for a period of 1 hour. The first burst should impact within five minutes and last burst fired within one hour of removal of ballistic shield from the heating chamber.

10. **Serviceability:** Five Years operational life.

11. **Storage:** Ballistic Shield should be stored at normal room temperature either hung on brackets or leaned against a vertical surface. In any condition the no weight/pressure should be on the striking face of the ballistic shield. The ballistic shield should not be placed in such a manner that the striking face of the shield is touching the floor/ground.



12. **User Manual:** User manual should be provided by a supplier with each Ballistic Shield containing the following information:

- Identification and description of the type of threat protection provided.
- Design and drawing mentioning all the dimensions and weight.
- Complete construction details.
- Coverage - area of coverage, curvature, and shape of shields.
- Complete details of all accessories and their usability.
- Care and maintenance guidance.
- Accessory wise warranty period.
- Any other relevant information.

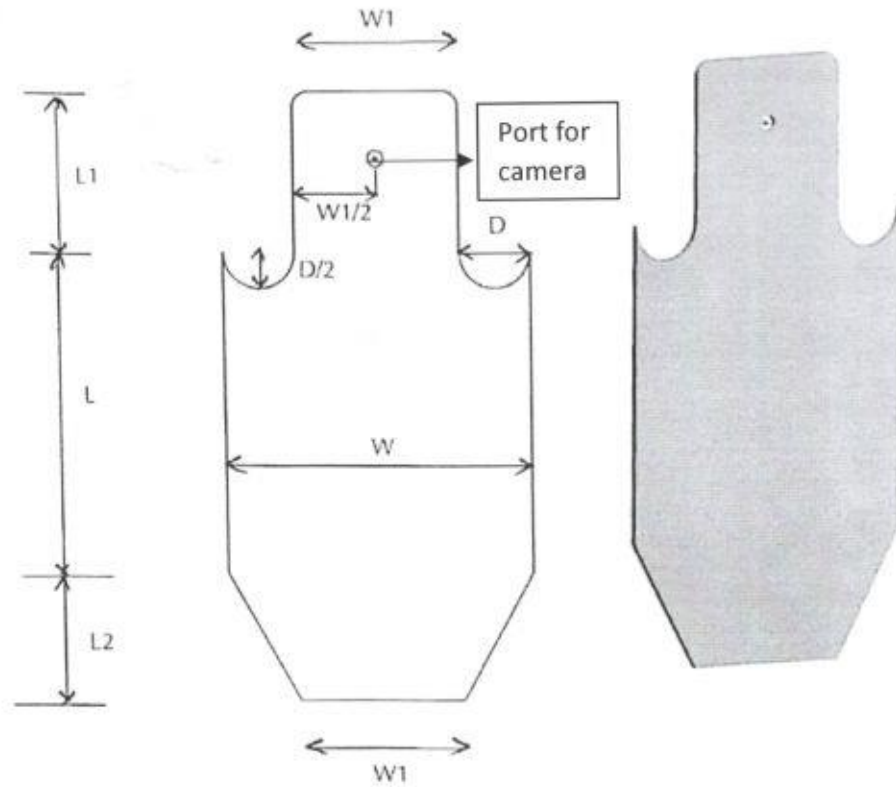
13. **Testing Facilities:** Ballistic trials as per the QRs will be held either at CFSL, TBRL, Chandigarh and GFSU or any other facility as decided by Technical Evaluation Committee/User organizations.

*Notes:*

- *The QRs are dynamic/live and may be amended only on the approval of competent authority.*
- *The QRs have been drawn jointly with the association of CAPFs, State Police Forces, DRDO (TBRL, DIPAS, DMSRDE Kanpur), GFSU, CFSL Chandigarh, AIIMS Delhi, IIT Delhi, BIS and DGQA.*
- *The level of protection is limited to ammunitions mentioned in QRs.*

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## Front View Of Ballistic Shield



Scaled Dimentions	Small Size	Large Size
L	40 cm	46 cm
L1	20 cm	22 cm
L2	16 cm	18 cm
W	39 cm	52 cm
W1	21 cm	28 cm
D	9 cm	12 cm
Other Parameters	Small size	Large Size
Weight	10 kg (inclusive of all accessories)	13 Kg (inclusive of all accessories)
Area	2394 .65 Sq. cm	3273.71 Sq. cm
Location of camera is suggestive, same can be fixed by the user organisation as per their requirement.		
Negative tolerance in dimentions is not permissible.		

Rear View Of Ballistic Shield

