

QUALITATIVE REQUIREMENTS (QRs) & TRIAL DIRECTIVES (TDs) OF BP MORCHA

DESIGN PARAMETERS FOR BP MORCHA

A. PROTECTION

Shall conform to Trial Directive, "Ballistic Morcha," Protection against the following ammunitions:

SL No.	Ammunition Description	Muzzle Velocity (In m/s)	Mass of Bullet (In g)	Firing Distance (In Meters)
i.	7.62x51mm (NATO)	838 ± 15	9.4-9.6	10
ii.	7.62 x 39mm (Hard Steel Core)	610 ± 15	7.45-8.05	10

B. PARAMETERS

SL No.	Characteristics	Specification															
1.	Assembling	Should be conveniently assembled and dismantled															
2.	Handling	Two carrying handles should be provided for convenient handling.															
3.		Dimensions (in mm)															
	Parameters	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Left (Small/Large)</th> <th>Center (Small/Large)</th> <th>Right (Small/Large)</th> </tr> </thead> <tbody> <tr> <td>1200/1900</td> <td>1200/1900</td> <td>1200/1900</td> </tr> <tr> <td>Height</td> <td>700/750</td> <td>700/750</td> </tr> <tr> <td>Width</td> <td>700/750</td> <td>700/750</td> </tr> <tr> <td>Thickness</td> <td colspan="2">Max. 6.5+0.5mm (tolerance).</td> </tr> </tbody> </table>	Left (Small/Large)	Center (Small/Large)	Right (Small/Large)	1200/1900	1200/1900	1200/1900	Height	700/750	700/750	Width	700/750	700/750	Thickness	Max. 6.5+0.5mm (tolerance).	
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4.	Firing Port	Each plate should have two firing port window of size 175±5mm x 125±5 mm adequate overlapping BP Steel sliding shutter from inner side. The height of the firing port shall be 1350 & 750mm respectively from the bottom to facilitate firing from knee bent as well as standing positions. However, user has got the option to keep only one firing port and location of the port as per their requirement. <i>Note:- User organization may opt for BR Glass in place of BP Steel sliding shutter in view of their functional requirements.</i>															
5.	Fitments	<p>i) All fitments in BP Morcha should be placed in such a way that the properties of BP steel are not affected.</p> <p>ii) The joints should be tested for its BP property irrespective of the distance of such joints from the edges.</p> <p>iii) There should not be any gap more than 1.5 mm between the sheets in assembled condition of the BP Morcha. However, there should be the provisions of overlapping of the BP sheets to prevent perforation/penetration through gap.</p>															
6.	Hinge Joints (Including Pin & Chain)	Should be Mild steel or High tensile strength steel coated with Zinc plating of 10 micron thickness to prevent ingress of moisture & dust for a prolong period of usages.															
7.	Locking Arrangement	Each plates of the BP Morcha should have convenient locking arrangement for assembling & dismantling.															

8.	Replacement	Whenever the BP Morcha is fired upon and the port shutter gets damaged, the replacement should be possible.
9.	Weight	BP Mobile Morcha consisting all the three plates with all fitments should not be more than 154 kg for Small & 260 kgs for large.

Note: a) Tolerance ± 5 mm shall be accepted in Height & Width.

b) The design and size of BP Morch as mentioned above is only the guideline, however, the user organization/department may define their own design considering their functional/operational requirements. In regards to weight of BP Steel which is suitable to provide the protection against above stated ammunition is concerned, the maximum weight of 1000mmx1000mmx6.5 + 0.5mm (tolerance) of BP Steel Plate is 51-54 Kg (approx.) *This weight is calculated with density of 7850 kg per cubic meter. Accordingly, the weight of BP Morcha may vary from the weight specified above and to be defined by the user in their tender documents.*

C. MATERIAL:-

Supplier should specify the chemical composition (I. elements weight %) and mechanical properties of BP Steel (I. hardness, yield strength, elongation etc). The supplier must provide the lot-wise certificate from any NABL accredited lab or any government agency or equivalent, which endorses the quality and metallurgical composition of BP steel used for the fabrication of BP Morchas. Each panel of BP Morcha should be of single, homogenous sheet of BP Steel.

Supplier should specify the chemical composition (ie. elements weight %) and mechanical properties of BP Steel (ie. hardness, yield strength, elongation etc). The supplier must provide the lot-wise certificate from any of the Government agencies like BIS, SAIL, MIDHANI, DMRL, DGQA, DMSRDE, IITs which endorses the quality and metallurgical composition of BP steel used for the fabrication of BP Morchas. Each panel of BP Morcha should be of single, homogenous sheet of BP Steel.

D. ERGONOMICS REQUIREMENTS

- i. Provision of two hooks inner side of each sidewall for hanging Weapons/Binoculars/Compass/NVD & Water bottle.
- ii. Storage facility for ammunition and Grenades as per user requirements.
- iii. The BP Morcha should accommodate minimum two soldiers inside and both can fire from the firing ports for standing & kneeling positions.
- iv. There should be a provision to attach/detach wheels as per tactical requirement of the user.
- v. As per user's requirement, the coating to be provided on the outer side of the BP Morcha in order to avert ricochet of projectile (**Optional**).

Note:-

However, Ergonomics Requirements and Extra Fitments in the BP Morcha to be decided by the user's Organization considering their functional requirements. The above mentioned Ergonomics Requirements may be taken as a guide line.

E. COLOUR


The bidders will submit samples of BP Morcha of any camouflage colour. However, in bulk supply, exact colour alongwith modifications required, if any, will be intimated by the users.


F. TESTING FACILITIES

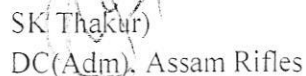
Ballistic trials as per the QRs will be held at CFSL and TBRL, Chandigarh or any other facility as decided by Technical Evaluation Committee.

Note:-

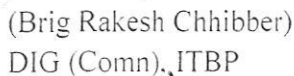
- The QRs are dynamic/live and may be amended only on the approval of competent authority.
- The QRs have been drawn jointly with the association members of CAPFs and CFSL Chandigarh.
- The level of protection is limited to the ammunitions mentioned above.
- All testing shall be carried out as per the protocols of Trial Directive.

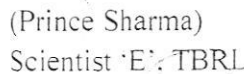

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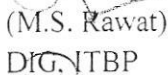

(Mahabir Prasad)
AD(Prov), SSB

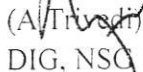

SK Thakur
DC(Adm), Assam Rifles

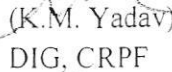

(Sabu A Joseph)
DIG, BSF

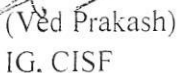

(Brig Rakesh Chhibber)
DIG (Comn), ITBP

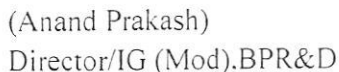

(Prince Sharma)
Scientist 'E', TBRL


(M.S. Rawat)
DIG, ITBP

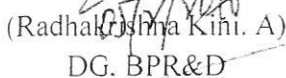

(A. Trivedi)
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TRAIL DIRECTIVES FOR TESTING OF BP MORCHA

A. GENERAL INFORMATION:-

1. Before commencement of the ballistic trial vendors shall be briefed about test procedure.
2. Test shall be conducted as per laid down procedure and no deviation shall be allowed.
3. The test result shall be recorded on the same day and firm representative shall be required to sign compliance test report. No re-testing of the provided sample shall be conducted on request of the firm.
4. The decision of Technical Evaluation Committee (TEC) or Constituted Board of Officers appointed for this purpose will be final and binding. The test results will be shown to vendor or authorised representative of firm. The test result will be recorded and firm signatory shall be required to endorse signature on Compliance Test Report (CTR).
5. A vendor or representative of firm must submit in writing any objection or representation with regard to testing to the officer in charge of the trial within an hour of the completion of evaluation of sample.

B. TEST SEQUENCE: - The Compliance Test Report (CTR) form shall be used to record and document the result of the tests. Sequence of test for the BP Morcha will be as under:

- i. Submission of all certificates prescribed in Tender Enquiry.
- ii. Measurement of Weight and other Physical measurement.
- iii. Visual inspection for checking deformity and other parameters
- iv. Ballistic trial (Sample Sheet Size 300 X 300mm).
- v. Ballistic trial (Randomly selected Sample Morcha fabricated from tested and passed sample BP steel sheet of same lot).

Note:- In case of non-conformity of any parameter of the test mentioned above, the next sequence of test shall not be conducted.

C. BALLISTIC TEST METHODS FOR SAMPLE BP STEEL SHEET

1. The firm should provide the sample of **two** BP Steel sheets measuring 300 x 300mm for ballistic testing (for each ammunition) before fabrication.
2. If any sample fails to meet the qualitative requirement (QRs), the entire lot of steel shall be rejected.
3. **06** (six) single shots of each ammunition will be fired from a distance of **10** meters at 90° . The distance from corner/edges 51mm and inter shot distance 20mm.

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D. ACCEPTANCE CRITERIA FOR BP STEEL MORCHA

1. 01 sample of Bullet Proof Morcha shall be selected randomly out of a lot of BP Steel tested before fabrication for visual inspection and ballistic testing.
2. The rejection and acceptance of chosen samples shall be deemed to have result of acceptance and rejection of all samples fabricated out of same lot of BP Steel.
Lot means a baby sheet that may be derived from one heat treated mother sheet. All such baby sheets coming out of a mother sheet that has been individually heat treated belong to a 'Lot'.
3. The composition and materials of the test piece shall comply with the specifications of the manufacturer.
4. 06 rounds of each ammunition in single shot to be fired preferably at vulnerable points (as decided by TEC) on fully assembled BP Morcha from a distance of 10 meters at 90°. In addition, one burst of 03 rounds (7.62X39mm, HSC) shall also be fired on fully assembled BP morcha but muzzle velocity and inter shot distance will not be applicable.

The other acceptance criteria for evaluation are elaborated below:-

SL	Description of Penetration	Estimation of Penetration
1.	No bulging or any other damage at the back of the armor plate.	Passed
2.	Clean bulge (no radial lines of surface cracks) at the back of the armor plate.	Passed
3.	Bulge at the back with radial lines of surface cracks. In doubtful cases, apply kerosene oil with a brush at the point of impact and test that no kerosene oil penetrates to the back of the plate.	Passed
4.	Bulge at the back with radial cracks permitting kerosene oil applied at the point of impact to penetrate through to the back.	Failed
5.	Bulge plug outlined at the back plate without penetration but permitting kerosene oil applied at the point of impact to penetrate through to the back.	Failed
6.	Bulge with tear along the circumference seen at the back of the armor plate.	Failed

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7.	Detachment of chips of any size from the back of armour plate while the bullet has not penetrated the armour plate. A witness plate of 0.5 mm thick sheet of 2024-T3 or 2024-T4 aluminum alloy may be placed in the line of flight of bullet at a distance of 15 cm (6 in) beyond the BP steel plate. Perforation of witness plate will constitute failure.	Failed
8.	Through shot hole with clean or torn edge or plug knocked put or coming out of the back of the armor plate.	Failed
9.	Through shot hole with chips of any shape or depth detached from the back of the armor plate in one or more circular layers.	Failed
10.	Development of cracks in the armour plate permitting kerosene oil extending beyond the area of penetration of bullet.	Failed

BALLISTIC TEST METHODS FOR SAMPLE BR GLASS

1. The piece of BR glass 500 x 500mm shall be provided by firm which shall be used for ballistic testing before fabrication.
2. During testing the samples provided by the firms fails to meet the requisite standard, the entire lot of BR Glass shall be rejected.
3. 03 (Three) shots fired from a distance of 10 meters at 90° on sample sheet of BR Glass.
4. The minimum distance from corner 76mm and inter shot distance 120mm in triangular to be maintained.

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TESTING CRITERIA FOR BR GLASS:-

Test Bullet	Bullet weight (In Gram)	Reference Velocity (In m/s)	Hits per Armor part at 90° angle of incidence	Distance (in meters)
7.62 x 51 mm NATO	9.4-9.6	838 ± 15	3	10
7.62 x 39mm (HSC)	7.45 - 8.05	610 ± 15	3	10

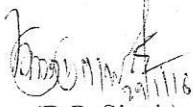
The acceptance criteria for evaluation are elaborated below


SL	Description of Penetration	Estimation of Penetration
1.	No perforation of the glazing by the bullet or parts of the bullet and no perforation of the witness foil by glass splinters from the rear face	Passed
2.	No perforation of the glazing by the bullet or parts of the bullet, but with perforation of the witness foil by glass splinters from the protected face	Passed
3.	Perforation of the witness foil by glass splinters from the rear face. <i>No perforation of the glazing by the bullet or parts of the bullet, but with perforation of the witness foil by glass splinters from the protected face. A witness plate of 0.5 mm thick sheet of 2024-T3 or 2024-T4 aluminum alloy may be placed in the line of flight of bullet at a distance of 15 cm (6 in) beyond the BP Glass.</i>	Failed
4.	Perforation of the witness foil by glass splinters from the protected face	Failed


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Note: -


- a) The firms will provide the certificate confirming that the BR Glass fitted in the fabricated Morcha is of same specifications of BR Glass which has been tested and passed the ballistic evaluation trial by TEC (Testing Evaluation Committee).
- b) Selected weapon and lot of ammunition, for which reference velocity has been once achieved, will remain the same throughout ballistic testing of all tender samples of various firms.
- c) All tests will be in accordance with the Trial directive. Any changes in the Trial directive will be decided by Technical Evaluation Committee.



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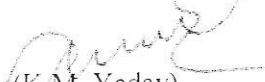

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