DRAFT QRS AND TDS OF MODULAR KILL HUT/ SHOOT HOUSE WITH ADVANCED TARGET SYSTEM :16 FEB 2023

Ser No	Parameters	Specifications	Trial Directives
1.	General	(a) A complete solution for installation, functioning and maintenance of Modular Kill Hut	(a) A Board of Officer (BOO) from user department will monitor the project.
		(b) Modular structure of Kill Hut facilitating various shooting practices with live amn upto 7.62 x 51 mm in a simulated close quarter battle environment. It will be designated as Kill Hut and would be equipped with an Advanced Target System and related ancillaries.	(b) The BOO will also act as the Project Management Group (PMG).
		(c) The aim would be to carry out room clearance drills and hone skills of own operators in room intervention techniques, engagement of hostiles in a closed environment and hostage rescue training.	(c) The vendors shall bear all costs from errors and omissions.
		(d) Kill Hut should be able to provide space for room clearance, corridor and stairway clearance drill and permit safe shooting of weapons 7.62 x 51mm, 9mm & 5.56mm *calibre*.	(d) During the STEC stage BOO will personally visit the existing facility of the vendors and physically check the Kill Hut. In case of no existing facility, the vendor to provide a sample with minimum two rooms of all materials to be used in the Kill Hut.
		(e) It should also facilitate use of Stun Grenade and explosive during door breaching.	(e) The same should be physically checked by the BOO.
		(f) Proposed layout of Kill Hut consisting of number rooms to be decided by user at tendering stage. Layout/sketch to be provided by user at tendering stage.	(f) After the STEC stage, the BOO will carry out physical on-site Acceptance Test of the Kill Hut.

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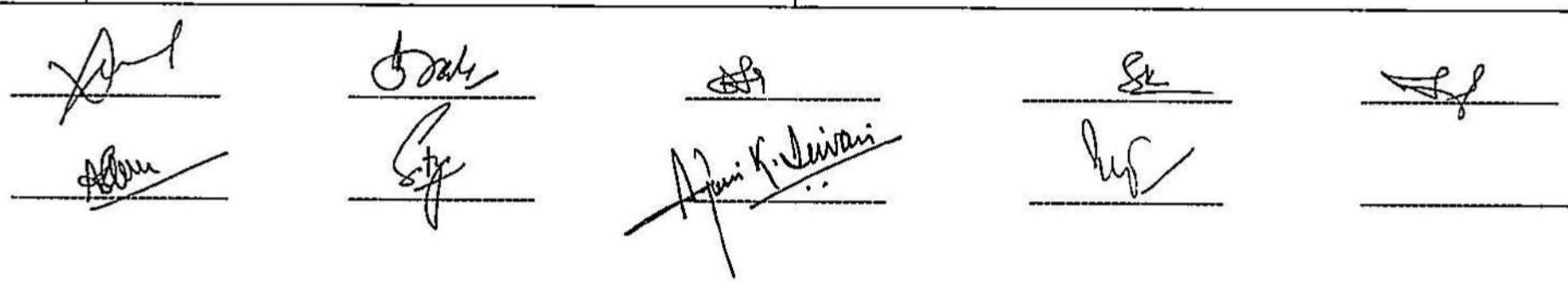
Ser No	Para-meters	Specifications	Trial Directives
2.	Inner Structure	(a) All walls should be made of panels composed of minimum 10mm AR 500 steel armoured plate, mild steel structural framing connection bolts and anchors (S275 compliant) and minimum 50mm armoured rubber adhered directly to the inside of the steel surface. (b) Shoot house should be safe from room to room and outside of the shoot house. (c) One wall should be desired to facilitate wall breeching panel to allow training for standard cutting and explosion breaching training through a wall. (d) All bolts should be supplied with back nuts to ensure that they do not become loose during use of the kill hut. (e) The structure must allow expansion or reduction in total number of rooms. All adjacent plates should be placed in a tight fit without gaps. (f) The structure of Kill Hut should be modular and permit a change in the layout with minimal effort. Each room should have movable panels. (g) All exposed steel surfaces i.e. those not covered by rubber tiles, should be covered by a coat of triple PUR layer 4mm. **Anti ricochetpanels** (h) All walls should be covered with Anti ricochet panelling that should be able to capture round and completely contain splatter through ballistic wall panels and bullet trapping fascia.	**For Parameters (a), (d), (f) & (g).** Vendor to show existing facility to the BOO or provide sample facility with a minimum of two rooms each during the STEC stage. BOO to physically check the specs during OSAT. **For Parameter (b), (h), (j) & (k).** Vendor to give undertaking during the STEC stage and the BOO to physically check the specs during OSAT. **For Parameter (c).** The steel panels used for the wall is AR 500 compliant will be checked and steel structural framing used for the wall to S275 compliant(class R2 for BS 5051 1988, NIJ level 3 of FB6 for EN 1522 or equivalent class shall be the acceptable standard). The OSAT procedure is att as per **Annexure II.** **For Parameter (e), (k), (l), (m) & (n).** (a) A certificate from lab/ test report from an accredited lab that the bullet trap panel has the capacity to stop/ absorb bullets of muzzle velocity upto 985 meters per second will also be provided by the firm. (b) Baffle plates installed should be minimum of 10mm thick AR 500 steel plate with attached durable and sacrificial plywood or rubber facing with an air gap. The BHN of the steel should be 470-530 tested as per ENISO 6506. The plywood/Rubber face should be either 19mm plywood or 43mm thick rubber tiles. One such panel will be displayed to the BOO for OSAT.

Ser No	Para meters	Specifications	Trial Directives
	1	(i) Material test certificates from an accredited laboratory showing classification of the reaction of fire behaviour according to EN 13501-1 and should be not less than classified non-combustible material A2-s1 d0. (j) Should have minimum stopping power of 985 m/s. Certificate regarding the same to provided from national/ NABL accredited lab. (k) Each indl rubber panel should have a surface life of minimum 5000 rounds distributed uniformly all over the panel area without disintegrating and deteriorating. (l) Bullet trap shall take one of several forms of angled (45°) steel plates that direct the spent bullets down into a sand or water pit. Alternatively, an escalator type of steel plate trap may be used which, while more complex to construct, will require less maintenance. (m) The backplate should cover the rear wall behind the bullet trap, and should extend outwards to cover the entire part of the rear wall that falls within the protected zone. The area of the backplate that is visible from the firing point/s shall be faced with wood or compactable material. (n) This is the part of the range that is enclosed by the safety angle of 80^0 to the sighting line in both the vertical and horizontal planes. All parts of the range falling within this zone shall be bulletproof and proof against ricochets and backsplash. Smooth faced flush jointed double brick or 250 mm dense concrete or similar can be considered suitable. Where parts of the structure within the protected zone are not considered bulletproof then they shall be over plated with steel plate. Where the rear wall of the range does not contain the safety angles, those parts of the side walls or ceiling or both that come within the safety angles shall also be bullet-proof, and proof against ricochets and splash back. Suitably designed and situated baffles may be erected in lieu of bullet proofing of sidewalls or ceilings where this is more practicable or economic. The floor of the range should be hard (e.g. concrete) and smooth, and should be kept clear of any objects that could cause ricochets if struck by a bullet. (o) No door or entrance should exist forward of the rearmost firing point, unless secured from the inside. A redlight should be fitted above all doors giving direct access to the range itself (not the building). Such lights should lit whenever the range is in use. (p) Cognisance should be taken of local bylaws, and adequate fire extinguishers should be available on the premises.	

Ser No	Parameters	Specifications	Trial Directives
3.	Door Panel	Each room should have one door. Doors should be Tactical Breach Doors having following features: - (a) Reusable (b) Each door must facilitate different types of forced entry including kick, rammer and explosives. (c) Should have certified bullet trap panelling/ tiles capable of preventing ricochet and splash back of minimum 7.62 x 51 mm amn from 5mtr range	(a) Sample of the door panel to be provided during STEC stage and the BOO to fire 9mm, 5.56mm and 7.62mm ammunition on the samples to confirm the ballistic property. (b) Vendor to provide certification of the door frame material duly certified by a National/ International accredited lab during the STEC stage and the same to be authenticated by the BOO. (c) The same to be checked physically during OSAT stage as well.
4	Window Panel	<u>OPTIONAL</u> Each room should have one window panel. The windows should be composed of anti-ricochet material preventing any ricochet during use of 7.62 x 51 mm calibre amn.	(a) Sample of window panel to be provided during the STEC stage and the BOO to fire 10 rounds each of 9mm, 5.56mm and 7.62mm ammunition on the samples to confirm the ballistic property. (b) Vendor to provide certification of the steel and the rubber panels for window duly certified by a National/ International accredited lab during the STEC stage and the same to be authenticated by the BOO. (c) The same to be checked physically during the OSAT stage as well.
5	Corridor	(a) The corridor should run along the entire length of rooms and all rooms should have doors opening in the corridor. (b) The corridor should be of standard width. (c) The flooring of the corridor will be as same as the room and the walls would be made of similar materials having same ballistic properties as the room walls.	To be physically checked during OSAT stage.

Ser No	Para-meters	Specifications	Trial Directives
6	Flooring	(a) Providing the foundation of required size as a base for entire Kill Hut and 2 meters compound area all around the Kill Hut.	To be physically checked by BOO during OSAT stage.
		(b) Specification of RCC base asper CPWD Specification.	To be physically checked by BOO during OSAT stage. **Side walls/Roof/Floor**. (a) The tiles/arrangement used should be of a tensile strength 01 N/mm2 at least. A copy of latest**(max three years old)** laboratory test report in terms of ASTM 412 or DIN53571 or DIN EN ISO 1798 2008-4 should be attached. Certifications should be provided for :- (i) The tiles must conform to at least Flame spread rating and smoke spread rating 84 as per ASTM E 84 (class 1) or Class BZ or DIN 4102. Or class 3 of BS 476: Part 7:1997. (b) Baffle plates where used and installed should be of minimum10 mm thick AR 500 steel plate with attached durable and sacrificial plywood or rubber facing with an air gap. The BHN of the steel should be 470-530 tested as per ENISO
		(c) Floor should be covered by certified anti ricochet tiles. Floor anti ricochet tiles should have a wear resistant coating with triple PUR layer. Thickness of base at least 50mm and PUR layer 4mm. (d) Should permit easy and wet cleaning. Tiles materials should be preferable non-combustible materials A2-s1 do but not more than medium contribution to fire D-s1 d0.	(c) Test procedure attached as per OSAT attached at **Annexure III**. (i) To be physically checked by BOO during OSAT stage. (ii) Vendor to provide National/ International accredited lab certificate of the samples and the same to be authenticated by the BOO during the STEC stage.



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<tr><th>Ser No</th><th>Para-meters</th><th>Specifications</th><th>Trial Directives</th></tr>
<tr><td>7</td><td>Target System</td><td>(a) The target system are outlined in the succeeding paragraphs. The target should enable the shot hit display in real time including sequence/ fall of hits at the firer as well as the instructor end in the control room. The make of these targets are as under:-
(i) Portable Target -Self sealing
(ii) Moving Target -Self sealing
(iii) 3D human size target -Self sealing
<table><tr><th>S No</th><th>Target Type</th><th>Qty</th><th></th><th>Target Description</th></tr><tr><th></th><th></th><th>Installed</th><th>Reserve</th><th></th></tr><tr><td>(i)</td><td>Portable Target</td><td>To be specified by user</td><td>To be specified by user</td><td>(i) Floor mounted target
(ii) Electronic precision target with facility for hit indication at the control room.
(iii) The target should be self-sealing or enable repeated firing of at least 100 rounds without repair.</td></tr></table></td><td>(a) Target samples to be provided by the vendor during STEC. HIT indication and self-sealing characteristic to be checked physically by the BOO during STEC by firing 9mm, 5.56mm, 7.62mm ammunition. A total of 100 rounds to be fired.
(b) Movement and other physical attributes of the targets to be checked by the BOO during the STEC stage.
(c) Test procedure attached as per OSAT at Annexure IV.</td></tr>
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<tr><th>Ser No</th><th>Para meters</th><th>Specifications</th><th>Trial Directive</th></tr>
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<tr><th>S No</th><th>Target Type</th><th colspan="2">Qty</th><th>Target Description</th><th>Remarks</th></tr>
<tr><td></td><td></td><td>Installed</td><td>Reserve</td><td></td><td></td></tr>
<tr><td>(ii)</td><td>Moving Target (Horizontal movement)</td><td>To be specified by user</td><td>To be specified by user</td><td>(i) Should be installed in each room and it should horizontally pop up from its covered place after opening of the gate or when someone enters in the room through door.
(ii) Should be remote control enabled.
(iii) Self sealing
(iv) Time to expose and retreat target should be programmable.
(v) <u>Hit indicative</u>.
Hit indication on computer. Self-sealing or enable repeated firing at least 100 rounds without repair.</td><td>The speed should be able to be programmed. The system should enable mounting target with minimum 3x4 feet dimension.</td></tr>
<tr><td>(iii)</td><td>3D Human Size Target</td><td>To be specified by user</td><td>To be specified by user</td><td>(i) Portable with anti ricochet material coating.
(ii) Self sealing
(iii) Hit indicative</td><td></td></tr>
</table>

(b) <u>Target Controlling System</u>.
(i) Should be with network enable operating system that should allow to change target's configuration at any distance.
(ii) It should be safe without danger splatter or ricochet.
(iii) Target should be versatile which can lift, fall, swing up and swing down.
(iv) Easy user interface.
</td><td></td></tr>
</table>

Ser No	Para meters	Specifications	Trial Directives
8	Catwalk	(a) A catwalk should be available on top of inner structure, so as to enable clear visual access to all rooms of the inner structure by a person standing on it. (b) Should be constructed with weather resistant, heavy duty steel and should have a rugged design. (c) Minimum width and minimum load bearing capacity to be specified by user. (d) Should have a rugged design with suitable rails for side protection. (e) A staircase located outside the inner structure should permit access to the catwalk without entering the inner structure.	Material sample to be provided during the STEC stage and the same to be checked physically by the BOO during the OSAT stage.
9	Shed	(a) A tubular open shed should cover the entire structure of the kill Hut (b) The basic structure would be of tubular steel columns with galvanised corrugated iron sheets roofing system. (c) The structure should be able to withstand 200kmph wind load. (d) Suitable lightning conductor should be installed on the top of the shed as per latest National Building code.	(a) Material sample to be provided during the STEC stage and the same to be checked physically by the BOO during the OSAT stage. (b) Vendor to provide CBRI certificate or equivalent certifying the wind velocity withstand capacity during STEC stage and the same to be authenticated by the BOO.

Ser No	Para meters	Specifications	Trial Directives
10	Lighting	a) Lighting should be uniform over the entire area of kill hut with external and internal lights. (b) The lighting arrangement should consist adequateLED lights in the corridor and adjoining areas. (c) Adequate high mast lights should be located the external structure. (d) All lights will be controlled by the centralised control system. (e) The light arrangements should be such that they can simulate all lighting conditions such as morning, day, dusk and night.	(a) Vendor to give undertaking as well as provide samples of the lighting system during the STEC stage. (b) BOO to physically check the lighting system during OSAT stage.
11	Fire Suppression System	(a) Fire sprinkler system for fire suppression should be provided in all rooms throughout the Kill Hut including corridor and all rooms. (b) The system should have manual external activation control located in the control room.	(a) Vendor to give undertaking as well as provide samples of the sprinklers during the STEC stage. (b)Vendor to provide National/ International accredited lab certificate for all the equipment. Vendor to provide fire safety certification from national/local auth agency (c) BOO to physically check the system during OSAT stage.

Ser No	Para-meters	Specifications	Trial Directives
12	Furniture	Following furniture items as **per quantity specified by the user** should be provided to give room a realistic look:- (a) Sofa Set (b) **Bed** (i) Single (ii) Double (c) Table Nos (d) Almirah Mannequin (Different size and shape)	(a) The BOO will select the furniture sample. (b) BOO to physically check the furniture quality and check anti ricochet behaviour and authenticate.
13	CCTV System	(a) The Kill Hut should have a complete CCTV system covering all rooms and corridors as per user specification in each room which can pan and tilt. (b) The system should have recording capacity of 30 days and playback capability. (c) A suitable LED screen should be provided in the control room for monitoring. (d) Cameras should have protective housing.	Vendor to give undertaking during STEC stage and the same to be physically checked by the BOO during OSAT.

Ser No	Para-meters	Specifications	Trial Directives
14	**Ventilation System**	(a) The Kill Hut should have a suitable non-AC (other than control room) ventilation system based on exhaust fans. (b) The system should be able to pump in fresh air and flush out gases to avoid lead poisoning as well and maintain fresh air in the inner structure. (c) All controls for this system would be located in the control room. The lead-in-Air assessment should be less than the permissible exposure limit i.e. 50 microgram (µg) per cubic meter based on an eight hour Time Weighted Average (TWA), in accordance with NIOSH (US National Institute of Occupational Health and Safety, April 2009) guidelines.	(a) Vendor to provide national/ international accredited lab certification about the capacity of the ventilation system. (b) Test procedure attached as per OSAT at **Annexure V.**
15	**Acoustic Reduction System**	(a) The Kill Hut should have sound reduction system so that echo of gun fire can be minimised. (b) Sound should be not more than 80db while firing Amn of 7.62mm/ 5.56mm (AK/INSAS/SIG Rif) (c) Suitable quality of Ear Muffs to be provided by the Vendor.	(a) Sample to be shown by the vendor during STEC stage and the same to be physically checked by the BOO during OSAT. (b) Test procedure attached as per OSAT at **Annexure VI.**
16	**Audio System**	PA and other audio system to help trainers to communicate with trainees as well as give them the ability to pipe sound effects into house, enhancing the reality of the training.	Suitable quality of audio system to be provided by the Vendor. Samples are to be checked by the BOO during OSAT stage.

Ser No	Para-meters	Specifications	Trial Directives
17	Control Room	(a) One room with permanent structure would be constructed adjacent to the inner structure. It should have following features: - (i) One master computer for shot analysis, capable of giving feedback of every target alongwith a printer with spare computer. In addition, LED monitors for instructor to watch feed from all CCTV cameras located in the facility. (ii) Communication system for interface with each room which should also have a central announcement system. (iii) Control room should be air conditioned. (iv) The power backup system should be such that it should cater for all the requirements like operation of ventilation, lighting and control of target etc. (v) Overall backup for light and target should be designed so that uninterrupted supply to be given to the targets. This backup should be designed keeping in view the power of motors attached with each target and other electric instruments /light points provided in the Kill Hut. (vi) The Centralized control computer should be able to control the targets and shooting program. The system must be enable with up-gradation of new software and applications which should be user friendly and easy to use. Following master controls should also be a part of the overall control mechanism: (aa) Ventilation system. (ab) All targets. (ac) Lighting system. (ad) Communication system. (ae) Power backup system. (af) Fire suppression system.	(a) Vendor to give undertaking during the STEC stage. The same to be physically checked by the BOO during the OSAT. (b) All control room attributes will be checked physically by the BOO.

Ser No	Parameters	Specifications	Trial Directives
		(vii) The software provided should be of latest version of windows/ Android operating system. (viii) The IT hardware including computer peripherals and monitor should from a reputed company which have service centre nearby the location. (ix) Suitable furniture and fittings should be provided for proper and easy operation of the control room.	
18	**Post installation warranty and maintenance**	(a) Post installation warranty duration, CAMC & AMC**(to be decided by the user during tendering stage)** (b) Maintenance and repair support of kill hut/shoot house upto5 years.	(a) Firm to provide undertaking for the following to be given to the board of Officers are:- (i) Annual maintenance assurance for 5 years. (ii) Uninterrupted supply of consumables for 5 years. (iii) MTTR & MTBF commitment along with replacement of target system during the guarantee period.

Ser No	Parameters	Specifications	Trial Directives
		(c) Commitment to supply the following quality targets and doors per year for five years as consumable as per user specifications:- (i) Portable target (ii) Horizontal move target (iii) 3D human size target (iv) Breachable doors- 100 Nos (v) Breachable window -24 Nos (e) MTTR and MTBF should be clearly committed for in the tender.	(iv) The following equipment will be supplied by the firm. (aa) A dust collection unit(Vacuum based) will be provided by the firm to collect and fragments by Vacuuming and filtering lead dust. (ab) One vacuum cleaner to remove rubber granulate from Granulated Bullet trap, in order to recover fired bullets.

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SC (OWE)

(ANJANI KUMAR TIWARI)
DEPUTY COMMANDANT
SSB.

Dr. PREM CHAND
DIG-TRS
CRPF

Annexure II
(Ref parameters 7 of Trial Directives)

ON SITE ACCEPTANCE TEST (OSAT) FOR BULLET PROOFING AND BULLET TRAP PANELING

1. The type of bullet trap will be specified by the user. Acceptable bullet traps acceptable areas under:-

(a) The standards acceptable are :-

(i) Every component exposed to potential impact should be made of AR 500 or AR 550 steel. The surface should comply with SP 6 paint specifications. The vendor should provide a copy of certificate from an accredited lab regarding compliance with AR 500/AR 550 steel and SP6 paint specifications.

(ii) The traps should eliminate dangerous ricochet and lead dust build up:-

(aa) **Lead Build –Up.** A dust collection unit (Vacuum Based) will be provided. Lead fragments should be collected into steel containers by vacuuming and filtering lead dust. There should be no oil, rubber or water used to eliminate Lead dust. Suitable HEPA filters should be provide at the exhaust.

(ab) There should be no ricochet.

(iii) The mouth of the bullet trap should lead to a declaration chamber from where it should lead to the bullet collection system. The collection system may be vacuum based, screw conveyor system (where bullets fall from declaration chamber to a semicircular through on the bottom of the trap) or canister based (where bullets fall from declaration chambers to suitably placed canisters).

(iv) A dust collection unit should be present to remove lead dust.

(v) All parts of the bullet trap will be visually inspected and physically checked by the BOO.

(vi) All parts of trap will be physically checked by the BOO.

(vii) The slope of rubber granulates and its depth will also be measured.

Annexure III
(Ref parameters 6 of Trial Directives)

ON SITE ACCEPTANCE TEST (OSAT) ANTI RICOCHET SOLUTION/BAFFLES

1. **Anti Ricochet Tiles.** Ricochet proofing will include providing protective baffles to eliminate backsplash. Presence of ricochet proofing by means provided by the firm/OEM will be checked by the Board of Officers on all relevant surfaces as specified in the QRs. The firing will be carried out by 9mm SMG, 9mm Pistol, 5.56mm Assault Rifle, 7.62mmAssault Rifle by firing one round on a marked anti ricochet panel placed on the both side walls, one on the floor and one on the roof as specified. The shot will be made at an angle of 30degree or more (which will be measured by the Board of Officers). Damaged tiles/floor portion will be replaced by the vendor:-

Weapons	Distance of anti Ricochet Panel to be Fired at
9mm Pistol	5 meters
9mm SMG	10 meters
5.56mm Rifle INSAS	20 meters
SIG 551 assault Rifle	25 meters
7.62mm AK-47 Rifle& 7.62x51mm Assault Rifle	30 meters

Note: Burst firing with two/three rounds each will also be carried on marked anti-ricochet panel by weapons specified in the table above less 9mm Pistol.

2. **Baffles.** The Baffles being provided will be visually inspected by the BOO. In addition to the ones being installed one baffle will be provided and subjected to the tests specified above. There should be no ricochet/backsplash of ammunition. Firing will be carried out from a secure location on the panel to prevent chances of injury to firers.

KILL HUT ONSITE ACCEPTANCE TEST (OSAT)

All installation will be as per QR & TD

Annexure IV

(Ref parameters 2 of Trial Directives)

ON SITE ACCEPTANCE TEST (OSAT) FOR TARGET SPECIFICATIONS

1. **On Site Acceptance Test Procedure**. Objective is to test and verify the functioning of Targets System. Steps will be as under for each target:-

(a) All system devices to be installed

(b) Turn master targetry machine from control room

(c) Initialize Targets system & Test absolute sensor on each target.

(d) Run Respective target system via RCS master computer.

(e) Test LED lamp for operation (where available), simulation with flashing and police lights on each target (where available)

(f) Test moving target and rotary target operation via Hand Held Controller.

2. Testing will form part of Contract period and no extension of the time will be granted to permanent rectification, modification, adjustment or retesting except where testing has been delayed or retesting has been necessitated by circumstances beyond the control of the contractor. 5 rounds shall be fired with 9mm SMG, 5.56mm INSAS, SIG 551, Assault Rifle and 7.62mm AK 47 Rifle&7.62x51mm Assault Rifle each on each target.

3. **Portable Target.**

(a) The installed and reserve target will be shown by the firm. The Board of Officers will also check the functionality of the reserve targets, which will be demonstrated by the firm after replacement of the main targets.

(b) 5 rounds shall be fired with 9mmSMG, 5.56mm INSAS, 5.56mm SIG 551, Assault Rifle, 7.62mm AK-47 rifle and 7.62x51mm Assault Rifle on each this target. The timer mechanism hit indicator, group size at firer in instructor end will be physically checked.

(c) A certificate from vendor/ OEM that targets are capable of being subjected to at least 100 rounds without repair will be checked.

(d) The target should consist of a box tgt and a covering frame with a target picture. The target frame should provide fall of shot with an accuracy of less than 2mm at the target centre.

4. **Moving target**.

(a) Moving target installed and reserve targets will be shown by the firm. The board of Officers will also check the functionality of the reserve targets, which will be demonstrated by the firm after replacement the main targets.

(b) (i) Five rounds shall be fired from 9mm SMG, 9mm Pistol, 5.56mm INSAS Rifle, 5.56mm SIG 551 Assault Rifle, 7.62mm AK47 Rifle& 7.62x51mm Assault Rifle.

(ii) The control variable speed of single or group of targets from the control room will be done from control room by the Board of Officers or OEM representative nominated by the Board of Officers. The movement while in static mode as also programming of speed and ability to mount Fig 12 and Rubiatargets will be checked.

(c) Material of targets as specified in QR Para 5 (b) will be checked.

(d) The target trolley/carrier should have at least 6mm AR 500 steel fairing for protection from bullet impacts. Primary frontal section bearing tgt carrier body shall made from at least 6mm AR 500 armor plate. Carrier body should be completely protected to protect its component. Lighting components should be integrated with the carrier and should provide dimmable white light.

5. **3D Human Size Target System**. Four sets of installed and reserve targets will be shown by the firm. The Board of Officers will also check the functionality of the reserve targets which will be demonstrated by the firm after replacing the main targets. The control and functionality of the target, as specified in QRs will be checked.

Annexure V
(Ref parameters 14 of Trial Directives)

ON SITE ACCEPTANCE TEST (OSAT) FOR VENTILATION SYSTEM

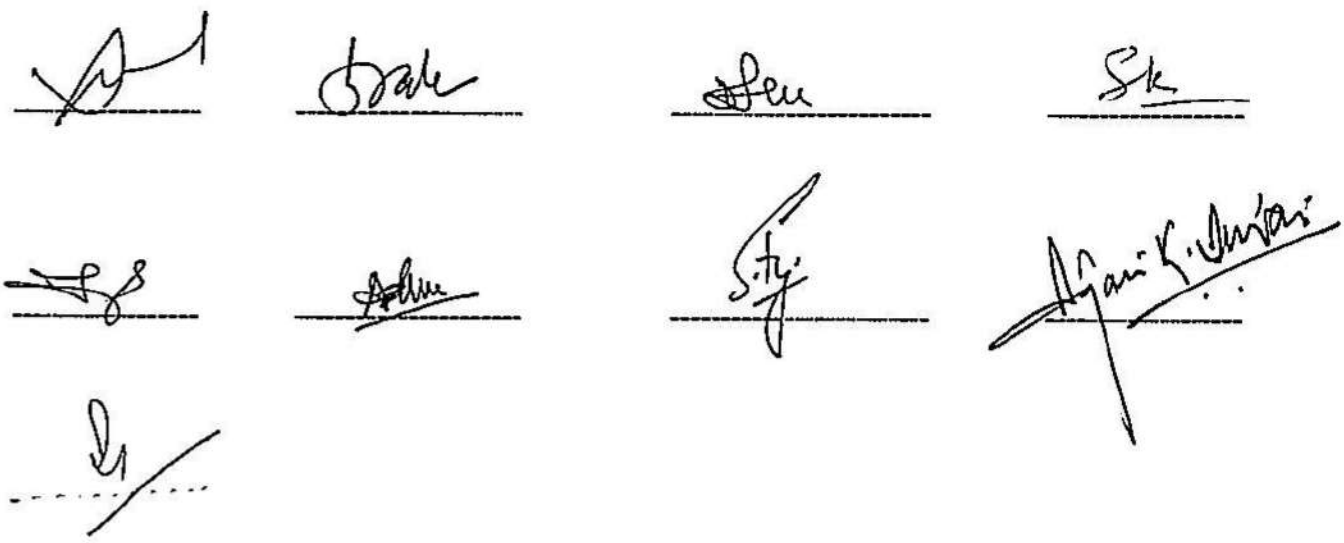
Lead Control

1. Ventilation system will be checked after firing 1000 rounds as well as after 2000 rounds in one day. Air samples will be tested for all lanes.

2. **Procedure.** Air samples will be extracted through a membrane filter in a cassette by means of sampling pump calibrated at 2.0 L/min. The membrane filter digested with acids and lead eliminates will be analyzed by inductively coupled Plasma Spectroscopy (ICP) at vendors cost.

3. For checking lead, air filters will placed by firm/OEM at the firers end and at several points down Kill Hut during firing in the range. An air sample will also be taken from the places above where filters are placed. The amount of lead collected in these filters will then be measured at a laboratory certified by the Central Pollution Control Board (CPCB) and national Accreditation Board for testing and calibration laboratories(NABL). Lab/(s) identified by the OEM/firm and chosen by the user for trials. The lead-in-air assessment should be lesser than 50 micrograms per meter cube of air.

4. In case the procedure/technology above is not available in India, a suitable method/technology specified by the selected lab will be chosen in consultation with user, vendor and lab reps.



5. **Smoke Test.** Using either a smoke tube or smoke candle, observe air flow currents and patters throughout the Kill Hut. This should identify disturbances and direction of airflow. Unnecessary personnel should not be present in each range or neat the supply air plenum during the assessment. Prior to activating the tube or candle, ensure that the ventilation system is on and operating. If a smoke candle is used, a coffee can with some type of a handle fabricated (pliers) should be used to handle the candle. At the firing line, smoke tests each firing station (booth). Test from the floor to about 6 foot level. Observe the Document unusual smoke patters or where smoke swirls and returns to the shooters position. Eddies or swirls near the floor, or other obstruction area concern and should be noted. If turbulence is observed, air velocities may be high in that area. Note that air velocity measurements conducted later in this area may not truly indicate the direction of the flow (turbulence and eddies may have flow directions other than down range but will be reflected only as a measured value). Conduct additional smoke measurements down range to ensure adequate air velocities and patters are maintained down range towards the bullet stop.

9. The values of Lead, air flow and pressure will be measured by a laboratory certified by CPCB and NABL, specified by the user, at the cost of the vendor.

Annexure VI
(Ref parameters 15 of Trial Directives)

ON SITE ACCEPTANCE TEST (OSAT) FOR ACOUSTIC REDUCING SYSTEM

1. **Noise characteristics.** Tests will be carried out by national/International lab specified by the user at the cost of the vendor for:-

   (a) Ambient noise levels without firing.

   (b) Noise level during firing.

   (c) Reverberation characteristics.

2. The procedure for the above tests will be as per international norms, A pre test meeting to coordinate the procedure will be held between the user, vendor and lab representatives.

3. **Ear Muffs.** All fifty ear muffs supplied will be worn by firers in the practices carried out to check the systems. The ear muffs should dampen the sound of firing inside closed Kill Hut to comfortable levels for the firer for both individual firers as well as for entire detachments. Theverbalorders should be clearly audible to firer/s while they are wearing ear muffs.

4. A surface provided with sound attenuation will be checked to see if its is durable to withstand repeated washing and cleaning.

Maj Vishal Dhande
51 SAG

Balachandran PCTO
ITBP

D P Mishra (AR)

(SUSHIL KUMAR)
BPR&D

Jagraj Sgh
ADRA(J&T)
DGAR

(Bala Chadra)
AC, ITBP

(Satya [illegible])
Maj
SC (NE)

(ANJANI KR. TIWARI)
DC, SSB.

Dr PREM CHAND
DISTRS
CRPF.

INVITATION OF VENDOR COMMENTS ON QR/ TDs OF MODULAR KILL HUT/ SHOOT HOUSE WITH ADVANCED TARGET SYSTEM

1. It is intimated that firms/ vendors' comments are invited on the QR/ TDs of Modular Kill Hut/ shoot house with advanced target system. All firms are requested to offer their comments on e-mail address scord@nsg.gov.in or gcproc@nsg.gov.in as per under mentioned format.

QRs	TDs	Comments by the firm

2. You are requested to offer comments within 15 days from the date of uploading on the website. The QR/ TDs of above mentioned equipment/ weapon are being considered by sub group committee meeting for finalization.

Dated : 28 Feb 2023

(Adam Shaikh)
TC (Proc)