

SECTION 11 01 01
FIREARM TRAINING EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies the furnishing, installation and connection of firing range equipment.

1.2 RELATED WORK:

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one Section of Division 26.

1.3 SUBMITTALS:

- A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:
- B. Shop Drawings:
 - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting details, materials, horsepower, RPM, enclosure, starting characteristics, torque characteristics, code letter, full load and locked rotor current, service factor, and lubrication method.
- C. Manuals:
 - 1. Submit simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets and application data.
- D. Certification: Two weeks prior to final inspection, unless otherwise noted, submit four copies of the following certification to the Resident Engineer:
 - 1. Certification that the equipment has been properly applied, installed, adjusted, lubricated, and tested.

PART 2 - PRODUCTS

Firearm training equipment to be Meggitt or approved equal. All firearm training equipment to be provided by a single manufacturer.

2.1 TRAP:

The bullet trap shall be made of hardened steel construction where all potential impact areas exposed are constructed with AR500 or AR550 armor steel that can contain handgun rounds, shotgun slugs and rifle rounds such as .223 .308 and 7.62

Bullet trap system shall be Factory Designed as a GRANTRAP bullet containment system incorporating:

- rigid tube steel support stanchions
- Engineered with 10 gauge steel "stepped" bed plates that provide adequate volume of GranTex media within primary impact areas.
- Incorporates supplemental safety bins to provide additional ballistic protection.
- Capable of capturing handgun and rifle rounds up to 3,600 feet per second or calibers up to 7.62.
- Designed to capture up to 100,000 rounds per shooting point.

The bullet containment will consist of a Factory Designed system that safely stops rounds by de-energizing velocity and predominantly captures rounds intact providing little-to-no lead dust or bullet fragmentation. The system shall provide environmental benefits by minimizing airborne dust, ricochet and reduces noise levels.

Trap must be constructed with no vertical supports or other leading edges so that shooting at close distances and cross angle fire can be contained without ricochet or splash back.

- A. Meggitt Model LE7500-OT Reclining GranTrap with Overtrap: Trap Assembly intended for higher volume rifle ranges and capturing projectiles emitted from rifles, pistols and shotguns along a line substantially parallel to the ground surface, with no backscatter. Capable of capturing jacketed, semi-jacketed and non-jacketed, shot and slug projectiles with muzzle velocities between 900 and 3,600 feet per second (274 to 1097 meters per second) and energy levels to 3,600 foot-pounds. Fully automatic weapons should not exceed 200 rounds per minute and two hours duration during a 24 hour period. Tracer or incendiary rounds are NOT permitted.

1.Assembly Height:

- a) Standard Height 9 feet (2.74 M).
- b) Optional Height 8 feet (2.44 M).
- c) Optional Height 12 feet (3.66 M).

- 2)Trap Assembly includes a box-type support frame inclined relative to the incoming direction of the projectiles. A volume of particulate material inside the box type Trap Assembly covered by a self-healing membrane is provided to slow down and capture incoming projectiles. The support frame is not be relied upon to capture projectiles.

- 3)Support frame includes an inclined bottom wall, a vertical back wall, and two sidewalls. Walls are fabricated from sheet metal and

- supported by a steel truss structure arranged and configured to properly support the bottom, back and sidewalls. Support trusses are located every 4 to 5 feet (1.2 to 1.5M) along the length/width of the trap assembly.
- 4) Support frame includes a recessed target region positioned to capture the majority of the projectiles.
 - 5) Provide support frame doors, normally closed, positioned proximate to the target region, arranged and configured to allow a portion of the volume particulate material from the target region to be removed from the Trap Assembly through the Support Frame when the door is opened.
 - 6) Reserve Portion: Trap Assembly includes a reserve portion of granulate material located above the target region. When the doors described above are opened, the reserve portion of granulate material will flow into the target region to maintain a constant depth of material in the target region.
 - 7) Supplemental Volume: Trap Assembly includes a supplemental volume of particulate material being arranged and configured to provide a backup for capturing projectiles when the Reserve portion described above has flowed into the target region. Supplemental volume is separated from the Reserve portion by a self-healing barrier.
 - 8) Upper frame supports the bullet traps 3/8 inch (9.5 mm) thick AR 500 (BHN) armor plate slop sheet, to protect the top portion of the trap assembly. Armor plate is covered with an air space, created by 7/8 inch rubber strips around the perimeter, and a 1/4 inch (6.5 mm) thick rubber belting, to capture the errant shots not redirect them.
 - 9) Upper frame is capable of holding up to 5 cubic feet (11.6 cubic meters) of GranTex media. Tracer or incendiary rounds are NOT permitted.

2.2 PISTOL OR RIFLE RATED SAFETY CEILINGS:

- A. Meggitt Model JG12: System based on the air-space principle that utilizes an air space between a soft frontal surface and a hard back surface so that bullets may enter the front but after ricocheting off the back surface, their particles cannot escape through the entrance holes.

- 1) Ceiling system shelters the entire gallery from a height of 8 feet (2.4 m) above the floor from the firing line downrange and shall be based on shooting from the lowest position normally used for a range of the specified type. Sheltered area shall extend from 1 inch (25 mm) of either sidewall.
- 2) Air-space ceiling panels pre-fabricated in units of approximately 4 feet square (.37 sm) for ease of handling. Dimensions may be altered

to suit the requirements of the facility. Panels furnished complete with all suspension hardware.

a) Panels shall consist of frames constructed of 2 inch (51 mm) by 4 inch (102 mm) lumber faced with unfinished plywood of 5/8 inch (15.9 mm) minimum thickness and covered on the back with 10 gauge hot rolled galvanized steel plate of .0125 inch (3.1 mm) AR 225 minimum thickness. Entire assembly shall be rigidly constructed using screws, lag bolts or ring-shank nails spaced on 6 inch (152 mm) maximum center distances.

b) Panels provided with suitable cleats or eye-bolts for the attachment of suspension hardware, and for securing the contiguous panels to each other.

B. Meggitt Heavy Duty Rifle Rated Model JG12D use steel plate of 3/8 inch (9.5 mm) AR 500 minimum thickness with suspension hardware consisting of No. 2/0 twin loop, zinc plated chain and suitable attachment hardware that provides vertical adjustment.

2.3 PISTOL OR RIFLE RATED BAFFLES:

The baffle is made of 3/8" AR steel and will deflect and contain standard handgun rounds fired at a perpendicular angle with no damage to the steel plate. This baffle will also deflect and contain high-power rounds (.223 .308 and 7.62) fired at a perpendicular angle.

Baffle system will consist of steel with spacer and covered with wood to deflect and contain bullet fragments and eliminate gaps where exit of projectile could damage air handling systems, lights and other utilities. Baffle and deflector system will enable shooting and moving throughout entire range starting from static shooting Stall to furthest point of bullet trap area. Areas of overhead range to be covered will use existing design on current range at LETC.

A. Meggitt Model JA4: Baffle based on the air-space principle that utilizes an air space between a soft frontal surface and a hard back surface so that bullets may enter the front but after ricocheting off the back surface, their particles cannot escape through the entrance holes.

1. Sheltered area shall extend from 1 inch (25 mm) of either sidewall.

2. Baffles pre-fabricated in units of approximately 4 feet square (.37 sm) for ease of handling. Dimensions may be altered to suit the requirements of the facility. Panels furnished complete with all suspension hardware.

a. Panels consist of frames constructed of 2 inch (51 mm) by 4 inch

(102 mm) lumber faced with unfinished plywood 5/8 inch (15.9 mm) minimum thickness and covered on the back with hot rolled galvanized steel plate. Entire assembly rigidly constructed using screws, lag bolts or ring-shank nails spaced on 6 inch (152 mm) maximum center distances.

- b. Provide panels with suitable cleats or eye-bolts for attachment of suspension hardware, and for securing the contiguous panels to each other.
- 3. Heavy Duty Rifle Model JA4D: Provided with armor steel plate of 3/8 inch (9.5 mm) AR 500 minimum thickness.
- 4. All wood items fabricated of (FTW) Fire Treated Wood.
- 5. Provide with appropriate suspension hardware consisting of 3/16 inch (4.8 mm) welded, zinc plated chain or suitable attachment hardware that provides vertical adjustment.

2.4 REDIRECTIVE GUARDS

A. Pistol and Rifle Rated Redirective Guards:

- 1. Meggitt Model JR5B: Redirective cove shelters the area behind it and is designed so that bullets hitting the cove are redirected down-range toward the bullet trap so nothing can be directed at the shooters. All parts shall be able to withstand, without damage, direct hits from all mid-range target ammunition and regular service ammunition from handguns and shotguns, except armor piercing.
 - a. Cove shall extend to within 1 inch (25 mm) of the building structure at both ends or into the area sheltered by other members.
 - b. Provide cove with provisions for appropriate mounting. For overhead suspension from structure use 2/0 twin loop, zinc-plated chain with "S" hooks and turnbuckles provided by the manufacturer.
 - c. All parts of the system shall be of materials and construction suitable for the class of service designated. Material shall be a minimum of 3/16 inch (4.8 mm) AR 225 armor plate steel.
- 2. Meggitt Heavy Duty Rifle Rated Model JR5D: Material shall be a minimum of 3/8 inch (6.59.5 mm) AR500 armor plate. Provide with appropriate suspension hardware consisting of 3/16 inch welded, zinc plated chain or suitable attachment hardware that provides vertical adjustment.

2.5 SHOOTING STALLS

15 shooting stalls with clear polycarbonate divider walls top to bottom. Stalls will be of design of existing shooting Stall/Booths on Current range at LETC.

Integrated pivoting shooter shelf and integrated pivoting full gate barricade.

Integrated local control smartpad or electric keypad controller for target retrieval

Integrated overhead lighting.

Integrated two way speaker system.

Sound Requirements. Factory designed by Range equipment company or installed after target and stall systems.

- Two way mic and speaker system with wireless microphone capability. Range control booth mic to students on range. Range to booth mic for student communication to range master. Wireless mic to range speaker capability so that range master may control and use range commands outside of range control booth.

A. Pistol Rated Shooting Stalls:

1. Meggitt Model BV10 Phoenix Clear View Shooting Stall with Barricade:

Each stall consists of an internal frame that is secured to the building and to which the panels with shelves and various accessories are mounted. Stalls are suitable for use with all standard service loads of handgun ammunition normally used for gallery range training.

- a. Stalls provide not less than 24 inches (610 mm) of separation between shooters at the shelf height. They shall define the firing line as located at their edges nearest the shooter at shelf height. Stalls shall provide support for other accessories and hardware as specified.
- b. Pylons: Each stall includes a tubular steel column to attach to an overhead structure. Frame weldment provides a base for attachment to the floor. Tubular column also serves as a conduit for concealment of the control and communications wiring
- c. Dividers: Each divider is a 1-1/4 inch (32 mm) clear Plexiglas panel integrated into a frame weldment.
- d. Provide cross members to tie the stalls together laterally and for mounting drive units of target systems. Cross members attach to the tubular members within stalls. Lateral members also act as raceways for the drive unit and stall wiring.

- e. Stall members shall not deflect more than 1 inch (25 mm) from a

static force of 40 pounds (18 Kg) applied any place upon their surfaces and should recover completely after removal of the force.

f. Provide reinforced "West Point" type ABS drop shelf for each stall so that each shooter may use his shelf when needed or drop it out of the way for prone shooting.

1. Provide shelves with resilient surfaces for weapons; raised lips to prevent accidental drop off; muzzle rest to support handguns with muzzles pointed downrange; and tray area for spent brass.

2. Mount left end of shelves on hinge pins on the downrange edges of shelves. On the bottom side of shelves, provide slideable locking members that when extended hook on hinge pins of adjacent shooting points.

g. Gate Barricade is a 60 inches high by 11-3/4 inches (2985 mm) wide by 3/4 inches (19 mm) thick, Formica covered wood panel. It is stored on the downrange right hand side of the shooter along with the blast shield. When the shooter wants to use the barricade for strong hand/weak hand shooting, the shelf must be lowered, then the barricade is moved into place by swinging the panel right-to-left (similar to a door) to the center of the shooting position. Center arm has a shot-pin lock that passes through both the arm and the hinge bracket when the barricade is in the use position. Provide blast panels extending downrange from the firing line to prevent the muzzle blast from neighboring shooters from interfering with each other. Each blast panel extends 24 inches (610 mm) downrange and to a height of 72 inches (1829 mm) above the floor. Panels are replaceable and made of acoustical material to absorb shock waves.

2.6 TARGET RETRIEVAL SYSTEMS

Target retrieval system will be controlled by master control unit from a single location (Individual Lane Controller LC at the booth) enabling range master complete control of every target. Master control can control individual or groups of targets.

Target retrieval system will have 180 degree turning capability and programmable movement from zero to 25 yards from both the master control and local control units.

Target retrieval system will be Factory Designed protected by hardened steel to deflect bullets.

Target Trolly movement will be controlled by Factory Designed system.

Trolly target carrier will enable the hanging of cardboard backers and paper targets.

A. Meggitt Training Systems XWT wireless Target Retrieval System

1. The Target Conveying Systems shall consist of a monorail track, system suspension supports, carrier body, lower carrier target holder assembly and an electronic control module. The system will have the capability of stopping at increments down range as specified by the Lane Controller (LC). The units of travel distance measure can be set for feet, yards or meter increments. The target carrier shall have the capability to accurately position itself within 1" of the commanded position. For durability reasons and to achieve this distance and precise target turning accuracy, magnetic rotary encoders must be utilized within the target carrier.
2. The Target Carrier shall have preset travel speed capabilities of 2, 4, 6, or 8 ft/sec with a maximum travel speed of 8 feet per second and must incorporate a soft start / soft stop speed feature. The carrier body shall be a durable fabricated unit and utilize no more than four (4) upper wheels. Smooth and accurate target transport is achieved by each target Carrier utilizing two (2) separate internally located DC drive motors - 1 at each side. For smooth transport, the carrier wheels shall be a durable conductive polyurethane material over aluminum hubs.
3. The front face of the target carrier (Protective prow) shall be positioned at no more than 35 degrees to deflect misdirected shots. The main target control components shall be housed within the target carrier. The unit shall be factory painted black.
4. The primary frontal section of the target carrier body shall be fabricated from 3/8" AR500 Armor plate. Other frontal sections that protect the turning shaft components must also be angled no greater than 35 degrees and fabricated from AR500 Armor plate.
5. The side panels of the target carrier body shall be fabricated from a minimum 12 Gauge (.105) steel and must have its lower portions slightly angled inwards / down, to enhance downrange redirection of errant impacts. For easy service access - these side panels shall only require removal and loosening of 2 screws.
6. An on-board 4800 Mah NiMH battery shall power the carrier unit. The battery shall automatically be charged whenever the carrier returns to the home position and parks into the automatic docking station.

- Battery shall also have quick connections for charging via a separate charger. System will include 1 spare battery.
7. The target carrier shall have an on-board microprocessor to control carrier operations that will communicate wirelessly with the Lane Controller (LC).
 8. For linear positional accuracy, the carrier shall have sensors that will measure relative position and speed of the carrier, as well as a home sensor. These sensors will communicate with the on-board processor. These location sensors will also automatically place the target into a "Face" position - when the carrier is commanded to return back to the home position.
 9. To provide 360° target presentations, a DC gear motor shall be located on the carrier assembly. The output shaft of the motor shall be mechanically connected to the target holder with a resilient coupling. The assembly shall be provided with electric sensors that will provide precise position information to the on-board processor. The 5-1/2" wide target holder deflectors shall be fabricated from AR500 Armor plate and have adjustable tension jaws and depth adjustable teeth that perforate and grip the target and backer.
 10. The target carrier shall house a protected target illumination light fixture. This fixture shall provide a minimum of 100 lumens of illumination and shall be adjustable to no less than 10 levels of brightness. The carrier light can also be programmed to provide a multiple flash sequence - to simulate return fire / muzzle flash from a target.
 11. The track shall be assembled from a 2.5" square / .098 thick / roll formed galvanized steel sections with a "T" top for the attachment of overhead support grippers. Thinner gauge Materials or the use of open channel type track designs that can collect lead, brass and other debris are not acceptable. Track sections shall be mechanically joined and the support grippers shall provide one inch (1") of vertical adjustment.
 12. No cables or wires shall extend past the firing line. The rail shall not be electrified for target movement or target turning power or control needs.
 13. The Lane controller has a touch screen interface. System is rated to be operational at 0 - +40 deg's C and stored at -40 to +70 Deg's C. The unit is designed for non-condensing humidity / indoor applications.
 14. No overhead mounted drive motors will be located above the shooters heads.

15. Carrier body will simply slide on / off track rails. No cables, wires, connections or additional carrier hardware removal required. The tracks far end will include a mechanical emergency stop device - which can be easily removed if a carrier must be removed from the track rail.
16. All operating controls and features, including course programming, can be accessed through the touch screen interface.

Target systems "required" features:

- Track rails must be a completely closed "box" design - 12 Ga. cold roll formed - zinc plated.
- Track must not be electrified or utilize bus bars/ feed rails/ cables or other devices for power or control signal delivery.
- Target system must not use an overhead drive motor - above the shooters head - for target transport.
- Target system must be NiMH battery powered.
- Each Target system must have a self engaging docking station at the firing line - for battery re-charge.
- Target systems transport carrier must incorporate a light with 10 levels of illumination - which can also be programmed to simulate a 3 round burst of muzzle flash.
- Target carrier's gripper assembly must have aggressive adjustable teeth to accommodate varying target & cardboard backers thicknesses.
- Target carriers are self propelled.
- Target carrier's side panels are made from minimum 12 G. (.105") HR steel.

2.7 CONTROL SYSTEM

Controls for 15 shooting stalls

Compatible with integrated local control smartpad or electric keypad controller for target retrieval at each shooting stall

Integrated overhead lighting.

Integrated two way speaker system

Sound Requirements. Factory designed by Range equipment company or installed after target and stall systems.

- Two way mic and speaker system with wireless microphone capability. Range control booth mic to students on range. Range to booth mic for student communication to range master. Wireless mic to range speaker capability so that range master may control and use range commands outside of range control booth.
- A. Meggitt Model RM9000 Master Control: Provide complete manual and automatic (programmed) operation of the firing range.
1. General Description: Master control consists of required hardware and software components necessary to carry out the functions described in this specification.
 - b. Hardware based on an IBM PC compatible computer with additional components and assemblies as necessary.
 - b. Master control software operates in the Windows XP environment.
 2. Functional Description: Master control shall provide the following functions:
 - a. Manually or automatically control the full potential of all target types required including face-left, face-right, random face, conceal, re-expose last face, pop-up, swing-up, swing-out, hit fall, hit return, hit sensitivity adjust, target illumination, clear hits, hit scores, and target movements such as downrange positioning and return for monorail target systems and lateral direction and speed control for moving target systems.
 - b. Allow entry, editing, permanent storage, retrieval, execution and deletion of conventional courses of fire (one shooter/one target) as well as advanced programs (one shooter/multiple targets).
 - c. Permit starting, stopping, pausing, continuing, and restarting programmed courses and scenarios.
 - d. Stop course in progress in the event of an emergency determined by the operator or automatically upon an encroachment into the secure area protected by the optional security system.
 - e. Download stored programs to selected individual control units.
 - f. Display targets graphically on the monitor in a manner representative of range layout.
 - g. Range display can be zoomed to any level desired by the operator.
 - h. Allow the writing of programmed scenarios to perform automatic,

timed target operation.

- i. Sections of programs can be skipped, repeated, and executed individually.
- j. Provide on-line help through a HELP menu.
- k. Provide dialog boxes, menus, buttons and other boxes as would be normally associated with Windows-based software.
- l. Provide the following menu items as a minimum:
 1. Controls - selects various target devices and target control functions.
 2. Program - controls all program functions including buttons for Run, Pause, Reset, Step, and Close. Display Status, Elapsed Time, Step, Instruction, Comment, Delay, Cycle.
 3. Signals - controls signal light and Rangemaster call functions.
 4. Security - controls firing line and door security functions.
 5. View - allows zoom in/out and simulation views.
 6. Help - on-line help system functions.
- m. Minimum System Requirements: The master control shall consist of the following as a minimum:
 1. IBM PC compatible desktop computer.
 2. Pentium IV processor, 1.7 MHz.
 3. 256 MB RAM.
 4. 40 GB hard disk drive.
 5. CD- ROM.
 6. VGA Monitor, 17 inch.
 7. 1 serial and 1 parallel port.
 8. Microsoft Windows XP.
 9. Range Interface Adaptor.
 10. PC to RIA serial cable.

PART 3 - EXECUTION

3.1 INSTALLATION:

Install equipment in accordance with manufacturer's recommendations, the NEC, NEMA, as shown on the drawings and/or as required by other sections of these specifications.

3.2 FIELD TESTS

Megger all motors after installation, before start-up. All shall test free from grounds.

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