

SECTION 11486

SHOOTING RANGE EQUIPMENT

Display hidden notes to specifier. (Don't know how? <u>Click Here</u>) Copyright 2010 - 2011 ARCAT, Inc. - All rights reserved

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial, Law Enforcement and Military Range Equipment.
- B. Turn-key Design and Construction Services:
 - 1. Bullet Traps.
 - 2. Baffles.
 - 3. Safety Ceiling.
 - 4. Ballistic Wall System.
 - 5. Acoustical Treatment.
 - 6. Fully Contained Range.
 - 7. Live Fire Shoot House.
 - 8. Portable Bullet Traps.
 - 9. Ballistic Rubber.

1.2 RELATED SECTIONS

- A. Section 02300 Earthwork.
- B. Section 03150 Concrete Accessories: Concrete anchors
- C. Section 03300 Cast-In-Place Concrete.
- D. Section 05100 Structural Metal Framing.
- E. Section 05500 Metal Fabrications.

1.3 REFERENCES

- A. ASTM E 84 Test method for the Surface Burning Characteristics of Building Materials.
- B. American Welding Society (AWS) D1.1 Structural Welding Code Steel.
- C. ASTM A514/A514M Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding.
- D. ASTM C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain,

and Sewer Pipe.

- E. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- F. Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
- G. National Rifle Association (NRA) of America The NRA Range Source Book.
- H. Environmental Protection Agency (EPA) Best Management Practices for Lead at Outdoor Shooting Ranges.
- I. Public Law: Title 29 Code of Federal Regulations (CFR) 1910.1025, Lead.
- J. Test Report: Ballistic Standards by Product, dated December 31, 2008 by Range Systems.
- K. ASTM E90 Laboratory Sound Transmission Class
- L. CEHNC 1110-1-23, USACE Design Manual for Ranges http://www.hnd.usace.army.mil/rdg/InterTemplate.aspx.
- M. TC 25-8, Army Training Ranges, 05 April 2004 https://atiam.train.army.mil/soldierPortal/atia/adlsc/view/public/7465-1/TC/258/TOC.HTM.
- N. US Army Study (Picatinny Arsenal) ballistic rubber capabilities and performance testing. Acceptable penetration and stopping power with specific use of 7.62 mm (M80 Ball) and 5.56 mm (M855 Ball). Field-test shows minimal ricochet at limited incidence of angle with specific use of 7.62 mm (M80 Ball), 5.56 mm (M855 Ball and M193 Ball) from M14 rifle, M16A2, M16A1, and the M4A1 carbine.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings prepared by the manufacturer showing plans, sections, elevations, layouts, profiles, and product component locations, including anchorage, bracing, fasteners, accessories, and finishes.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. Closeout Submittals: Provide manufacturer's maintenance and operation instructions that include recommendations for periodic checking and adjustment of systems and maintenance of all components. One year warranty on manufacturing defects.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have a minimum of 5 years manufacturing similar equipment, and be a certified contract holder for the General Services Administration (GSA) with a current license.
- B. Installer Qualifications: Minimum 2 years experience installing similar equipment and

acceptable to the equipment manufacturer.

- 1.6 DELIVERY, STORAGE, AND HANDLING
 - A. Store products in manufacturer's unopened packaging until ready for installation.
 - B. Store and dispose of solvent-based materials, and materials used with solventbased materials, in accordance with requirements of local authorities having jurisdiction.
 - C. Store materials protected from exposure to rain, snow or other harmful weather conditions
- 1.7 PROJECT CONDITIONS
 - A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: RANGE SYSTEMS by Renew Resources, Inc., which is located at: 5121 Winnetka Ave. N. ; New Hope, MN 55428; Toll Free Tel: 888-999-1217; Tel: 763-533-9200; Fax: 763-537-6657; Email: <u>request info (briang@rangesystems.com</u>); Web: <u>www.range-systems.com</u>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- 2.2 SYSTEM DESIGN AND INSTALLATION SERVICES
 - A. Provide the following services in connection with the delivery of ballistic range systems:
 - 1. Sales and Customer Support: Provide knowledgeable customer service and sales staff familiar with the requirements of live fire shooting environments.
 - 2. Design: Provide design staff experienced in designing live fire environments, and the products used in those environments.
 - a. Design/Engineering/Architectural Services.
 - b. Environmental Control (HVAC Systems).
 - 3. Technical Support: Technical personnel shall have the experience and knowledge to provide equipment installation, on-site technical support, new equipment training, and operations and maintenance guidance.
 - a. Installation.
 - b. On-site Technical Support.
 - c. Maintenance Programs.
 - 4. Equipment shall be assembled entirely by mechanical fasteners. No on the job cutting or welding is permitted.
- 2.3 RANGE DESIGN CRITERIA:
 - A. Bullet Traps:
 - 1. Pistol and Rifle Rated: Dimensions shall be as indicated on the drawings.
 - 2. Encapsulator[™] Bloc Trap as manufactured by Range Systems for capturing jacketed, semi-jacketed and non-jacketed, shot and slug projectiles with

minimum muzzle velocities of 600 feet per second (FPS) (183 meters per second) to .308/7.62 mm grade, certified up to 3700 ft-lbs (5017 joules) of impact. Encapsulator™ Bloc Trap captures projectiles fired from oblique angles and point-blank range without back-splatter or ricochet. Tracer or incendiary rounds are NOT permitted.

- a. Trap assembly includes 3/8 inch (9.5 mm) thick AR 500 steel back plate clad with 2 inch thick (51 mm) Dura-Panel[™] anti-ricochet rubber tile. A series of Dura-Bloc[™] ballistic rubber are positioned relative to the direction of incoming rounds and secured in place by a proprietary compression system installed on top of the trap assembly and protected with a ballistic faceplate.
- b. The self-healing properties of Dura-Bloc[™] ballistic rubber close up the bullet's path after the round has penetrated the surface so each bullet is encapsulated inside the Dura-Bloc[™] ballistic rubber material.
- c. Encapsulates standard handgun and frangible rounds and will defeat armor piercing and non-armor piercing, with appropriate steel armor plate backing. Dura-Panel[™] ballistic rubber surface is self-healing to 2,500 rounds distributed uniformly over the panel surface area without eroding, deteriorating, or significantly distorting the surface. Dura-Bloc[™] ballistic rubber surface is self-healing to 5,000 rounds distributed uniformly over the bloc.
- d. Trap assembly is modular in design to allow installation to a wall structure or as a free-standing assembly.
- e. Full trap assembly provides a footprint depth of 20 inches (508 mm).
- f. Formulated rubber ballistic material will be a mixture of modified high density composite rubber based particles and bonding agents, cold molded under high pressure to form dimensionally stable ballistic panels and blocks.
- 3. Encapsulator[™] Grantrap as manufactured by Range Systems for capturing jacketed, semi-jacketed and non-jacketed, shot and slug projectiles with velocities 600 feet per second (FPS) (183 meters) to .308/7.62 mm grade, certified up to 3600 foot-pounds (4881 joules) of impact. Encapsulator[™] Grantrap captures projectiles fired from oblique angles and point-blank range without back-splatter or ricochet. Tracer or incendiary rounds are NOT permitted.
 - a. Trap Assembly includes a support frame inclined relative to the direction of incoming projectiles.
 - b. Support frame includes an inclined support surface fabricated from 10 gauge steel and supported by a steel truss structure arranged and configured to properly support the granular rubber media.
 - c. Rubber granulate material fills the area within the support frame.
 - d. Dura-Bloc[™] ballistic rubber forms the front edge of the trap assembly to contain the rubber granulate fill and capture, rather than redirect, errant rounds.
 - e. A hopper located above the target region of the trap provides a supplemental volume of rubber granulate to maintain a constant depth of material. The front facing of the hopper is constructed of AR 500 steel and covered with 2 inch (51 mm) thick Dura-Panel™ rubber to provide ballistic protection and capture errant shots. To accommodate lower ceiling height, trap assembly will be complete without hopper components.
 - f. An optional self-healing rubber membrane cover reduces migration of rubber granulate material.
- B. Baffles: Placement as indicated on Drawings.
 - 1. Rifle Rated (suitable for indoor and outdoor installation)

- a. Dura-Panel[™] ballistic baffle as manufactured by Range Systemsto provide ballistic protection from rounds up to 7.62 mm grade, certified up to 3700 foot-pounds (5017 joules) of impact.
- b. Baffle will provide anti-ricochet protection and capture and contain errant rounds, rather than redirect.
- c. Dura-Panel[™] baffle is constructed of 3/8 inch (9.5 mm) thick AR 500 steel plate backer finished with a front covering of 2 inch (51 mm) thick Dura-Panel[™] ballistic rubber. Each baffle panel encapsulates up to 2,500 rounds per panel.
- d. Dura-Panel[™] baffle sections can be bridged from wall to wall or suspended from ceiling. Provide appropriate attachment hardware.
- e. Formulated rubber ballistic material will be a mixture of modified high density composite rubber based particles and bonding agents, cold molded under high pressure to form dimensionally stable ballistic panels.
- 2. Pistol Rated (suitable for indoor and outdoor installation):
 - a. Dura-Panel[™] ballistic baffle as manufactured by Range Systems to provide ballistic protection from rounds up to 7.62 mm grade, certified up to 3700 ft-lb (5017 joules) of impact.
 - b. Baffle will provide anti-ricochet protection and capture and contain errant rounds, rather than redirect.
 - c. Dura-Panel[™] baffle is constructed of 1/4 inch (6.35 mm) thick AR 500 steel plate backer finished with a front covering of 2 inch (51 mm) thick Dura-Panel[™] ballistic rubber. Each baffle panel encapsulates up to 2,500 rounds per panel.
 - d. Dura-Panel[™] baffle sections can be bridged from wall to wall or suspended from ceiling. Provide appropriate attachment hardware.
 - e. Formulated rubber ballistic material will be a mixture of modified high density composite rubber based particles and bonding agents, cold molded under high pressure to form dimensionally stable ballistic panels.
- C. Safety Ceiling: Placement as indicated on Drawings.
 - 1. Rifle Rated: Ballistic safety ceiling as manufactured by Range Systems to provide ballistic protection from rounds up to 7.62 mm grade, certified up to 3,700 foot-pounds (5017 joules) of impact.
 - a. Ceiling system shall shelter gallery ceiling from the firing line to a distance downrange determined by range layout and activity.
 - b. Ceiling system will provide anti-ricochet protection and capture and contain errant rounds.
 - c. Ballistic safety ceiling system shall be constructed of 3/8 inch (9.5 mm) thick AR 500 steel plate backer and finished with a front covering of 2 inch thick (51 mm) Dura-Panel[™] ballistic rubber. Safety ceiling will be modular in construction.
 - d. Ceiling panels can be bridged from wall-to-wall or suspended from ceiling structure. Provide appropriate attachment hardware with system.
 - e. Formulated rubber ballistic material will be a mixture of modified high density composite rubber based particles and bonding agents, cold molded under high pressure to form dimensionally stable ballistic panels.
 - 2. Pistol Rated: Ballistic safety ceiling as manufactured by Range Systems to provide ballistic protection from rounds up to 7.62 mm grade, certified up to 3,700 foot-pounds (5017 joules) of impact.
 - a. Ceiling system shall shelter gallery ceiling from the firing line to a distance downrange determined by range layout and activity.

- b. Ceiling system will provide anti-ricochet protection and capture and contain errant rounds.
- c. Ballistic safety ceiling system shall be constructed of 1/4 inch (6.35 mm) thick AR 500 steel plate backer and finished with a front covering of 2 inch thick (51 mm) Dura-Panel[™] ballistic rubber. Safety ceiling will be modular in construction.
- d. Ceiling panels can be bridged from wall-to-wall or suspended from ceiling structure. Provide appropriate attachment hardware with system.
- e. Formulated rubber ballistic material will be a mixture of modified high density composite rubber based particles and bonding agents, cold molded under high pressure to form dimensionally stable ballistic panels.
- D. Ballistic Wall System: As shown on Drawings.
 - 1. Rifle rated ballistic tactical wall system as manufactured by Range Systems is modular to facilitate ease of installation.
 - a. Ballistic tactical wall system is constructed of 3/8 inch (9.5 mm) thick AR 500 steel plate backer and finished with a front covering of 2 inch thick (51 mm) Dura-Panel[™] ballistic rubber. Each ballistic rubber wall panel measures 2 feet by 2 feet by 2 inches (610 mm by 610 mm by 51 mm) and encapsulates up to 2,500 rounds per panel. Manufacturer's dimensional tolerance +/- 1/4 inch length and width.
 - 2. Pistol rated ballistic tactical wall system as manufactured by Range Systems is modular to facilitate ease of installation.
 - a. Ballistic tactical wall system is constructed of 1/4 inch (6.35 mm) thick AR 500 steel plate backer and finished with a front covering of 2 inch thick (51 mm) Dura-Panel[™] ballistic rubber. Each ballistic rubber wall panel measures 2 feet by 2 feet by 2 inches (610 mm by 610 mm by 51 mm) and encapsulates up to 2,500 rounds per panel. Manufacturer's dimensional tolerance +/- 1/4 inch length and width.
- E. Acoustical Treatment: As shown on Drawings.
 - 1. Acoustic Dura-Panel[™] as manufactured by Range Systems
 - a. Acoustic Dura-Panel[™] has a 0.65 Noise Reduction Coefficient (NRC) rating to reduce noise in range. Applied to surfaces in the range, the channeled finish of Acoustic Dura-Panel[™] disrupts and dissipates sound wave patterns, minimizing gunfire noise.
 - b. Each Acoustic Dura-Panel[™] measures 2 feet by 2 feet by X inches (610 mm by 610 mm by X mm).
 - c. When directly applied to AR 500 steel, Acoustic Dura-Panel[™] captures bullets intact and encapsulates up to 2,000 rifle rounds per panel.
 - d. Acoustic Dura-Panel has a Sound Transmission Class (STC) rating of 29 as determined in accordance with ÅSTM E-413-04 "Classification for Rating Sound Insulation

2.4 LIVE-FIRE SHOOT HOUSE: LAW ENFORCEMENT

- A. System: Standardized parts, Modular design, Armored protection, Shoot House (SMASH) System as manufactured by Range Systems. SMASH[™] components are interchangeable and reconfigurable.
 - 1. Provide a 360 degree live fire environment in a fully modular, reconfigurable shoot house system as indicated or required by the drawings.
 - 2. Shoot house walls shall be designed to eliminate any possibility of shootthrough during live fire exercises and shall eliminate ricochet and splatter.
 - 3. Interior shoot house ballistic walls will consist of 3/8 inch (9.5 mm) AR 500

ballistic plate steel, steel support tubing, steel support angle, connection bolts and anchors, and 2 inch (50 mm) thick *Dura-Panel[™] anti-ricochet ballistic rubber adhered directly to steel surface with "no air gap" between the rubber and steel wall. No air gap significantly reduces airborne lead particulates and increases durability by eliminating the need for wood backing.

- 4. Standard room layouts shall utilize 2 foot (610 mm) dimensional increments AR 500 steel and Dura-Panel[™] Walls. Custom room dimensions can be provided.
- 5. Connections between panels shall be mechanical (not welded) and include a dual external wall seam plate system to provide continuous ballistic protection.
- 6. Shoot house shall be designed to be quickly assembled and disassembled using patented and ballistic tested fasteners.
- 7. Catwalk system shall be modular and non-permanent attachment with bolts. Catwalk shall be galvanized steel and designed and constructed to carry a working load of 100psf and shall have railings installed on all sides.
- 8. Shoot house shall include entry points such as breach and standard pre-hung doors. All doors shall be framed to allow installation of 36" wide x 80" high doors.
- 9. Breach doors shall be capable of supporting mechanical, explosive, and shotgun breaches. Breach doors shall lead in and out of the shoot house, shall swing inwardly, and withstand all operational and environmental requirements as specified.
- 10. Components: Refer to drawings for scope and configurations. Construction may include, but is not limited to, the following elements:
 - a. Multi-story designs.
 - b. Ballistic ceilings/roof.
 - c. Ballistic stairwells and stairways.
 - d. Ballistic breaching doors/windows.
 - e. Ballistic sliding doors/windows/wells.
 - f. Ballistic pivot walls.
 - g. Exterior ballistic protection.
 - h. Lighting.
 - i. Target systems.
 - j. Closed circuit camera system.
 - k. NIOSH compliant HVAC system.
 - I. Concrete slab.

2.5 LIVE-FIRE SHOOT HOUSE: MILITARY

- A. System: Standardized parts, Modular design, Armored protection, Shoot House (SMASH) System as manufactured by Range Systems. SMASH™ components are interchangeable to provide a 360 degree live fire shooting environment in a fully modular, deployable, reconfigurable shoot house system as indicated or required by the drawings.
 - 1. Performance: Live fire shoot house shall be ballistically capable to accommodate the use of 7.62mm NATO and 5.56mm NATO, .45 cal, 9 mm NATO, .12 GA shotgun slugs, 00 buck and sabot rounds.
 - 2. Shoot house walls shall be designed to eliminate any possibility of shootthrough during live fire exercises and shall eliminate ricochet and splatter.
 - 3. Interior shoot house ballistic walls will consist of AR 500 ballistic plate steel, 3/8 inch (9.5 mm) typical, 1/2 inch (13 mm) where noted or required for ballistic rating, steel support tubing, steel support angle, connection bolts and anchors, and 50 mm thick (2 inch) *Dura-Panel anti-ricochet ballistic rubber adhered directly to steel surface with "no air gap" between the rubber and steel wall. No air gap significantly reduces airborne lead particulates and

increases durability by eliminating the need for wood backing.

- 4. Encapsulating ballistic rubber Dura-Bloc[™] Hotwalls placement in high impact or target areas shall maintain the ballistic integrity of the live fire shoot house.
- Standard room layouts shall utilize 2 foot (610 mm) dimensional increments AR 500 steel and Dura-Panel Walls. Custom room dimensions can be provided.
- 6. Connections between panels shall be mechanical (not welded) and include a dual external wall seam plate system to provide continuous ballistic protection.
- 7. Shoot house shall be designed to be quickly assembled and disassembled using patented and proprietary connectors.
- 8. Depending on ballistic capability levels, shoot house shall maximize the use of portable bullet traps or Dura-Bloc[™] Hotwall placement in high impact or target areas to maintain the integrity of the facility and ensure a safe training environment.
 - a. Shoot house shall be equipped with portable bullet traps.
 - 1) Each bullet trap shall be capable of being moved by two soldiers and shall have the ability to be moved to various wall positions.
 - 2) The size of each portable bullet trap shall be determined by manufacturer.
 - 3) Bullet traps shall be made to encapsulate all acceptable rounds and shall not present ricochet and splatter hazards. Test data is required for the absorption and non-ricochet of live-fire rounds tested randomly from 15 degrees to 90 degrees of baseline defined as any internal protected structural surface.
 - 4) Encapsulates standard handgun and frangible rounds and will defeat armor piercing and non-armor piercing. Ballistic rubber surface of bullet trap is self-healing to 2,500 rounds distributed uniformly over the trap surface area without eroding, deteriorating, or significantly distorting the surface.
 - b. Shoot house shall be equipped with Dura-Bloc[™] Hotwalls in high impact or target areas.
- 9. Catwalk system shall be modular and non-permanent attachment with bolts. Catwalk shall be galvanized steel and designed and constructed to carry a working load of 100 psf and shall have railings installed on all sides.
- 10. Shoot house shall include entry points such as breach and standard pre-hung doors. All doors shall be framed to allow installation of 36 inches wide by 80 inches high (914 mm by 2032 mm) doors.
- 11. Breach doors shall be capable of supporting mechanical, explosive, and shotgun breaches. Breach doors shall lead in and out of the shoot house, shall swing inwardly, and withstand all operational and environmental requirements as specified.
- 12. Components: Refer to drawings for scope and configurations. Construction may include, but is not limited to the following elements:
 - a. Multi-story designs.
 - b. Ballistic ceilings/roof.
 - c. Ballistic stairwells and stairways.
 - d. Ballistic breaching doors/windows.
 - e. Ballistic sliding doors/windows/wells.
 - f. Ballistic pivot walls.
 - g. Exterior ballistic protection.
 - h. Lighting.
 - i. Target systems.
 - j. Closed circuit camera system.
 - k. NIOSH compliant HVAC system.
 - I. Concrete slab.

2.6 PORTABLE BULLET TRAPS

- A. Product: Portable Encapsulator[™] Trap as manufactured by Range Systems.
 - Constructed of patented formula composite rubber and backed by 3/8 inches (9.5 mm) AR500 ballistic steel edges and backplate. Bullet stopping power up to standard 7.62mm and 5.56mm green tip. The rubber bullet encapsulation system virtually eliminates ricochet and splatter. Rubber block compression system included. This unit disassembles to its component parts for easy transport. Heavy duty casters with brakes and tubular steel construction. 82 inches H by 25 inches W by 21 inches D (2083 mm by 635 mm by 533 mm). Weight 655 lb (297 kg).
- B. Product: Portable Tactical Trap on Stand as manufactured by Range Systems.
 - Constructed of patented rubber composite and 3/8 inch (9.5 mm) AR500 ballistic steel back plate with 2 inches (51 mm) ballistic steel edges. Accommodates up to standard 7.62mm. ammunition. Shooting surface is 24 inches by 36 inches (610 mm by 914 mm) and bottom edge of trap is 36 inches (914 mm) off the floor. Overall unit height is 60 inches (1524 mm). Weight 216 lb (98 kg).
 - 2. Portable Tactical Trap mounting system allows the trap to be stand or wall mounted. Specify H stand or Corner stand. Hardware provided.
- C. Product: 2.5D Portable Encapsulator[™] Trap as manufactured by Range Systems.
 - Constructed of patented formula composite rubber and backed by 3/8 inches (9.5 mm) AR500 ballistic steel edges and backplate. Bullet stopping power up to standard 7.62 mm and 5.56 mm green tip. The rubber bullet encapsulation system virtually eliminates ricochet and splatter. Rubber block compression system included. This unit disassembles to its component parts for easy transport.
 - 2Shooting surface area is 24 inches by 44 inches (610 mm by 1118 mm). Unit dimensions are 79 inches H by 28 inches wide by 26 inches deep (2007 mm by 711 mm by 660 mm). Weight is 700 lb (318 kg).

2.7 BALLISTIC RUBBER PROTECTION MATERIAL

- A. Product: Dura-Panel as manufactured by Range Systems. NSN: 9320-01-565-6156. Provides anti-ricochet protection at indoor and outdoor ranges when used as part of the Encapsulator system. Made of patented rubber composite. Each panel measures 24 inches by 24 inches by 2 inches (610 mm by 610 mm by 51 mm) and weighs 34 lb (15.4 kg). Dura-Panel™ is designed to prevent ricochet and splatter of standard pistol and rifle rounds up to .308 / 7.62 mm. Dura-Panel can be applied directly to steel, concrete or plywood using an industrial adhesive. Each panel will take approximately 2200 rounds before replacement is required depending on bullet type and distribution of wear.
- B. Product: Super Dura-Panel as manufactured by Range Systems. 48 inches by 24 inches by 2 inches (1220 mm by 610 mm by 51 mm) 70 lb (31.7 kg).
- C. Product: Dura-Panel EXP as manufactured by Range Systems. Same properties as the Dura-Panel with added low volume tracer extinguishing properties.
- D. Product: Acoustic Dura-Panel[™] as manufactured by Range Systems. Acoustic Dura-Panel[™] is an effective noise control measure for indoor firing ranges. The channeled exterior finish disrupts sound wave patterns so they quickly dissipate resulting in a reduction of reverberation and its rubber composition assists with noise abatement by absorbing airborne sounds. Total weight: 34 lb (15.4 kg). 24 inches by 24 inches by 2 inches (610 mm by 610 mm by 51 mm) To be used with the

Encapsulator[™] system. NRC rated. The NRC for the Acoustic Dura-Panel is .65 eliminating 65 percent of all noise it comes in contact with. Acoustic Dura-Panels can be applied directly to steel, concrete or plywood using an industrial adhesive. Each panel will take approximately 2200 rounds before replacement is required depending on bullet type and distribution of wear.

- E. Product: Acoustic Dura-Panel EXP as manufactured by Range Systems. Same properties as the Acoustic Dura-Panel with added low volume tracer extinguishing properties
- F. Product: Dura-Bloc as manufactured by Range Systems. NSN: 9320-01-565-6471. Made of patented rubber composite. Designed to encapsulate ammunition up to 7.62 caliber. Reduces airborne lead. Total weight: 74 lb (33.5 kg) per block. 24 inches L by 12 inches W by 9 inches H (610 mm by 305 mm by 229 mm).
- G. Product: Super Dura-Bloc as manufactured by Range Systems. NSN: 9320-01-565-6464. Measuring 24 inches by 8.5 inches by 48 inches (610 mm by 216 mm by 1219 mm). Designed to encapsulate standard ammo up to 7.62mm. 275 lb (124 kg).
- H. Product: Three Foot Dura-Bloc as manufactured by Range Systems. NSN: 9320-01-565-6480. 36 inches by 12 inches by 9 inches (914 mm by 305 mm by 229 mm).
- I. Product: Dura-Bloc EXP as manufactured by Range Systems. Same properties as the Dura-Bloc with added low volume tracer extinguishing properties.
- J. Product: Three foot Dura-Bloc EXP as manufactured by Range Systems. Same properties as the Three foot Dura-Bloc with added low volume tracer extinguishing properties.
- Froduct: Corner-Bloc as manufactured by Range Systems. NSN: 9320-01-565-6480. 34 lb (15.4 kg). 16 inches L by 8 inches W by 8 inches H (406 mm by 302 mm by 302 mm).
- L. Product: Corner-Bloc EXP as manufactured by Range Systems. Same properties as the Corner-Bloc with added low volume tracer extinguishing properties

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until exterior locations, structure and installing surfaces have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- 3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.END OF SECTION