

SECTION 08116

BULLET-RESISTANT STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Bullet-resistant steel door and frame systems.
- B. Door hardware for bullet-resistant steel door and frame systems.

1.2 RELATED SECTIONS

- A. Section 08710 - Door Hardware.
- B. Section 08800 - Glazing.
- C. Section 09900 - Paints and Coatings.

1.3 REFERENCES

- A. AISC Manual of Steel Construction; American Institute of Steel Construction.
- B. AISI Cold Formed Steel Design Manual; American Iron and Steel Institute.
- C. ASTM A 366 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- D. ASTM A 569 - Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality.
- E. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
- F. ASTM E 152 - Method for Fire Test of Door Assemblies.
- G. Formulas for Stress and Strain; J. W. Roark and W. C. Young; McGraw-Hill Book Company.
- H. HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; Hollow Metal Manufacturers Association.
- I. NFPA 80 - Fire Doors and Windows.

- J. Simplified Design of Structural Steel; Harry Parker and James Ambrose; Wiley-Interscience Publication, John Wiley and Sons.
- K. Structural Design for Dynamic Loads; Norris, Hansen, Holley, Briggs, Namyet, and Minami; McGraw-Hill Book Company.
- L. TM5-855-1 - Fundamentals of Design for Conventional Weapons; Department of the Army.
- M. TM5-1300 - Structures to Resist the Effects of Accidental Explosions.
- N. UL 10B - Fire Tests of Door Assemblies.
- O. UL 752 - Bullet Resistant Equipment.

1.4 SYSTEM DESCRIPTION

- A. Design requirements: Comply with applicable recommendations of the following:
 - 1. AISC Manual of Steel Construction.
 - 2. AISI Cold Formed Steel Design Manual.
 - 3. TM5-855-1.
 - 4. TM5-1300.
 - 5. Formulas for Stress and Strain.
 - 6. Simplified Design of Structural Steel.
 - 7. Structural Design for Dynamic Loads.
- B. Performance requirements:
 - 1. Bullet resistance requirements: Withstand bullet resistance level as follows, in accordance with and tested by UL 752:
 - a. _____ M.P.S.A.
 - b. _____ H.P.S.A.
 - c. _____ S.P.S.A.
 - d. _____ H.P.R.
 - 2. Bullet resistance ratings: Test assemblies in accordance with UL 752 for specified ratings, assemblies bearing labels of that agency.
 - 3. Fire resistance ratings:
 - a. Fire-rated assemblies to be tested in accordance with ASTM E 152 (UL 10B) for specified fire resistance ratings, approved by Underwriters

- Laboratories, Inc., and to bear fire rating seal of that agency.
- b. Fire resistance rating: ___.
 - c. Fire resistance ratings are indicated on drawings.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Minimum five (5) years documented experience producing products specified in this section.
 - 2. Installer: Minimum five (5) years documented experience installing products specified in this section.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop drawings: Indicate capability of door and frame assemblies to meet requirements of design data; include the following:
 - 1. Door and frame elevations and sections.
 - 2. Location and details of all openings; include door hanging and latching hardware in a schedule.
 - 3. Material types, gages, locations, and fabrication details of system components; include all reinforcements.
- C. Quality assurance submittals:
 - 1. Design data: Bullet resistance analysis design calculations for specific project conditions, certifying system conformance to specified performance requirements; design calculations to bear seal and signature of registered professional structural engineer licensed to practice in the state in which the project is located.
 - 2. Certificates: Contractor's certification that:
 - a. Products of this section, as provided, meet or exceed specified requirements.
 - b. Manufacturer of products of this section meets specified qualifications.
 - c. Installer of products of this section meets specified qualifications.
 - 3. Manufacturer's instructions: Printed installation and adjusting instructions for systems.

- D. Closeout submittals: Warranty documents, issued and executed by manufacturer of systems, countersigned by Contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store units in accordance with requirements of HMMA 840.
- B. Remove wraps or covers from doors and frames upon delivery at the building site; clean and touch-up scratches or disfigurement caused by shipping or handling promptly with rust inhibitive primer.
- C. Store units on planks or dunnage in a dry location; store doors in a vertical position spaced by blocking.
- D. Store units covered to protect them from damage, but permitting air circulation.

1.8 WARRANTY

- A. Manufacturer's warranty: Furnish system manufacturer's standard 2-year warranty against defects in product workmanship and materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturer: Krieger Steel Products, 4880 Gregg Road, Pico Rivera CA 90660; ASD. Tel: 562-695-0645, Fax: 562-692-0146.
- B. Requests for substitution will be considered in accordance with provisions of Section 01600.
- C. Substitutions: Not permitted.
- D. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

2.2 MATERIALS

- A. Steel sheet: One of the following:

1. Cold-rolled steel sheet conforming to ASTM A 366, commercial quality.
 2. Hot-rolled steel sheet conforming to ASTM A 569, pickled and oiled, commercial quality.
- B. Galvanized steel sheet: ASTM A 653/A 653M, minimum G90 zinc coating.
- C. Insulating material: One of the following:
1. Glass fiber.
 2. Rock wool.
 3. Polyurethane foam.
- D. Glazing for lites is specified in Section 08800.
- E. Primer: Manufacturer's standard.

2.3 COMPONENTS

- A. Doors: Fabricate in accordance with Architect-approved shop drawings, and as follows:
1. Thickness:
 - a. 1-3/4 inches (44 mm) minimum.
 - b. 2 inches (50 mm) minimum.
 2. Face sheets:
 - a. Doors for interior use: Steel sheet.
 - b. Doors for exterior use: Galvanized steel sheet.
 - c. Visible seams on face sheets not permitted.
 3. Core:
 - a. Stiffen face sheets with continuous vertical sections, formed of steel sheet, which, upon assembly, span full thickness of interior space between door faces.
 - b. Spot-weld stiffeners to both face sheets.
 - c. Fill spaces between stiffeners with insulating material.
 4. Vertical edges:
 - a. Join face sheets at vertical edges by continuous welding:
 - 1) Join door faces by continuous weld on each edge, extending full door height.
 - 2) Grind, fill, and dress welds to provide smooth flush surface.
 - b. Form edge profiles both vertical edges of doors as follows:
 - 1) Single acting swing doors: Bevel 1/8 inch in 2 inches (3.17 mm in 50 mm).

- 2) Double acting swing doors: Radius 2-1/8 inches (54 mm).
 - c. Visible seams on vertical edges not permitted.
- 5. Horizontal edges:
 - a. Close top and bottom edges of doors with inverted continuous recessed steel channels, 12 gage minimum; spot-weld channels to both door faces.
 - b. Provide openings in bottom closure of exterior doors to permit escape of entrapped moisture.
 - c. Provide additional flush closing channel at top edge of exterior doors; spot-weld channel to both door faces.
 - d. Provide additional flush closing channel at bottom edge of doors to receive weatherstripping; spot-weld channel to both door faces.
- 6. Hardware preparation:
 - a. Mortise, reinforce, drill, and tap doors at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
 - b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.
- B. Moldings and stops:
 - 1. Fabricate of same material as door face material, gage in accordance with Architect-approved shop drawings.
 - 2. Provide moldings to secure glazing for doors specified or scheduled to have glazed openings in accordance with opening sizes indicated on Architect-approved shop drawings.
 - 3. Weld fixed moldings to door on security side.
 - 4. Provide loose stops, countersunk for fasteners; secure stops to opening with fasteners of size, type, and spacing indicated on Architect-approved shop drawings.
 - 5. Form moldings with mitered corner joints.
- C. Glazed lites: Factory-assemble lites in doors indicated to have lites, using glazing materials specified in Section 08800; field assembly not permitted.
- D. Frames: Fabricate in accordance with Architect-approved shop drawings, and as follows:
 - 1. Frames for interior use: Fabricate from steel sheet, minimum 14 gage thickness.
 - 2. Frames for exterior use: Fabricate from galvanized steel sheet, minimum 14 gage thickness.

3. Form frame members straight, and of uniform profile through lengths in accordance with frame schedule and approved shop drawings.
 4. Stops: Form integral stops minimum 5/8 inch (15.8 mm) in depth.
 5. Fabricate frames as welded units with integral trim, of sizes and profiles indicated on approved shop drawings.
 - a. Weld contact edges of joints closed tight.
 - b. Miter perimeter trim faces and weld continuously.
 6. When shipping limitations so dictate, fabricate frames for large openings in sections designed for assembly in the field; install alignment plates or angles, of same material and gage as frame, at each joint.
 7. Hardware preparation:
 - a. Mortise, reinforce, drill, and tap frames at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
 - b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.
 8. Floor anchors:
 - a. Fabricate of material indicated on Architect-approved shop drawings; minimum 18 gage.
 - b. Weld anchors inside each jamb for floor anchorage.
 9. Jamb anchors:
 - a. Fabricate of material indicated on Architect-approved shop drawings; weld anchors inside each jamb for wall anchorage.
 - b. Provide anchor types for indicated adjacent wall construction.
 10. Plaster guards: Fabricate from minimum 26 gage galvanized steel; weld in place at hardware mortises on frames to be set in masonry or concrete openings.
 11. Provide welded frames with temporary steel spreader welded to jamb feet for bracing during shipping and handling.
- E. Teller windows: Fabricate in accordance with Architect-approved shop drawings, and as follows:
1. At sill, design and fabricate integral stainless steel pass tray to dimensions shown on drawings
 2. Provide appurtenance blocking to allow voice transference around glass perimeter.
- F. Door hardware:

1. Supply door hardware in accordance with Architect-approved shop drawings, and as follows:
 - a. Hinges: Butt hinges, US32D finish, minimum 1-1/2 pair per door leaf.
 - b. Locksets and latchsets: Lever-handle, type and finish matching locksets and latchsets specified in Section 08710.
 - c. Closers.
 - d. Exit devices: Manufacturer's "PanicAire" devices.
 - e. Thresholds: Exterior doors.
 - f. Flushbolts: Inactive leaf of pairs of doors.
 - g. Smoke gaskets.
2. Cylinders for locksets and exit devices are specified in Section 08710.

2.4 FINISHES

- A. Shop priming:
 1. After fabrication, fill and sand tool marks and surface blemishes on both faces and both vertical edges smooth and free from irregularities.
 2. Treat for paint adhesion, then apply primer to all accessible surfaces; allow to cure prior to shipment.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of conditions:
 1. Prior to installation, check and correct frames for size, swing, squareness, alignment, twist and plumb.
 2. Verify openings are in accordance with approved shop drawings.
- B. Installer's examination:
 1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
 2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
 3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.

4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 PREPARATION

- A. Remove steel spreaders from welded frames prior to installation; use of spreaders for installation purposes not permitted.

3.3 INSTALLATION

- A. Install units in accordance with Architect-approved shop drawings, manufacturer's printed installation instructions, requirements of HMMA 840, and requirements of UL 752.
- B. Install fire-rated assemblies in accordance with NFPA 80.
- C. Oversize assemblies:
 1. Weld field joints in accordance with AWS D1.1 and approved shop drawings.
 2. Finish exposed field welds smooth; touch-up with rust inhibitive primer.
- D. Finish surfaces having abrasion damage smooth; touch-up with rust inhibitive primer.
- E. Installation of door hardware is specified in Section 08710.
- F. Field painting is specified in Section 09900.
- G. Site tolerances: Do not exceed the following installation tolerances:
 1. Squareness: Plus or minus 1/16 inch (1.6 mm) measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
 2. Alignment: Plus or minus 1/16 inch (1.6 mm) measured on jambs on a horizontal line parallel to the plane of the wall.
 3. Twist: Plus or minus 1/16 inch (1.6 mm) measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
 4. Plumb: Plus or minus 1/16 inch (1.6 mm) measured on the jamb at the floor.

3.4 ADJUSTING

- A. Adjust installed doors for correct swings and site tolerances.

END OF SECTION