
SECTION 08110 - METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Hollow metal steel doors and frames including necessary accessories indicated on Drawings and specified in this Section and finish hardware installation.
- B. Related Sections:
 - 1. Section 04000 - Concrete Unit Masonry.
 - 2. Section 06100 - Rough Carpentry.
 - 3. Section 07920 - Sealants and Caulking.
 - 4. Section 08710 - Finish Hardware.
 - 5. Section 09100 - Metal Framing
 - 6. Section 09210 - Lathing, Plaster and Stucco
 - 7. Section 09900 - Painting.

1.02 REFERENCE STANDARDS

- A. Except as otherwise specified herein or shown on the Drawings, comply with the latest editions of all applicable codes and regulations including the applicable requirements of the following Reference Standards and Codes which are hereby made a part of this Section, as they relate to the metal doors and frames.
 - 1. BOCA Building Code, 2001 Edition.
 - 2. The Occupational Health and Safety Administration (OSHA) Code of Federal Regulations(CFR), Volume 29.
 - 3. American Society for Testing and Materials (ASTM):
 - a. A366-96 Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
 - b. A653/A-96 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - c. A924/A-96a Specs for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
 - d. C270-96a Specification for Mortar for CMU
 - 4. Factory Mutual (FM), latest edition.
 - 5. National Builders Hardware Association - "Recommended Locations for Builders", latest edition.
 - 6. Steel Door Institute (SDI), latest editions.
 - a. SDI 100 Standard Steel Doors and Frames, latest edition.
 - b. SDI 105 Recommended Erection Instructions for Steel Frames.

- c. SDI 107 Hardware on Steel Doors (reinforcement application).
- 7. Underwriters Laboratories (UL), latest edition.
- 8. UL 1784 Air Leakage Test of Door Assemblies.
- 9. National Fire Protection Association (NFPA)
 - a. NFPA 80 Standard for Fire Doors and Windows.
 - b. NFPA 101 Life Safety Code.
 - c. NFPA 105 Smoke and Draft Control Assemblies.
- 10. Americans with Disabilities Act and Accessibility Guidelines (ADA)
- 11. American National Standards Institute (ANSI):
 - a. A250.4-1994 Test Procedure and acceptance criteria for physical endurance, steel doors and frames.
 - b. A224.1-1980 Test Procedure and acceptance criteria for prime painted steel surfaces for steel doors and frames.
 - c. A117.1 Accessible and Usable Buildings and Facilities

1.03 SUBMITTALS

- A. Submit properly identified product data including manufacturer's specifications and installation directions before commencing work.
- B. Shop Drawings: Submit shop drawings for review, indicating model number, sizes, elevations, sections, jamb and head details, locations, fire labels, construction and erection details, methods of anchorage, gages, finishes, reinforcement, anchors, louvers, light openings, glazing stops and hardware locations. Do not proceed with any fabrication until all details are approved.
- C. Upon request, submit nonreturnable samples necessary to be evaluated for construction compliance.
- D. Label Construction Certification: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for each door and frame assembly constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

1.04 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies complying with NFPA 80 and have been tested, listed, and labeled according to UBC-43-2 and ISO-3008 by a nationally recognized independent testing and inspection agency.
- B. In addition to complying with other legal requirements, comply with:
 - 1. UL: Label requirements in accord with required classification.

- 2. Permanently attach label to frame and door in accord with UL procedures.
 - C. Provide doors and frames complying with SDI 100 and as specified.
- 1.05 DELIVERY, STORAGE, AND HANDLING
- A. Deliver steel doors and frames cartoned or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory finished doors.
 - B. Inspect steel doors and frames upon delivery for damage. Minor damage may be repaired if refinished items are equal in all respects to new work and acceptable to RESIDENT. Remove and replace damaged items as directed.
 - C. Store doors and frames at building site under cover. Place units on minimum 4 inch high wood blocking. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.
 - D. Deliver all doors and frames to the jobsite in a timely manner to not delay progress of other trades.

1.06 WARRANTY

- A. Hollow metal doors and frames shall be supplied with a 1 year warranty against defects in materials and construction.
- B. Warranty shall begin on date of substantial completion of the project.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide doors and frames from same manufacturer:
 - 1. The following manufacturers are accepted subject to requirements of this Section.
 - a. Curries Company, Mason City, IA.
 - b. Ceco Corporation, Door Division, Carol Stream, IL.
 - c. Quality Engineered Products Co., Tampa, FL.
 - d. Republic, Pembroke Pines, FL.
 - e. Steelcraft, Cincinnati, OH.
- B. Equivalent products of other manufacturers which meet the requirements of the Drawings and this Section may be provided if approved by the Resident.

2.02 HOLLOW METAL FRAMES

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- A. Fabricate interior frames to profiles indicated of 16- gage bonderized electro-zinc coated sheet steel in accordance with ASTM A366-72(1979) and ASTM A591-77(1983), Class C.
 - B. Fabricate exterior frames to profiles indicated, of 14-gage bonderized hot-dip zinc coated sheet steel in accord with ASTM A525 83, G90 or ASTM A526-80, 1.25 oz. zinc per sq.ft.
 - C. Frames: Fully welded, custom type, with mitered or butted head and jamb members with integral stops and with combination buck and trim as shown.
 - 1. Corners shall have continuous welds around, flush and smooth, without dishing.
 - 2. Metal frames in block walls shall be filled solid with grout.
 - D. Hardware Reinforcements and Preparations:
 - 1. Frames shall be mortised, reinforced, and drilled/ tapped for mortised hardware according to approved finish hardware schedule and templates by hardware supplier.
 - a. Drilling and tapping for surface applied hardware shall be done in the field.
 - b. Locate finish hardware according to "Recommended Locations for Builder's Hardware" published by National Builders Hardware Association, SREF, or as otherwise directed by Resident.
 - 2. Butt (Hinge) Reinforcing:
 - a. Steel plate 3/16" thick by 1-1/4" minimum to 1-1/2" maximum by 10 inches long, offset as required to have faces of butts flush with door frame edge and secured by not less than 6 spot welds.
 - 3. Strike Reinforcement: Offset clips of 12 gage steel, 1-1/4" x 4-7/8" long.
 - 4. Closer Shoe Reinforcing for Parallel Arm:
 - a. 12 gage steel plates (minimum 20" long x 1-3/4" wide) at bottom of door stop located next to door rabbet on hinge.
 - b. Provide Styrofoam or treated wood over plates to allow closer foot screws to seat without interference from grout fill.
 - E. Silencer (Mute) provisions: Punch frames to receive silencers on strike jamb scheduled in Section 08710 Finish Hardware.
 - F. Center Mullions, Fixed or Removable: Fabricate so that only one thickness of metal occurs at point of silencer punch-outs.
 - G. Grout:
 - 1. Grout Guards:
 - a. Provide 26 gage sheet metal covers welded to the back of frames at hinges, lock, bolts, tapped reinforcements at hardware and silencer locations.

- b. At Silencer locations, furnish suitable removable plugs in holes to keep grout free.
 - 2. Coatings:
 - a. Provide full coverage at frame interior before grouting with corrosion inhibiting bituminous coating.
 - 3. Grout at Frames:
 - a. Grout fill door frames at metal stud walls.
 - b. Grout fill-in-place door frames at masonry and concrete walls after installation.
 - c. Grout shall be a mortar mix complying with ASTM C270, Type S-1800 psi minimum.
- H. Jamb Anchors: Provide in accordance with frame manufacturer's recommendations for attachment to masonry walls, concrete columns and metal stud system as shown on Drawings.
- I. Floor Anchors: Provide 14 gage galvanized sheet steel angle shaped anchors for each jamb, which extends to the floor, punched for not less than two 1/4" diameter bolts.
- J. Spreaders: Provide frames with temporary steel spreader bars tack welded to jambs to maintain full rigidity and proper alignment during installation.
- K. Grout solid all hollow metal door frames.

2.03 HOLLOW METAL DOORS

- A. Fabricate interior doors from 16-gage bonderized electro-zinc coated cold-rolled stretcher leveled sheet steel in accordance with ASTM A366-72 (1979) and ASTM A591-77 (1983), Class C.
- B. Fabricate exterior doors from 16-gage bonderized hot-dip zinc coated sheet steel in accord with ASTM A525-83, G90 or ASTM A526-80, 1.25 oz zinc per s.f.
- C. Types: Custom flush, seamless hollow construction with louvers and vision cutouts as shown on Drawings.
- D. Sizes and Thickness: Sizes shall be as indicated and thickness 1-3/4 inches unless otherwise specified or shown.
 - 1. Provide undercuts where indicated for ventilation. 5/8-inch maximum undercut allowed for fire labeled doors.
- E. Door Perimeter:
 - 1. Stile Edges: Reinforce stile edges full height with 16 gage bonderized zinc coated

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- steel channels.
- a. Bevel for Single Acting Doors: 1/8 inch in 2 inches.
2. Door Tops: Reinforce door tops with full width 16 gage bonderized zinc coated steel channels. Exterior door tops shall have flush surface.
 3. Door Bottoms: Reinforce door bottoms with full width 16 gage bonderized zinc coated steel channels.
 - a. Provide weep holes in bottom of exterior doors on each side.
 4. Special Reinforcing: In accordance with Detail Sheets included with this section.
 - a. Lock Rail is to be one piece, full height minimum 16-gage channel.
 - b. Hinge Rail Reinforcement Manufacturer's Option:
 - (1). One piece, full height, 12 gage channel formed, and tapped for hinges.
 - (2). One piece, full height, minimum 16 gage channel formed and with minimum 3/16" thick steel by minimum 8" long at each hinge.
 - c. Cylindrical Lock Reinforcement: Minimum 16- gage standard hardware lock box.
 - d. Exit Device Reinforcement: Minimum 14 gage channel or box minimum 16" long by 3-1/2" wide.
 - e. Door closer reinforcement shall be minimum 12-gage channel, welded to top channel. Bottom of reinforcement shall be a minimum of 5-3/4" from top of door, by width of door.
 5. Astragals: Flat security type or "Z" as indicated in Drawings or Specifications.
 6. All doors shall comply with ANSI A250.4-1994 Level "A" criteria and be tested to 1,000,000 operating cycles and 23 twist tests.
 - a. Certification of Level "A" doors shall be submitted with approval drawings by the distributor.
 - b. Do not bid or supply any type or gage of door not having been tested and passed this criteria.
- F. Core Material:
1. Core Fill: All spaces between stiffeners shall be insulated with fiberglass or mineral insulation, as per manufacturer's standard.
- G. Stiffeners:
1. Doors shall have minimum 20 gage, continuous one piece, vertical steel stiffeners with shape standard to manufacturer, spaced not to exceed 6 inches apart and welded at 6 inches on center to face skin.

- H. Hardware Reinforcement and Preparation: Mortise, drill and tap for hardware in accordance with accepted finish hardware schedule and templates furnished by hardware supplier.
 - 1. Drilling and tapping for surface applied hardware shall be done in the field.
 - 2. Locate finish hardware in accordance with "Recommended Locations for Builder's Hardware", published by National Builders Hardware Association or as otherwise directed by Project Resident.
 - 3. Butt (Hinge) Reinforcing: 3/16 inch thick steel plate 1-1/4 inch minimum to 1-1/2 inch maximum x 10 inches long, offset where required, secured by not less than six spot welds.

2.04 FINISHING AND SHOP PAINT

- A. After Fabrication: Grind exposed weld marks smooth and flush, clean and degrease surfaces, apply metallic filler, sand smooth and apply shop coat of manufacturer's standard rust-inhibitive metal primer baked on.
- B. Prime Coat: Thoroughly cover all surfaces to provide uniform dry film thickness of not less than 1.0 mil without runs, smears, or bare spots.
- C. Primer Coat: Use manufacturer's standard rust inhibiting primer complying with ANSI A-224.1-1990.

PART 3 EXECUTION

3.01 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.02 INSTALLATION

- A. Frames:
 - 1. Install plumb, level, and true to line, secured in openings
 - 2. Install frames according to accepted shop drawings, manufacturer's printed instructions.
 - 3. Grout fill door frames at metal stud walls and grout fill-in-place all other doorframes after installation.
 - 4. Install fire-rated frames according to NFPA 80.
 - 5. Anchor frames in concrete with galvanized anchor bolts: 3/8" in. F.H. countersunk –

- 3 per jamb and 2 per head.
6. Anchor frames in steel stud partitions with steel stud anchors.
 7. Provide adjustable floor clips for all frames in metal stud walls.
 8. Provide mortar guards in frames for all hardware reinforcement.
 9. Wherever possible, leave frame spreader bars intact until frames are set perfectly square and plum and all anchors are securely attached.

B. Doors:

1. Install in openings plumb, level and true to line.
2. Apply hardware and adjust to achieve smooth and quiet operation.
3. Install (insect) (rat) screens on interior of exterior door louvers.
4. Place fire-rated doors with clearance as specified in NFPA 80.
5. Remove hardware, except prime-coated items, tag, box and re-install after finish painting has been completed.

3.03 ADJUST AND CLEAN

- A. Primer Coat Touch-Up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective plastic wrappings from prefinished doors.
- C. Fill all dents, holes, etc. with metal filler and sand smooth flush with adjacent surfaces-paint to match.
- D. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Provide final adjustment as follows:
 1. Door Contact With Silencers: Doors shall strike a minimum of two silencers without binding lock or latch bolts in the strike plate.
 2. Head, Strike, and Hinge Jamb Margin: 1/8".
 3. Meeting Edge Clearance, Pairs of Doors: +/- 1/16".
 4. Bolts and Screws: Leave tight and firmly seated.
 5. Sound seal gasketing.
 6. Vermin Protection:
 - a. Drop Seal: Full contact with no gasp.
 - b. Brush weather-stripping.

END OF SECTION