

SECTION 081113**STEEL DOORS AND FRAMES****PART 1 GENERAL****1.1 GENERAL REQUIREMENTS**

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the steel door and frame work as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.
 - 2. Interior hollow metal vision panels.
 - 3. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping necessary.
 - 4. Preparation of hollow metal doors to receive glazing where required.
 - 5. Steel louvers for hollow metal doors.
 - 6. Furnishing anchors for building into masonry and drywall.
 - 7. Factory prime painting of work of this Section.

1.3 RELATED SECTIONS

- A. Unit Masonry - Section 042000.
- B. Carpentry - Section 062000, for installation of doors and frames.
- C. Finish Hardware - Section 087100.
- D. Glass and Glazing - Section 088000.
- E. Gypsum Board Assemblies - Section 092116.
- F. Painting and Finishing - Section 099100.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- B. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of

construction, reinforcement for surface applied hardware, dimensions of profiles and hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.

- C. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
 - 1. Coordinate glazing frames and stops with glass and glazing requirements.
- D. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.
 - 1. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40" or less above the sill.
 - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.
 - 3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 250 deg. F. (or greater if required by Code) maximum in 30 minutes of fire exposure.
- E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- F. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.
- G. Fire rated assemblies must have M.E.A. approval with UL label.
- H. Work of this Section must meet the minimum standards of ANSI 250.4 and SDI-100; where more stringent requirements are specified herein, such requirements shall apply.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palletted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
- B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Commissioner; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A 250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

PART 2 PRODUCTS**2.1 FABRICATION - GENERAL**

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- D. Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

2.2 MANUFACTURERS

- A. Provide products manufactured by Steelcraft, Curries, Ceco Door Products, or approved equal meeting these specifications.
 - 1. Manufacturer must be a member of the Steel Door Institute.

2.3 FRAMES

- A. Materials
 - 1. Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B not less than 14 ga., and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653 with A-60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.
 - 2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008/A, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011/A, Commercial Steel, Type B. Metal thickness shall

be not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.

B. Design and Construction

1. All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Unless otherwise noted, knock-down frames will not be accepted.
2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
3. Jamb depths, trim, profile and backbends shall be as shown on drawings.
 - a. Frames at drywall partitions shall be formed with double return backbends to prevent cutting into drywall surface.
4. Welded frames shall have corners mitered and reinforced, and faces of welded frames shall be continuously back welded full depth and width of frame, conforming to NAAMM Standard HMMA-820. Exposed welds shall be made smooth and flush.
5. Minimum depth of stops shall be 5/8".
6. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints between faces of abutting members shall be securely welded and finished smooth.
 - a. Mullions shall have 16 ga. internal steel stiffeners welded not less than 4" o.c.
7. Hardware Reinforcements
 - a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
 - b. Minimum thickness of hardware reinforcing plates shall be as follows:
 - 1). Hinge and pivot reinforcements - seven (7) ga., 1-1/4" x 10" minimum size.
 - 2). Strike reinforcements - twelve (12) gauge
 - 3). Flush bolt reinforcements - twelve (12) gauge
 - 4). Closer reinforcements - twelve (12) gauge
 - 5). Reinforcements for surface mounted hardware - twelve (12) gauge.
8. Floor Anchors
 - a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
 - b. Minimum thickness of floor anchors shall be fourteen (14) gauge.
9. Jamb Anchors
 - a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the wire type. Anchors shall be not less than 0.156"

diameter steel wire. The number of anchors provided on each jamb shall be as follows:

- 1). Frames up to 7'-6" height - three (3) anchors.
 - 2). Frames 7'-6" to 8'-0" height - four (4) anchors.
 - 3). Frames over 8'-0" height - one (1) anchor for each 2'-0" or fraction thereof in height.
- b. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb as follows:
- 1). Frames up to 7'-6" height - four (4) anchors.
 - 2). Frames 7'-6" to 8'-0" height - five (5) anchors.
 - 3). Frames over 8'-0" height - five (5) anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".
- c. Frames to be anchored to previously placed concrete or masonry shall be provided with minimum 3/8" concealed bolts set into expansion shields or inserts at six (6) inches from top and bottom and twenty-four (24) inches o.c. Reinforce frames at anchor locations with sixteen (16) gauge sheet steel stiffeners welded to frame at each anchor.
10. Anchors in exterior frames and in masonry walls shall be hot dip galvanized per ASTM A 153.
 11. Frames for installation in masonry wall openings more than 4'-0" in width shall have an angle or channel stiffener factory welded into the head. Such stiffeners shall be not less than twelve (12) gauge steel and not longer than the opening width, and shall not be used as lintels or load bearing members.
 12. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.
 13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
 14. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
 15. Loose glazing stops shall be of cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium- or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.
 16. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.
1. Frames set in masonry walls shall be grouted in as described in Section 042000, "Unit Masonry." These frames shall have surfaces in contact with grout shop coated with epoxy coating equal to Series 27 FC Typoxy made by Tnemec or approved equal spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.

2.4 HOLLOW METAL DOORS

- A. **Materials:** Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008/A, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than eighteen (18) gauge. Face sheets for exterior doors shall be not less than sixteen (16) gauge and shall have a hot dipped galvanized coating conforming to ASTM A 924 and A 653, A-60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.
- B. **Design and Construction**
 - 1. All doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
 - 2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
 - 3. **Core Construction:** Resin impregnated Kraft paper with maximum 1" cells; fastened to face sheets with waterproof adhesive.
 - a. **Fire Rated Door Core:** As required to provide fire-protection and temperature rise ratings indicated.
 - b. **Insulated Door Core:** As required to provide R-value indicated below.
 - 1). **Thermal-Rated Doors:** Provide doors fabricated with thermal-resistance value (R-value) of not less than 1.5 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
 - 5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
 - 6. Edge profiles shall be provided on both vertical edges of doors as follows:
 - a. Single-acting swing doors - beveled 1/8" in two (2) inches.
 - b. Double acting swing doors - rounded on 2-1/8" radius.
 - c. No square edge doors permitted.
 - 7. **Hardware Reinforcements**
 - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation - such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.

- b. Minimum gauges for hardware reinforcing plates shall be as follows:
 - 1). Hinge and pivot reinforcement - seven (7) gauge.
 - 2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers - twelve (12) gauge.
 - 3). Reinforcements for all other surface mounted hardware - sixteen (16) gauge.

8. Glass Moldings and Stops

- a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
- b. Fixed moldings shall be securely welded to the door on the security side.
- c. Loose stops shall be not less than twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.

- 9. Louvers shall be sixteen (16) gauge sheet steel, stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. Fifty (50) percent free area, unless indicated otherwise on drawings.

C. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames, which shall be fully cured before shipment.

D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

2.5 LABELED DOORS AND FRAMES

- A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service.
- B. If any door or frame specified by the Commissioner to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Commissioner shall be so advised before fabricating work on that item is started.

2.6 HARDWARE LOCATIONS

- A. The location of hardware on doors and frames shall be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by prevailing Handicapped Codes.

2.7 CLEARANCES

- A. Fabricate doors and frames to meet edge clearances as follows:
 - 1. Jams and Head: 1/8" plus or minus 1/16".
 - 2. Meeting Edges, Pairs of Doors: 1/8" plus or minus 1/16".

3. Bottom: 3/4" if no threshold; 3/8" at threshold.

B. Fire rated doors shall have clearances as required by NFPA 80.

2.8 MANUFACTURING TOLERANCES

A. Manufacturing tolerance shall be maintained within the following limits:

1. Frames for Single Door or Pair of Doors

- a. Width, Measured Between Rabbets at the Head
 - 1). Nominal opening width +1/16", -1/32"
- b. Height (total length of jamb rabbet):
 - 1). Nominal opening height + 3/64"
- c. Cross Sectional Profile Dimensions
 - 1). Face: + 1/32"
 - 2). Stop: + 1/32"
 - 3). Rabbet: + 1/64"
 - 4). Depth: + 1/32"
 - 5). Throat: + 1/16". Frames overlapping walls to have throat dimension 1/8" greater than dimensioned wall thickness to accommodate irregularities in wall construction.

2. Doors

- a. Width: + 3/64"
- b. Height: + 3/64"
- c. Thickness: + 1/16"
- d. Hardware Cutout Dimensions
 - 1). Template dimensions +0.015", -0"
- e. Hardware Location: + 1/32"

2.9 PREPARATION FOR FINISH HARDWARE

A. Prepare door and frames to receive hardware:

- 1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
- 2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.

B. Provide reinforcements for both concealed and surface applied hardware:

- 1. Drill and tap mortise reinforcements at factory, using templates.
- 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

2.10 REJECTION

A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION

- A. Refer to Section 062000 for installation procedures for all work of this Section.

END OF SECTION

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