

**SECTION 08110**  
**STEEL DOORS AND FRAMES**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This work shall include furnishing and installing all steel doors and frames completely as located and detailed on Drawings.
- B. Types of steel doors used on this Project shall include, but not be limited to:
  - 1. Flush Steel Doors.
  - 2. Steel Doors with Glass Lites and/or Louvers.

1.02 RELATED WORK

- A. CONCRETE UNIT MASONRY: Section 04220.
- B. JOINT SEALANTS: Section 07900.
- C. WOOD DOORS: Section 08210.
- D. FINISH HARDWARE: Section 08710.
- E. GLASS AND GLAZING: Section 08800.
- F. PAINTING: Section 09900.

1.03 QUALITY ASSURANCE

- A. Approved Products: As applicable, products used herein shall comply with requirements of the Florida Product Approval System as required by Florida Statute 553.842 and Florida Administrative Code 9B-72.
- B. Manufacturer: Steel doors and frames shall be manufactured by a single firm specializing in the production of this type of work.
- C. Fire-Resistance Classifications: Where fire-resistance classifications are shown or scheduled for steel doors and frame assemblies, the doors and frames shall comply with the requirements of NFPA No. 80 and shall have been tested and rated with the appropriate hardware by Underwriters Laboratories (UL). A UL label shall be provided on each door and frame so classified.
  - 1. Opening assemblies shall meet the requirements of NFPA 105 Hot Smoke Test.
  - 2. Stairwell doors and other doors indicated shall comply with the temperature-rise rating of 450 degrees F maximum in 30 minutes of fire exposure.

D. Design Criteria: Comply with the following:

1. Transmission Characteristics of Fixed Glazed Framing: Comply with requirements indicated below for transmission characteristics and test methods.
  - a. Air and Water Leakages: Air infiltration of not more than 0.06 CFM per square foot of fixed area per ASTM E 283 and no uncontrolled water penetration per ASTM E 331 at pressure differential of 6.24 psf (excluding operable door edges).
2. Thermal Design Criteria: All exterior door assemblies shall have been fabricated as thermal insulated door and frame assemblies and tested in accordance with ASTM C 236. Provide thermal-rated assemblies with a minimum U-Factor of 0.24.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for each type of door and frame.
- B. Shop Drawings: Submit shop drawings for the fabrication and installation of the steel doors and frames. Drawings shall include details of each frame type, elevations of door design types, glazed openings, louvers, conditions at openings, details of construction, location and installation requirements of finish hardware, and reinforcements and details of joints and connections, showing anchorage and accessory items.
  1. A schedule of doors and frames shall be provided using the same opening numbers referenced on the Drawings and the same schedule format.
  2. Submit shop drawings as a package with the submittals for other doors and for finish hardware to facilitate a coordinated review.
  3. Shop drawings shall indicate accurate dimensions of work shown. Frame returns shall allow for conditions (i.e., whether 5/8 inch gypsum board; or exposed masonry as scheduled). Except where otherwise shown, 1/4 inch caulking space shall be provided for each jamb and head abutting wall materials.
  4. Shop drawings shall list and locate all items of finished hardware furnished by other Sections of the Specifications but prepared for by the manufacturer of hollow metal doors and frames, from templates provided by the hardware supplier.

1.05 PRODUCT DELIVERY AND STORAGE

- A. Doors and frames shall be protected during transit, storage, and handling to prevent damage, soiling, and deterioration.
- B. Each door shall be packaged at the factory in a separate heavy paper carton. Each carton shall be marked for location to correspond with the Shop Drawings.
- C. Ship welded frames in bundles securely strapped or in packages.
- D. Store doors and frames at the building site under cover. Frames shall be stored in an upright position. Place the units on at least 4-inch wood sills or on floors in a manner that will prevent rust or damage. Avoid the use of non-vented plastic or canvas shelters that create a humidity chamber. If the wrapper on the door becomes wet, remove the carton immediately. Provide a 1/4-inch air space between the doors to promote air circulation.

1.06 PROJECT CONDITIONS

- A. Measurements: Obtain and verify all measurements at the buildings as required to properly fabricate and install all special door and frame requirements if and when they occur. Verify all conditions that may affect door installation.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Products: Provide one of the following:
  - 1. "Lock Seam Design"; American Steel Products.
  - 2. "Series H"; Pioneer Industries, Inc.
  - 3. "Series L"; Steelcraft/Ingersoll Rand.
  - 4. Model 707, Curries
  - 5. Or Equal per Section 01600.

### 2.02 STEEL FRAMES

- A. Frames shall be double rabbeted design, depth and profile as detailed and furnished with minimum 5/8-inch stop. Exterior frames shall be fabricated from 16-gauge prime quality galvanized (G 90) steel conforming to ASTM A 526. Interior frames shall be fabricated from 16-gauge prime quality steel conforming to ASTM A 366 and ASTM A 568. Frames shall be designed with integral stop and trim.
- B. Frame corners shall be mitered and continuously arc welded (both inside of mitered corners and butt edges) with all exposed welds ground and sanded smooth. Mitered corners shall be reinforced with 18-gauge channel-shaped reinforcements. Knock down frames will not be acceptable.
- C. Head members shall be 2 inches high unless otherwise indicated.
- D. Strike jambs shall be provided with three (3) holes for rubber bumpers (silencers); refer to Section 08710 - FINISH HARDWARE for furnishing and installation of silencers.

### 2.03 STEEL DOORS

- A. Hollow metal steel doors shall be 1-3/4 inches thick heavy-duty, hollow steel, lock seam construction. Exterior doors shall be fabricated from 18 gauge prime quality galvanized (G 90) steel conforming to ASTM A 526 or ASTM A 591. Interior doors shall be fabricated from 18-gauge prime quality steel conforming to ASTM A 366 and ASTM A 568.
- B. Door face sheets shall be formed from one sheet of metal with no seams permitted on the door face. Seams shall be permitted on the vertical edge of the door only. Welds on 2-inch centers shall occur around the perimeter of the door using the projection welding method. Tops shall be flush and closed with no holes. Top and bottom of door shall be closed with a minimum 16-gauge flush or inverted closure channel.
- C. Polystyrene foam core shall be self extinguishing, non-toxic in case of fire.
- D. The clearance for doors shall be 3/32- to 1/8-inch at jambs and heads, and 1/8- to 3/16-inch at meeting stiles of pair of doors. The lock edges of stiles shall be beveled 1/8 inch in 2 inches for steel doors.

- E. The top and bottom edges of all exterior steel doors shall be closed to provide a weather seal. This seal shall be provided as part of the door construction or by the addition of inverted steel channels or other suitable shapes welded, caulked, and sealed to the face sheets.
- F. All exterior double doors shall have a steel astragal attached to the active leaf.
- G. All double doors shall have an astragal.
- H. Louvers shall be the manufacturer's standard sight-proof stationary louvers.
- J. Provide a latch guard at all exterior metal doors.

#### 2.04 LABELED STEEL DOORS AND FRAMES

- A. Where indicated on Drawings, furnish UL Labels with appropriate fire resistance ratings for the class of opening specified. Both doors and frame shall have labels attached. Construction details and hardware application shall be as approved by the labeling authority.
- B. All approved fire doors shall be arranged to either remain in normally closed position with suitable self-closing device or in normally open position with a fusible element or smoke detector actuated mechanism which will close the door automatically in case of fire, as indicated on Drawings and/or as required by governing authorities.
- C. Pairs of UL label fire doors shall have an overlapping steel astragal welded or bolted to the active leaf.
- D. The clearances for fire doors shall be as required by the authority having jurisdiction.
- E. Louvers shall be door manufacturer's standard as specified above; equipped with UL approved fusible link fire damper for label required.

#### 2.05 GLAZING

- A. Glazing Stops and Beads: Stops and beads for glazed openings shall be formed from 20-gauge steel and furnished with synthetic rubber or felt gaskets. Secure beads to frames on secure side of opening with oval-head, countersunk phillips-head fasteners approximately 12 inches to 16 inches on center. Miter folded shapes at corners. Butt or miter square or rectangular beads at corners. Glazing arrangements shall accommodate glass thickness indicated.
- B. Glazing materials shall be as specified under Section 08800 - GLASS AND GLAZING. In fire rated doors provide clear fire rated glass.

#### 2.06 DOOR LOUVERS

- A. Exterior Door Louvers: Fabricate louvers and mount flush into doors without overlapping moldings on surface of door facing sheets. Provide internal support as recommended by louver manufacturer. Prime paint after fabrication.
  - 1. Provide not less than 16 gage galvanized steel sheet. Fabricate units with stationery, weatherproof Z-shaped blades and U-shaped frames, not less than 1-3/8 inches thick. Space louver blades not more than 1-1/2 inches o.c. Assemble units by welding.
  - 2. Provide removable insect screens on interior side of frame, consisting of 18-14 aluminum wire mesh, 0.011-inch diameter, in rigid, formed metal frame.
- B. Fire-Rated Louvers: Louvers shall be the manufacturer's standard sightproof stationary louvers

constructed of inverted V-shaped or Y-shaped blades.

1. Provide manufacturer's standard insect and bird screen backup for all exterior louvers. Screens shall be removable for maintenance and cleaning.
2. Equip louvers with UL approved fusible link fire damper for label required.

## 2.07 FINISH

### A. Shop Applied Finish:

1. Apply a primed finish to all galvanized and non-galvanized metal surfaces furnished under this Section. Clean and chemically treat metal surfaces to assure maximum paint adherence; follow with a dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer on all exposed surfaces.
2. Finished surfaces shall be smooth and free from irregularities and rough spots. Paint shall be baked, or oven dried. The time and temperature for drying shall be in accordance with manufacturer's recommendations for developing maximum hardness and resistance to abrasion.

B. Paint Finish: Other than pre-finished doors and frames, finish painting of steel doors and frames is specified under Section 09900 - PAINTING. Paint all surfaces including top and bottom.

C. Color of all steel doors and frames to be selected by Architect.

## 2.08 HARDWARE PROVISIONS AND REINFORCING

### A. Hardware Provisions for Pressed Steel Frames:

1. Unless a different strike is noted on Hardware Schedule, frames shall have steel hinge plate reinforcement projection welded with provisions for 4-1/2 inch x 4-1/2 inch full mortise type hinges and steel strike tap plate reinforcement projection welded with provisions for Universal ANSI A115.1 or A115.2 strike.
2. Frames shall be provided for 1-1/2 pair of hinges, unless noted otherwise. Mortar guards shall be formed from 26-gauge galvanized steel and shall be welded in place.
3. Closer reinforcement shall be sleeve type installed in frame header for all doors which are indicated to receive door closers.
4. Provide metal reinforcements for all other hardware items indicated.
5. Minimum gauges of hardware reinforcing plates shall be as follows:
  - a. Hinge Reinforcements: 8 gauge, 1-1/4 x 10-inch minimum size.
  - b. Lock Reinforcements: 12 gauge.
  - c. Closer Reinforcements: 12 gauge.
  - d. Surface-Mounted Hardware: 12 gauge.

### B. Hardware Provisions for Steel Doors:

1. Mortise, reinforce, drill, and tap doors at the factory to receive all mortised type hardware. Drilling and tapping for surface applied hardware shall be performed in the field. Provide

concealed metal reinforcement for surface applied hardware indicated in the Hardware Schedule.

2. Doors shall have steel integral hinge reinforcement with provisions for 4-1/2 inch x 4-1/2 inch full mortise template type hinges for 1-1/2 pair of hinges per door, unless noted otherwise.
  3. Doors shall have steel integral lock reinforcement with provisions for locksets as indicated.
  4. Doors shall have steel closer reinforcement concealed in the door for all doors which are indicated to receive closers.
  5. Minimum gauges for hardware reinforcing plates shall be as follows:
    - a. Hinge Reinforcements: 8 gauge.
    - b. Lock Reinforcements: 12 gauge.
    - c. Closer Reinforcements: 12 gauge.
    - d. Surface Mounted Hardware: 16 gauge.
  6. Provide an astragal at all double doors.
  7. Provide a latch guard at all exterior doors.
  8. Provide a weather seal and sweep at all exterior doors.
  9. Install on all exterior doors not provided with a rain hood or otherwise under cover a Pemko 346 AL Drip Cap
  10. Provide fire-rated hardware at all fire rated doors.
- C. Location of Hardware: The location of hardware in connection with hinged and other swing type hollow metal doors and frames shall be as follows, unless indicated or specified otherwise:
1. Top Hinge: To manufacturer's standard, but not greater than 5 inches from head rabbet to top of hinge.
  2. Bottom Hinge: To manufacturer's standard but not greater than 10 inches from finish floor to bottom of hinge.
  3. Intermediate Hinge: Equally spaced between top and bottom hinge.
  4. Locks (cylindrical, mortise, unit or integral): 38 inches from finish floor to center of strike.
  5. Refer to Section 08710 - FINISH HARDWARE for additional locations.
- D. Anchors:
1. All frames shall have an integral or welded on sill anchor.
  2. Furnish six (6) per frame, 10 inch long corrugated or other deformed type adjustable anchors as condition applies.
- 2.09 WORKMANSHIP
- A. All work shall be shop fabricated to required profiles by forming and welding with corners, angles, and

edges straight and sharp.

- B. Fit and fabricate accurately with corners, joints, seams and surfaces free from warp, buckles or other defects.

### PART 3 - EXECUTION

#### 3.01 INSPECTION

- A. Examine the areas and conditions under which steel doors and frames are to be installed. Do not proceed with steel door and frame installation until unsatisfactory conditions have been corrected.

#### 3.02 DOOR AND FRAME INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with approved shop drawings, manufacturer's data and as herein specified.
- B. Steel Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames," unless otherwise indicated.
  - 1. Except for frames located at in-place drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
  - 2. In masonry and cast-in-place concrete construction, wall anchors shall be located at the hinge and strike levels, and frames shall be grouted solid (Jambs and Heads).
  - 3. Install fire-rated frames in accordance with NFPA Standard No. 80.
  - 4. In concrete construction, locate three (3) wall anchors per jamb at hinge and strike levels.
- C. Steel Doors: Fit steel doors accurately in frames, within clearances specified in SDI-100 "Recommended Specifications for Standard Steel Doors and Frames."
  - 1. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

#### 3.03 GLAZING

- A. Glazing Standards: Comply with recommendations of Glass Association of North America (GANA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Inspect all sash, frames, and surroundings to be glazed and verify compliance with the following:
  - 1. The frames are firmly anchored in proper position, plumb and square within 1/8 inch of nominal dimensions on approved shop drawings.
  - 2. That all rivet, screw, bolt and nail heads, welding fillets and other projections are removed from glazing rabbets to provide the specified clearances.
  - 3. That all corners and fabrication intersections are sealed, and frames are weathertight.
  - 4. That all rabbets are of sufficient depth and width to receive the glass and provide the required overlap of glass.

- B. The sizes of glass or polycarbonate sheet indicated on drawings are approximate only; determine the actual sizes required by measuring frames to receive the glass at the project site, or from guaranteed dimensions provided by the frame supplier. Dimensions for glass and glass holding surroundings shall be coordinated to provide the following minimum clearances:
  - 1. At perimeter edge of glass on all four sides, provide clearance equal to glass thickness.
  - 2. The sealer space between the face of glass and fixed or applied glazing stops shall not be less than 1/16 inch plus glass and sash tolerance, but 1/8 inch minimum.
- B. No attempt shall be made to change the size of heat strengthened or tempered glass units after they leave the factory. Nipping to remove flares or to reduce oversized dimensions of any type of glass shall not be permitted.

### 3.04 ADJUST AND CLEAN

- A. Examine door for scratches, dents and perforations. Hand tool or mechanically remove loose rust. Alter damaged area as required to provide filler anchorage. Treat the surface with rust neutralizing primer. Fill with metal-based filler. Prime and paint as required.
- A. Prime Coat Touch-up: Immediately after installation, sand smooth all rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.
- C. Cleaning: Immediately prior to final inspection and before Final Acceptance, remove all protective materials and clean all exposed members. Thoroughly clean all glass, including removal of manufacturer's labels or any other material or substance on the glass, in the event this has not been performed at a prior time. Cleaning shall be performed by the use of cleaning materials and methods that will not damage the glass or surroundings in any way.
  - 1. Do not use abrasives or harmful cleaning agents.
  - 2. Remove from the premises all waste materials and debris accumulating due to this work.

END OF SECTION 08110