SECTION 08110
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY
A. Specifications apply to steel doors, steel door frames, and steel frame components such as sidelites, borrowed lites, transom frames and architectural stick assemblies as shown on architects' plans and schedules and as conforming to ANSI A250.8-1998 (SDI-100).

1.02 RELATED WORK
A. Work not included: Installation of frames and doors, glass and glazing, field painting of prime painted doors and frames, door and frame hardware, protection at the building site of items furnished under this specification.

1.03 REFERENCES
A. American Society for Testing and Materials
1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
2. ASTM E 152 – Standard Methods of Fire Tests of Door Assemblies
3. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
5. ASTM A 653 – Standard Specification for Steel, Sheet, Zinc-Coated (Galvannealed) by the Hot-Dip Process
6. ASTM A 924 – Standard Specification for General Requirements for Steel, Sheet, Metallic Coated by the Hot-Dip Process

B. American National Standards Institute
1. ANSI/NFPA 80 Standards for Fire Doors and Fire Windows
2. ANSI/NFPA252 Fire Tests of Door Assemblies
3. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames
1. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing
2. ANSI A250.6 (SDI 107) – Hardware on Standard Steel Doors (Reinforcement-Application)
3. ANSI A250.7 – Nomenclature for Steel Doors and Steel Door Frames
4. ANSI A250.8 (SDI-100) – Recommended Specifications for Steel Doors & Frames
5. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
6. ANSI/DHI A115 Specifications for Hardware Preparations in Standard Steel Doors and Frames
7. ANSI/DHI A115.IG Installation Guide for Doors and Frames

C. Steel Door Institute
1. SDI 105 – Recommended Erection Instructions for Steel Frames
2. SDI 106 – Recommended Standard Door Type Nomenclature
4. SDI 109 – Hardware for Standard Steel Doors & Frames
5. SDI 110 – Standard Steel Doors & Frames for Modular Masonry Construction
6. SDI 111 – Recommended Standard Details for Steel Doors and Frames
7. SDI 112 – Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors & Frames
8. SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames
9. SDI 124 – Maintenance of Standard Steel Doors and Frames

D. Fire Protection
1. UL 10C Standard for Safety for Positive Pressure Fire Tests of Door Assemblies
2. NFPA 252 Fire Tests of Door Assemblies (Neutral test pressure)
3. UBC 7-2-1997 Positive Pressure Fire Tests of Door Assemblies
   1) NFPA 80 Standard for Fire Doors and Fire Windows

1.04 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8-1998 (SDI-100), ANSI A151.1, and other specifications herein named. Test reports shall be submitted upon request.

B. Acoustical qualities: Doors shall have a minimum sound transmission classification of 28 as tested under ASTM designation E490 and ASTM designation E413.

C. Insulation properties: Doors shall have a U factor .363 (R factor of 2.85).

D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:
1. All labeled fire doors and frames shall be of a type that has been investigated and tested in accordance with UL-10(c), UBC 7-2-1997.
2. Underwriters' Laboratories labeled doors and frames shall be manufactured under the UL factory inspection program and in strict compliance to UL procedures, and shall provide the degree of fire protection, heat transmission and panic loading capability indicated by the opening class.
3. Warnock Hersey labeled doors and frames shall be manufactured to meet the specific requirements of that labeling agency's current procedure for the tested hourly rating designated and shall be subject to inspection by representatives of the labeling agency.
4. A physical label or approved marking shall be affixed to the fire door or fire door frame, at an authorized facility as evidence of compliance with procedures of the labeling agency.

1.05 REGULATORY REQUIREMENTS
A. Doors and frames shall conform to applicable codes for fire ratings. All interior vertical stairwell doors shall carry a minimum 250°F temperature rise rating in addition to the required fire rating.

1.06 SUBMITTALS
A. Submit shop drawings (and product data) under provisions of Division 01.
B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.
C. Indicate door elevations, internal reinforcement, closure method, and cutouts for (glazing) (louvers).
D. Submit manufacturer's installation instructions under provisions of Division 01.

1.07 DELIVERY, STORAGE AND PROTECTION
A. Storage of Doors:
   1. Doors shall be stored in an upright position under cover. Place the units on at least 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters that create humidity chamber and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately. Provide a 1/4" (6.35 mm) space between the doors to promote air circulation.
B. Storage of Frames:
1. Frames shall be stored under cover on 4” (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Assembled frames shall be stored in a vertical position, five units maximum in a stack. Provide a 1/4” (6.35 mm) space between frames to promote air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:
   1. Any member of the Steel Door Institute.

B. Substitutions allowed only with written approval by architect prior to bid date.

2.02 MATERIALS

A. Frames and frame components shall be manufactured from commercial quality carbon steel conforming to ASTM designation A568 and A569 or hot-dipped galvannealed steel having an A60 zinc-iron alloy coating conforming to ASTM designation A653. Galvannealed steel shall be treated to insure proper paint adhesion. All steel component parts used in galvannealed doors and/or frames shall meet the galvanized specification.

B. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with ANSI A250.10.

2.03 DOORS

A. Exterior doors shall be 16[1.3mm] or 14 gage [1.7mm] hot dipped galvannealed steel, with closed tops.

B. Interior doors shall be 18[1mm] or 16[1.3mm] gage cold rolled steel.

C. Construction of Doors:
   1. Flush Doors
      a. Doors shall be full-flush seamless construction, fabricated from commercial quality carbon steel or hot-dipped galvannealed steel 16[1.3mm] or 14 gage [1.7mm] for 1-3/4”[45mm] doors.
      b. The door shall be vertically stiffened with steel stiffeners and sound deadened with fiberglass batts. The stiffeners shall be hat shaped sections
STEEL DOORS AND FRAMES

2. Temperature Rise Doors

a. Doors shall be the same as 1-3/4” (45 mm) flush doors except for the core. Doors shall be full-flush seamless construction, fabricated from cold-rolled steel or hot-dipped galvannealed steel 16 (1.3mm) or 14 gage (1.7 mm). Mineral fiber core material shall be designed to comply with the 250° F (121° C) maximum temperature rise rating.

2.04 FRAMES

A. Exterior frames shall be 16 (1.3mm) or 14 gage (1.7mm) hot dipped galvannealed steel.

B. Interior frames shall be 16 (1.3mm) or 14 gage (1.7mm) commercial quality carbon steel.

C. Construction Frames:
STEEL DOORS AND FRAMES

1. Flush Frames
   a. Flush frames shall be formed from 16 (1.3mm) or 14 gage (1.7mm) commercial quality carbon steel or galvannealed steel.
   b. Frames shall have 2" (51 mm) faces. Frame shall be set-up and welded. Miter corners shall have reinforcements with four concealed integral tabs for secure and easy interlocking of jambs to head.
   c. 16 (1.3mm) and 14 gage (1.7mm) frames shall be factory prepared for field installed silencers, (3) per strike jamb and (2) per head for pairs of doors. Stick on silencers shall not be permitted.
   d. Frames for 1-3/4" (45mm) doors shall have 7 gage (4.4mm) universal steel hinge reinforcements prepared standard or heavy weight template hinges. Strike reinforcements shall be 16 gage (1.3mm) and prepared for the strike.
   e. Steel plaster guards shall be provided for all mortised cutouts.
   f. Galvannealed frames shall have galvannealed hardware reinforcements. Frames shall be furnished with a minimum of six wall anchors and two adjustable base anchors of manufacturer’s standard design.
   g. Steel plaster guards shall be provided for all mortised cutouts.
   h. All hinge and strike reinforcements shall be projection welded to the door frame.
   i. Reinforcements for surface closer shall be 14 gage [1.7mm] steel.
   j. Adequate reinforcements shall be provided for other hardware when specified.

2. Construction of Architectural Stick Components
   a. Architectural stick frame assemblies shall be made of standard frame components, manufactured from 16 gage (1.3mm) or 14 gage (1.7mm) commercial quality carbon steel or galvannealed steel. Where sticks are used at door openings and frame assemblies, they shall be prepared for hardware as specified. Frame assemblies shall be fabricated from three basic components:
      b. Open sections (perimeter members), closed sections (intermediate members), and sill sections.
         1) Open sections shall be identical in configuration to standard frames.
         2) Closed sections shall have identical jamb depths, face dimensions and stops as open sections. Closed sections shall be factory assembled and shall have full-length internal reinforcement of 16 gage (1.3mm) steel, factory spot-welded to both soffits at 8" (203 mm) on center.
         3) Sill sections shall be fabricated from galvannealed steel and shall be either flush with both faces of adjacent vertical members or recessed from one face of the adjacent vertical members.
   c. Individual components shall be cut to length and notched to assure square joints and corners. All joints and corners of the frame assembly shall be
welded and ground smooth at the face of the sections. Frame assemblies shall be shipped to job site completely welded. Field joints shall be permitted only when the size of the total assembly exceeds shipping limitations. When frame assemblies are subjected to wind loads, vertical members shall be free of field splices.

d. All necessary anchors for jambs, heads and sills of assemblies shall be provided. When verification of field dimensions is necessary, they shall be made by the contractor. Frame fabrication shall not begin until these dimensions have been submitted.

2.05 ACCESSORIES

A. Vision Lites shall be as indicated on the drawings; moldings shall be manufacturer’s standard.

B. Louvers shall be as indicated on the drawings; blade and frame configuration shall be manufacturer’s standard or as specified elsewhere.

2.06 PROTECTIVE COATINGS

A. The inside of all frames shall be fully grouted or, when an anti-freeze agent is used, shall be coated with a fibered asphalt coating prior to grouting. Coating shall be field applied by the contractor to a minimum 1/16”[1.6mm] thickness.

2.07 FABRICATION

A. Frames shall be supplied

1. Set up and welded with faces welded and ground smooth. Miters of frames shall be back welded. Weld shall penetrate the outside face. Faces shall be dressed smooth and prime painted. Filler materials are not permitted.

2.08 FINISH

A. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with the ANSI A250.10 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames”.

STEEL DOORS AND FRAMES 08110-7

Revised 11/08/12
PART 3 - EXECUTION

3.01 GENERAL:
   A. Doors and frames shall be installed in accordance with ANSI/DHI A115.IG Installation Guide for Doors and Frames.

3.02 VERIFICATION OF CONDITIONS:
   A. Examine areas and conditions under which the work of this Section will be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.

3.03 FRAME ERECTION:
   A. Install frames plumb, square, and vertical, and in proper alignment with surrounding construction. Unless otherwise indicated, set face of frames flush with wall or partition finish on hinge side, to allow full 180° swing of doors.
      1. Shim floor anchors as required by floor conditions and scheduled finish floor materials.
      2. Verify rough-in for electrical devices where applicable.
   B. MASONRY CONSTRUCTION:
      1. Verify placement and location of mortar guards and rubber silencers prior to installation of frames.
      2. Set frames into position and brace as required to hold plumb, square, and rigidly in place as masonry is erected around frames. Provide temporary wood spreaders as necessary. Wood spreaders must support both rabbets to prevent torsional twisting or bowing during grouting of frames.
      3. Fill backs of frames solid with mortar or grout as work progresses. Do not allow mortar or grout to enter mortar guards at hardware cut-outs.
      4. Install not less than three (3) masonry anchors per jamb, beginning 8” above floor and spacing at maximum intervals of 24”. Firmly embed frame anchors into mortar in bed joints of masonry.
      5. Clean all excess mortar from exposed faces of frames prior to installation of doors and hardware.
   C. STUD CONSTRUCTION:
      1. Set frames into position in rough stud openings prior to installation of wall finish material.
      2. Install frames plumb, square, and level, and anchor to studs with specially fabricated stud anchors spaced not more than 24” o.c., minimum three (3) anchors per jamb.
3. Verify locations of frame anchors and pre-drill jambs for expansion anchors used to secure frames.
4. Shim frames as necessary to ensure fit and to provide plumb and square frame installation.
5. Exposed heads of anchors shall be flush with face of jambs or slightly depressed in countersunk openings.

D. RATED CONSTRUCTION: Comply with applicable requirements of NFPA 80.

3.04 DOOR INSTALLATION:

A. General:

1. Hang doors accurately in steel frames. Adjust for required tolerances as follows:

   a. Clearance at Head and Jambs: 1/8" or less
   b. Clearance at Sill (with threshold): 3/8" or less
   c. Clearance at Sill (without threshold): 3/4" or less
   d. Clearance at Meeting Edges of Pairs of Doors: 1/8" or less.
   e. Diagonal Distortion: 1/8" or less, measured with straight edge from corner to corner.

B. Rated doors: Comply with applicable requirements of NFPA 80.

C. Hardware Installation: Refer to Section 08 71 00 Door Hardware.

3.05 ADJUSTING AND CLEANING:

A. Cleaning and touch-up: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer. Remove and replace defective work, including doors or frames that are warped, dented, bowed, or otherwise unacceptable.

B. Adjustment: Adjust doors for proper swing and operation without binding or dragging.

END OF SECTION