

## SECTION 08111

### STANDARD STEEL DOORS AND FRAMES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.2 SUMMARY

- A. This Section includes the following
  - 1. Standard hollow-metal frames

##### 1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

##### 1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance and temperature-rise ratings, and finishes for each type of steel door and frame specified.
- B. Shop Drawings: In addition to requirements below, provide a schedule of standard steel doors and frames using same reference numbers for details and openings as those on Drawings.
  - 1. Elevations of each door design
  - 2. Details of doors, including vertical and horizontal edge details
  - 3. Frame details for each frame type, including dimensioned profiles
  - 4. Details and locations of reinforcement and preparations for hardware
  - 5. Details of each different wall opening condition
  - 6. Details of anchorages, accessories, joints, and connections
  - 7. Details of glazing frames and stops showing glazing
  - 8. Details of conduit and preparations for electrified door hardware and controls.
- C. Coordination Drawings: Drawings of each opening, including door and frame, drawn to scale and coordinating door hardware. Show elevations of each door design type, showing dimensions, locations of door hardware, and preparations for power, signal and electrified control systems.
- D. Qualification Data: For installer.
- E. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of standard steel door and frame.
- F. Product Code/Certification: Provide written verification that the exterior door products provided and installed as a system or assembly in this Project meet or exceed requirements of Florida Building Code 2004 for wind resistance of components and cladding with any local code amendment requirements. Provide design data and verification documentation signed and sealed by a professional engineer registered in the State of Florida including but not limited to the following:
  - 1. Manufacturer's written certification indicating the type, grade and size unit provided meets requirements.
  - 2. Manufacturer's test data and engineering data developed indicating that requirements have been met.
  - 3. Independent testing laboratory reports and certifications verifying that products meet requirements.

4. Calculations and definition of the code required loading for each unit in the Project. Include location schedules for clarification.
5. Installation requirements describing types of fasteners and spacing.
6. Submit certification prior to or in conjunction with other submittals required herein. Other submittals received prior to receipt of this certification will be rejected.

#### 1.5 QUALITY ASSURANCE

- A. Exterior products provided under this section shall meet or exceed requirements of Florida Building Code 2004 for wind resistance of components and cladding with any local code amendments.
- B. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- C. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door 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 at atmospheric (neutral) pressure according to NFPA 252 or UL 10B.
  2. Temperature Rise-Rating: At exit closures, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
- E. Smoke Control Door Assemblies: Comply with NFPA 105 or UL 1784.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination"

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palletized, wrapped or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack-welded to jambs and mullions.
- C. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4" spaces between each stacked door to permit air circulation.

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

#### 1.8 COORDINATION

- A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering standard steel doors and frames which may be incorporated into the work include but are not limited to the following:

1. Standard Steel Doors and Frames:

Amweld Building Products, Inc.  
Ceco Door Products (An ASSA/ABLOY Group Company)  
Curries Company (An ASSA/ABLOY Group Company)  
Republic Builders Products.  
Steelcraft Manufacturing Co.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.
- D. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/ A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/ A 153M.
- F. Grout: Comply with ASTM C 476, with a slump of 4 inches for sound-control door frames built into concrete, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6-to-12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Division 8 Section "Glass and Glazing"
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15 mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

### 2.3 STANDARD STEEL DOORS

- A. Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.
1. Design: Flush panel
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.
- a. Fire Door Core: As required to provide fire protection and temperature rise ratings indicated.
- b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 4.0 deg. F x h x sq. ft./BTU when

tested according to ASTM C 1363. Locations: Exterior doors and interior doors where indicated.

3. Vertical Edges for Single-Acting Doors: Beveled edge. Beveled Edge: 1/8" in 2"
  4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/18" radius.
  5. Top and Bottom Edges: Closed with flush or inverted 0.042" thick end closures or channels of same material as face sheets.
  6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames"
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical endurance level: Level 2 and Physical Performance Level B (Heavy Duty), Model 2, Seamless.
- C. Interior Doors: Face sheets fabricated from cold-rolled sheet steel, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical endurance level: Level 2 and Physical Performance Level B (Heavy Duty), Model 2, Seamless.
- D. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
1. Hinges: Minimum 0.123" thick by 1-1/2" wide by 6" longer than hinge, secured by not less than 6 spot welds.
  2. Lock Face, Flush Bolts, Closers and Concealed Holders: minimum 0.067" thick
  3. All Other Surface Mounted Hardware: Minimum 0.067" thick
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- #### 2.4 STANDARD STEEL FRAMES

- A. Comply with ANSI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
  2. Frames for Level 3 Steel Doors: 0.0785" thick steel sheet 14 gauge metal.
- C. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.
1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
  2. Frames for Level 2 Steel Doors and Frames for Wood doors: 0.059" thick steel sheet, 18 gauge.
- D. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames to comply with the following minimum sizes:
1. Hinges: Minimum 0.123" thick by 1-1/2" wide by 6" longer than hinge, secured by not less than 6 spot welds.
  2. Lock Face, Flush Bolts, Closers and Concealed Holders: minimum 0.067" thick
  3. All Other Surface Mounted Hardware: Minimum 0.067" thick
- E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
- F. Jamb Anchors:
1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042" thick.

2. Postinstalled Expansion Type for In-Place Concrete: Minimum 3/8" diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

G. Floor Anchors: Formed from same material as frames, not less than 0.042" thick, and as follows:

1. Monolithic Concrete Slab: Clip-type anchors, with two holes to receive fasteners

H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

I. Ceiling struts: Minimum 3/8" thick by 2" wide steel.

J. Plaster Guards: Formed from same material as frames, not less than 0.016" thick.

## 2.5 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032" thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8" high, unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032" thick, fabricated from same material as frames in which they are installed.

## 2.6 FABRICATION

A. Fabricate standard steel door and frame units to be rigid, and free from defects, warp or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metals. Wherever practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at project site, clearly identify work that cannot be permanently factory-assembled before shipment.

B. Standard Steel Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.

C. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of the same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush and invisible.

2. Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and jambs by butt-welding.

3. Provide countersunk, flat or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

4. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete.

5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Stud-Wall Type: Locate anchors not more than 18" from top and bottom of frame. Space anchors not more than 32" o.c. and as follows:

- 1) Four anchors per jamb at 60" to 90" in height
- 2) Five anchors per jamb at 90" to 96" in height.
- 3) Two anchors per head for frames more than 42" wide and mounted in metal-stud partitions.

- b. Compression Type: Not less than two anchors in each jamb.
  - c. Postinstalled Expansion Type: Locate anchors not more than 6" from top and bottom of frame. Space anchors not more than 26" o.c.
- 7. Door Silencers: Except on weatherstripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction
  - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
  - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Finish Hardware".
  - 1. Reinforce doors and frames to receive nontemplated mortised and surface mounted door hardware.
  - 2. Comply with applicable requirements of ANSI A250.6 and ANSI/DHI A115 Series Specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
  - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.
  - 2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  - 3. Provide loose stops and moldings on inside of doors and frames.
  - 4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
- F. Fabricate concealed stiffeners, reinforcement, edge channels, and moldings from either cold- or hot-rolled steel sheet.

## 2.7 STEEL FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish standard steel door and frames after assembly.
- B. Metallic Coated Steel Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
  - 1. Galvanizing Repair Paint: High zinc-dust content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Steel Surface Preparation: Clean surfaces to comply with SSPC SP-1 "Solvent Cleaning"; remove dirt, oil, grease or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC SP-3 "Power Tool Cleaning" or SSPC SP-6 / NACE No. 3, "Commercial Blast Cleaning"
- D. Factory-Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pre-treatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils
  - 1. Shop Primer: Manufacturer's standard fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for

substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

### **PART 3 - EXECUTION**

#### **3.1 EXECUTION**

- A. Examine substrates, areas and condition, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of standard steel doors and frames.
  - 1. Examine roughing-in for embedded and built-in anchors to verify actual locations of standard steel frame connections before frame installation
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Remove welded-in shipping spreaders installed at factory.
- B. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel doors and frames for squareness, alignment, twist and plumb to the following tolerances:
  - 1. Squareness: +/- 1/16", measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: +/- 1/16", measured at jambs on a horizontal line parallel to plane of wall.
  - 3. Twist: +/- 1/16", measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - 4. Plumb: +/- 1/16", measured at, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

#### **3.3 INSTALLATION**

- A. Provide doors and frames of sizes, thicknesses, and designs indicated. Install standard steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Standard Steel Frames: Install standard steel frames for doors and other openings, of size and profile indicated. Comply with SDI 105.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80
    - b. Install frames with removable glazing stops located on secure side of opening.
    - c. Install door silencers in frames before grouting.
    - d. Remove temporary braces necessary for installation oknly after frames have been properly set and secured.
    - e. Check, plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - f. Apply bituminous coating to backs of frames that are filled with mortar, grout, and plaster containing anti-freezing agents.
    - g. Floor anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with floor postinstalled expansion anchors.
  - 2. Floor anchors may be set with powder actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

4. Concrete Walls: Solidly fill space between frames and concrete with grout. Install grout in lifts and take precautions including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
  5. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush and invisible on exposed faces.
  6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
  7. Installation Tolerances: Adjust standard steel frames for squareness, alignment, twist and plumb to the following tolerances:
    - a. Squareness:  $\pm 1/16$ " , measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment:  $\pm 1/16$ " , measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist:  $\pm 1/16$ " , measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumb:  $\pm 1/16$ " , measured at, measured at jambs on a perpendicular line from head to floor.
- C. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire Rated Steel Doors:
    - a. Jambs and Head:  $1/8$ "  $\pm 1/16$ "
    - b. Between Edges of Pairs of Doors:  $1/8$ "  $\pm 1/16$ "
    - c. Between Bottom of Door and Top Of Threshold: Maximum  $3/8$ "
    - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum  $3/8$ "
  2. Fire-Rated Doors: Install doors with clearances according to NFPA 80
  3. Smoke-Control Doors: Install doors according to NFPA 105
- D. Glazing: Comply with installation requirements in Division 8 Section "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9" o.c. and not more than 2" o.c. from each corner.

### 3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors and frames that are warped, bowed, or otherwise unacceptable.
- B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.
- C. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- D. Galvanized Surfaces: Clean abraded areas and repair with repair paint according to written manufacturer's instruction.

END OF SECTION