

SECTION 08110
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.

1.02 SUMMARY

- A. Work includes:
1. Interior flush steel doors.
 2. Exterior flush steel doors.
 3. Pressed steel door frames.
 4. Louvers in flush steel doors.
- B. Related Work Specified in Other Sections:
1. Installing anchors and grouting frames in masonry construction: Section 04810.
 2. Door Schedule: On the Drawings.
 3. Wood doors: Section 08210.
 4. Door hardware: Section 08710
 5. Glass and glazing into doors and pressed metal frames: Section 08800.
 6. Painting primed doors and frames: Section 09900.
 7. Spot-grouting frames installed in steel-framed gypsum board partitions: Section 09250.

1.03 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)/Door and Hardware Institute (DHI):
1. ANSI/DHI A115 Series, preparation for bolts, closers, latches, locks, and pivots in steel doors and frames.
 2. ANSI/DHI A115.IG, "Installation Guide for Doors and Hardware."
 3. ANSI A250.8, "Recommended Specifications for Standard Steel Doors and Frames."
- B. Steel Door Institute (SDI)
1. SDI-105, "Recommended Erection Instructions for Steel Frames."
 2. SDI-111 Series, "Recommended Details, Steel Doors and Frames."
 3. SDI-117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
 4. SDI-122, "Installation and Trouble-Shooting Guide for Standard Steel Doors and Frames."
- C. National Fire Protection Association (NFPA):
1. NFPA 80, "Fire Doors and Fire Windows."
 2. NFPA 105, "Installation of Smoke-Control Door Assemblies."
 3. NFPA 252, "Fire Test of Door Assemblies."

1.04 SUBMITTALS

- A. Product Data: Submit, for each type of door and frame specified, manufacturer's illustrated literature, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation of steel frames and of custom steel doors. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Note glass thickness and setting method to confirm that glazing frames and stops have been coordinated with glass and glazing requirements.
- C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Provide steel doors and frames of each type required for the project (flush, panel, stile and rail) manufactured by a single firm specializing in the production of this type of work, unless otherwise acceptable to the Architect.
- B. Steel Door and Frame Standard: Comply with ANSI A250.8, unless more stringent requirements are indicated.
- C. Steel Sheet Thicknesses: Thickness dimensions, including those referenced in ANSI A250.8, are minimums as defined in referenced ASTM standards for both uncoated steel sheet and the uncoated base metal of metallic-coated steel sheets.
- D. Fire-Rated Door Assemblies: Provide units that comply with NFPA 80 that are listed and labeled by UL, Factory Mutual, Warnock Hersey, or other testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
 - 1. Test Pressure: Test at atmospheric pressure.
 - 2. Temperature Rise Rating: At stairwell enclosures, provide doors which have a maximum transmitted temperature end point of not more than of 450 deg F (232 deg C) above ambient at the end of 30 minutes of standard fire test exposure.

1.06 EXISTING CONDITIONS

- A. Field Measurements: Before fabricating steel frames for existing openings, or for openings cut into existing walls, verify opening sizes by field measurement. Show dimension on shop drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames upon delivery for damage and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch (6 mm) spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide standard steel doors and frames by one of the following:
 - 1. Amweld Building Products
 - 2. Ceco Corp.
 - 3. Curries Company.
 - 4. Republic Builders Products.
 - 5. Steelcraft Manufacturing Co.

2.02 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
- C. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an **A40 (ZF120)** zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.

2.03 FLUSH STEEL DOORS

- A. General: Provide doors of sizes, thicknesses, and designs indicated.
- B. Interior Doors: ANSI 250.8 Level 2, heavy-duty, .042-inch- (1.3-mm-) minimum thickness cold-rolled steel faces, Model 2 (seamless), and ANSI A250.4 for Physical Performance Level B (Heavy Duty).

- C. Exterior Doors: ANSI 250.8 Level 3, extra heavy-duty, metallic-coated steel faces, 0.053 inch (1.3 mm) minimum thickness steel before application of metallic coating, Model 2 (seamless), and ANSI A250.4 for Physical Performance Level A (Extra Heavy Duty).
 - 1. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.
 - 2. Thermal-Rated (Insulated) Doors: Provide exterior doors fabricated with polystyrene core laminated to door faces, and thermal-resistance value (R-value) of not less than 7.7 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
- D. Core Construction: Fabricate doors with core construction that produces a door complying with the referenced standards and provides the required fire-resistance. Except at exterior doors where foamed insulation core is specified, manufacturer's standard core construction complying with specifications will be acceptable.
- E. Vision Glass Systems: Manufacturer's standard kits consisting of steel moldings to accommodate glass thickness and size of glass indicated. (Refer to Section 08800 for glass schedule.) Moldings shall be flush with the door faces, unless otherwise shown on Drawings.
- F. Door Louvers: Where louvers are indicated in doors, provide stationary, sightproof louvers that comply with SDI 111C, with inverted V-shaped or Y-shaped blades or baffles formed of 0.020-inch- (0.5-mm-) thick, cold-rolled steel sheet set into 0.032-inch- (0.8-mm-) thick steel frame.

2.04 PRESSED METAL FRAMES

- A. General: Provide steel frames for doors, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated. For exposed fasteners, provide countersunk flat head screws and bolts.
- B. Interior Welded Frames: Fabricate frames from cold-rolled steel, with corners mitered or coped and continuously welded, and with seamless face joints.
 - 1. Fabricate frames for Level 2 steel doors and for wood doors from 0.053-inch (1.3 mm) thick cold-rolled steel.
- C. Exterior Frames: Fabricate frames from metallic-coated steel sheets, with corners mitered or coped and continuously welded, and with seamless face joints. Touch up metallic coating after welding.
 - 1. Fabricate frames for Level 3 doors from 0.067-inch (1.7 mm) thick steel.
- D. Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

- E. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.
- F. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic zinc-coated or metallic-coated steel sheet.
- G. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

2.05 FABRICATION

- A. Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance and free from defects including warp or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- B. Clearances:
 - 1. Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors. Not more than 3/4 inch (19 mm) at bottom.
 - 2. Fire Doors: Provide clearances according to NFPA 80.
- C. Door-Edge Profile: Square edge, unless noted otherwise.
- E. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- F. Fabricate concealed stiffeners, reinforcement, edge channels and moldings from either cold- or hot-rolled steel.
- G. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- H. Frame Construction: Fabricate frames to shapes and sizes shown, with corners shop welded or mechanically fastened in the field, as specified in Article 2.04.
 - 1. Provide welded frames with temporary spreader bars.
- I. Door Hardware, General: Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames" and ANSI A205.8.
- J. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

1. Reinforce doors and frames at finish hardware locations with steel reinforcing plates complying with ANSI A205.8-1998 for minimum thicknesses and dimensions.
 - a. Hinges: 0.123 inch (12 MSG)
 - b. Lock Face, Flush and Surface Bolts: 0.067 inch (14 MSG)
 - c. Surface-Applied Closers, Hold-Open Arms, and Exit Devices: 0.067 inch (14 MSG)
 - d. Pull Plates and Bars: 0.053 inch (16 MSG) on door only.
 - e. Floor checking hinges and pivot hinges: 0.167 inch (7 MSG)
 - f. Kick and Push Plates: Reinforcing is not required.
 - g. Other Surface-Mounted Hardware: 0.053 inch (16 MSG).

- K. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

- L. Glazing Stops: Manufacturer's standard, formed from 0.032-inch- (0.8-mm-) thick steel sheet.
 1. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass panels.
 2. Provide screw-applied, removable, glazing stops on inside of glass panels.
 3. Drill stops and frame to receive countersunk flat-head machine screws spaced uniformly not more than 12 inches (304.8 mm) on center. Furnish flat head machine screws of appropriate size for fastening stops to frame.

2.07 FINISHES

- A. Shop Painting, General: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- B. Preparation: Clean steel surfaces to remove mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
- C. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. General: Install steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's installation instructions, and these specifications.
- B. Placing Frames: Comply with provisions of SDI-105 unless otherwise indicated. 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.

1. Except for frames located at existing concrete, masonry or drywall installations, place frames prior to construction of enclosing walls and ceilings.
 2. In existing concrete or masonry construction, provide at least three completed opening anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
 3. In metal stud partitions, provide at least three wall anchors per jamb; install adjacent to location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.
 4. At in-place drywall partitions install knock-down slip-on drywall frames
 5. Install fire-rated frames in accordance with NFPA 80.
- C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
1. Install fire-rated doors with clearances specified in NFPA 80.
 2. Smoke-Control Doors: Install to comply with NFPA 105.
- D. Sidelight Panel Installation: Clean glazing rabbets. Set solid panels into the openings using setting blocks and edge blocks as necessary to center the panel in the framed opening and allow room for thermal expansion and contraction. Secure in place with the metal stops furnished with the frame.
- 3.02 ADJUSTING AND CLEANING
- A. Prime Coat Touch-up: Immediately after installation, sand smooth rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Final Adjustments: Just prior to final inspection, check and readjust operating hardware. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable. Leave steel doors and frames undamaged and in proper operating condition.

END OF SECTION 08110