

SECTION 08114 – CUSTOM STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the 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. Steel doors.
2. Steel door frames.
3. Sidelight or borrowed-light frames.
4. Fire-rated door and frame assemblies.
5. Fire-rated window assemblies.
6. Impact resistant doors, frame and hardware assemblies.

- B. Related Sections include the following:

1. Division 4 Section “Unit Masonry Assemblies” for building anchors into and grouting frames in masonry construction.
2. Division 8 Section “Flush Wood Doors” for wood doors installed in steel frames.
3. Division 8 Sections for Door hardware and weather stripping.
4. Division 8 Section “Glazing” for glass in doors and sidelights or borrowed lights.
5. Division 9 Section “Gypsum Board Assemblies” for steel stud and gypsum board partitions.
6. Division 9 Section “Painting” for field painting doors and frames.

1.3 DEFINITIONS

- A. Uncoated steel sheet thicknesses are indicated as the minimum thickness according to HMMA 803, Steel tables.

- B. Metallic-coated steel thicknesses are indicated as the minimum thickness of the uncoated base metal.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, legal compliance, 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, 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.

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. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
 - 1. Temperature-Rise Rating: If indicated, provided doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.
- C. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.
- D. Impact resistant door, frame and hardware assemblies must meet the wind load and impact requirements of the South Florida Building Code, Dade County Edition 1994, and shall comply with the N.O.A. requirements as described at the end of this section and referenced on drawings.

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 Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames under cover at building site. Place units on minimum 4-inch high wood blocking. Avoid nonvented plastic or canvas shelters that could create a humidity chamber. If wrapped on doors become wet, remove cartons immediately. Provide minimum ¼-inch spaces between stacked doors to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors and frames that may be incorporated to compliance into the Work include, but are not limited to, the following:
 - 1. Steel Doors and Frames:
 - a. American Steel Products Corp.
 - b. Amweld Building Products, Inc.
 - c. BRS Products.
 - d. Ceco Door Products.
 - e. Curries Company.
 - f. Deronde Products, Inc.
 - g. Emerson Engineering, Co., Inc.
 - h. Firedoor Corporation of Florida.
 - i. Fleming: S.W. Fleming Limited.
 - j. Habersham Metal Products Co.
 - k. Karpen Steel Custom Doors & Frames.
 - l. Kewanee Corporation.
 - m. LaForce, Inc.
 - n. National Custom Hollow Metal Doors & Frames.
 - o. Pioneer Industries.

- p. Precision Metals, Inc.
 - q. Security Metal products, Inc.
 - r. Steelcraft; a division of Ingersoll-Rand.
 - s. Tex-Steel Corporation.
 - t. Therma-Tru Corp.; HMF Division.
2. Impact resistant door, frame and hardware assemblies:
- a. As referenced on the N.O.A. report attached at the end of this section.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheets: ASTM A 366, CS (commercial steel), type B.
- C. Metallic-Coated Steel Sheets: ASTM A 653, CS (commercial steel), type B; with G60 (Z180) zinc (galvanized) or A60 (ZF 180) zinc-iron-alloy (galvannealed) coating.
- D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, zinc coat according to ASTM A 153/A 153M, Class C or D as applicable.

2.3 Doors

- A. General: Provide flush-design doors, 1-3/4 inches thick, of seamless hollow construction, unless otherwise indicated. Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or stile edges.
 - 1. Visible joints or seams around glazed panel inserts are permitted.
 - 2. For single-acting swing doors, bevel both vertical edges 1/8 inch in 2 inches.
- B. Metallic Core Construction: Provide the following core construction welded to both door faces:
 - 1. Steel-stiffened Core: 0.026-inch steel vertical stiffeners extending full-door height, spaces not more than 6 inches apart and spot welded to face sheets a maximum of 6 inches o.c. Fill spaces between stiffeners with insulation of minimum 0.6-lb/cu. ft. density or sound deadener applied to inside surfaces of face sheets.
- C. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
- D. Astragals: As required by NFPA 80 to provide fire ratings indicated.

- E. Top and Bottom Channels: Spot weld metal channel not less than thickness of face sheet to face sheets not more than 6 inches o.c.
1. Reinforce tops and bottoms of doors with inverted horizontal channels of same material as face sheet so flanges of channels are even with bottom and top edges of face sheets.
 2. For exterior doors, close bottom edge with metallic-coated steel closing channel and top edge with filler channel of same material, so webs of channels are flush with bottom and top door edges.
- F. Hardware Reinforcement: Fabricate reinforcing plates from the same material as door to comply with the following:
1. Hinges and Pivots: 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
 2. Lock Face, Flush Bolts, Closers, and Concealed Holders: 0.093 inch thick.
 3. All Other Surface-Mounted Hardware: 0.053 inch thick.
- G. Interior Doors: Fabricate face sheets of doors from two 0.042-inch thick, cold-rolled, stretcher-leveled steel sheets and other metal components from hot- or cold-rolled steel sheets.
- H. Exterior Steel Doors: Fabricate face sheets of doors from two 0.053-inch thick, stretcher-leveled, metallic-coated steel sheets. Provide weep-hole openings in bottom of doors to permit entrapped moisture to escape. Seal joints in top edges of doors against water penetration.

2.4 FRAMES

- A. Fabricate frames of full-welded unit construction, with corners mitered, reinforced, and continuously welded full depth and width of frame. Knockdown frames are not acceptable.
1. For exterior use, form frames from 0.067-inch thick, metallic-coated steel sheets.
 2. For interior use, form frames from cold- or hot-rolled steel sheet of the following thicknesses:
 - a. Openings up to and including 48 inches wide: 0.053 inch.
 - b. Openings more than 48 inches wide: 0.067 inch.
- B. Hardware Reinforcement: Fabricate room the same material as frame. Minimum thickness of steel reinforcing plates for the following hardware:
1. Hinges and Pivots: 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot wells.
 2. Strikes, Flush Bolts, and Closers: 0.093 inch.
 3. Surface-mounted Hold-Open Arms and Panic Devices: 0.093 inch.

- C. Mullions and Transom Bars: Provide closed or tubular mullions and transom bars where indicated. Fasten mullions and transom bars at crossings and to jambs by butt welding. Reinforce joints between frame members with concealed clip angles or sleeves of same metal and thickness as frame.
- D. Head Reinforcement: Where installed in masonry, leave vertical mullions in frames open at top for grouting.
- E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153, Class B.
- F. Jamb Anchors: Weld jamb anchors to frames near hinges and directly opposite on strike jamb as required to secure frames to adjacent construction.
1. Masonry Construction: Adjustable, flat, corrugated, or perforated T-shaped anchors to suit frame size; formed of same material as frame; not less than 0.053 inch thick; with leg not less than 2 inches wide by 10 inches long. Furnish at least the number of anchors per jamb according to the following frame heights:
 - a. Three anchors per jamb from 60 to 90 inches in height.
 - b. Four anchors per jamb from 90 to 96 inches in height.
 2. Metal-Stud Partitions: Insert type with notched clip to engage metal stud, welded to back of frames, formed of same material as frame, not less than 0.042 inch thick. Provide at least the number of anchors for each jamb according to the following heights:
 - a. Four anchors per jamb from 60 to 90 inches in height.
 - b. Five anchors per jamb from 90 to 96 inches in height.
 3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch diameter concealed bolts into expansion shields or inserts 6 inches from top and bottom and 26 inches o.c, unless otherwise indicated. Reinforce frames at anchor locations. Except for fire-rated openings, apply removable stop to cover anchor bolts, unless otherwise indicated.
- G. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same materials as frame, 0.067 inch thick, as follows:
1. Clip-type anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions.
- H. Head Anchors: Provide 2 head anchors for frames more than 42 inches wide and mounted in steel-stud walls.
- I. Head Reinforcement: For frames more than 48 inches wide in masonry wall openings, provide continuous steel channel or angle stiffener, 0.093 inch thick for full width of opening, welded to back of frame at head.

- J. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.
- K. Rubber Door Silencers: Except on weather-stripped doors, drill stop in strike jamb to receive three silencers on single-door frames and drill head jamb stop to receive two silencers on double-door frames. Install plastic plugs to keep holes clear during construction.
- L. Plaster Guards: Provide 0.016-inch thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior openings and prevent mortar or other materials from obstructing hardware operation.

2.5 STOPS AND MOLDINGS

- A. Provide stops and moldings around, glazed, panels where indicated.
- B. Form fixed stops and moldings integral with frame, unless otherwise indicated.
- C. Provide removable stops and moldings where indicated or required, formed of 0.032-inch thick steel sheets matching steel frames. Secure with countersunk flat or oval head machine screws spaced uniformly not more than 12 inches o.c. Form corners with butted hairline joints.
- D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.6 FABRICATION

- A. Fabricate doors and frames rigid, neat in appearance, and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible. 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.
 - 1. Fabricate doors to comply with acceptance criteria of ANSI A250.4 for a Level A door.
- B. For doors with metallic core construction, weld cores to both door face sheets.
- C. Exposed Fasteners: Provide countersunk flat or oval heads for exposed screws and bolts, unless otherwise indicated.
- D. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors and frames fabricated as thermal-insulating assemblies and tested according to ASTM C 236 or ASTM C 976.
 - 1. Provide thermal-related assemblies with U-factor of 0.3 Btu/sq. ft. x h x deg F, unless otherwise indicated.
- E. Hardware Preparation: Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final schedule and templates

provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series specifications for door and frame preparation for hardware.

1. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
2. Locate hardware as indicated or, if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for cleaning, treating, priming, and when specified, finishing.
- B. Finish products specified in this Section after fabrication.

2.8 METALLIC-COATED STEEL FINISHES

- A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion 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.
- B. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. 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 or fabricator's standard, fast curing, lead- and chromate-free, primer complying with ANSI A224.1 acceptance criteria; recommended by primer manufacturer for zinc-coated steel; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2.9 STEEL SHEET FINISHES

- A. Surface Preparation: Clean surface 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, complying with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
- B. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. 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 or fabricator's standard, fast curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A224.1 acceptance criteria; 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 INSTALLATION

- A. General: Install doors and frames according to DHI A115.IG and manufacturer's written instructions.
- B. Frames: Install steel frames for doors, transoms, sidelights, borrowed lights, and other openings, of size and profile indicated.
 1. Set masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.
 - a. Set anchorage devices opposite each anchor location according to details on Shop Drawings and anchorage device manufacturer's written instructions. Level drilled holes rough, not reamed, and free of dust and debris.
 2. Floor anchors may be set with powder-actuated fasteners instead of masonry anchorage devices and machine screws, if so indicated on Shop Drawings.
 3. Placing Frames: Set frames accurately in position; plumb; align, and brace securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - a. At existing concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices.
 - b. At fire-rated openings, install frames according to NFPA 80.
 - c. Field splice only at approved locations. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
 - d. Remove spreader bars from each frame only after frame is properly set and secured.
- C. Doors: Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
 1. Jambs and Head: 3/32 inch.
 2. Meeting Edges, Pair of Doors: 1/8 inch.
 3. Bottom: 3/8 inch, if no threshold or carpet.

- 4. Bottom: 1/8 inch, at threshold or carpet.
- D. Fire-Rated Doors: Install with clearances as specified in NFPA 80.
- E. Impact resistant door, frame and hardware assemblies:
 - 1. Comply with all applicable requirements of N.O.A. report, attached at the end of this section.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

END OF SECTION 08114

