SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contract Drawings and general provisions of the Construction Contract, including Contract Clauses and Conditions (CC &C), Supplemental Contract Clauses and Conditions, and Division 1 sections of these Contract Specifications, apply to work of this Section.

B. Related Sections include the following:

1. Refer to Section 04810, “Unit Masonry Assemblies” for building anchors into and grouting frames in masonry construction.
2. Refer to Section 05500 “Metal Fabrications” for customized hollow-metal work other than doors, panels, and frames.
3. Refer to Section 08211, “Flush Wood Doors” for wood doors installed in steel frames.
4. Refer to Section 08346, “Sound Control Door Assemblies” for acoustical doors with an STC rating of 47 to 52.
5. Refer to Division 8 sections for door hardware and weather stripping.
6. Refer to Section 08800, “Glazing” for glass in doors and sidelights or borrowed lights.
7. Refer to Section 09260, “Gypsum Board Assemblies” for steel stud and gypsum board partitions.
8. Refer to Section 09912, “Painting” for field painting primed doors and frames.

1.2 SUMMARY

A. This Section includes the following:

1. Steel doors.
2. Steel door frames.
3. Stainless-steel doors and frames.
4. Sidelight or borrowed-light frames.
5. Hollow-metal panels and frames.
6. Fire-rated door and frame assemblies.
7. Louvers in doors.

1.3 DEFINITIONS

A. Uncoated steel sheet thickness is indicated as the minimum thickness according to HMMA 803, Steel Tables.

B. Metallic-coated steel sheet thickness is indicated as the minimum thickness of the uncoated base metal.

C. Stainless-steel sheet thicknesses are indicated as the specified thickness for which over and under thickness tolerances apply according to ASTM A 480/A 480M.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label 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, location and thickness of lead lining, and details of joints and connections. Show anchorage and accessories.

1. Electric Hardware Devices: Indicated routing of electrical conduit for electric hardware devices.
2. Security System Components: Indicate all cutouts required to metal door and frame components to accept security system components.

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.

D. Product Certificates: Signed by manufacturers of doors certifying that products furnished comply with or exceed the acceptance criteria of ANSI A250.4 for Level A doors.

E. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

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 or UL 10B.

1. Test Pressure: Test at atmospheric (neutral) pressure.
2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
3. Temperature-Rise Rating: If indicated at exit enclosures, provide doors that have a temperature-rise rating of 250 deg C maximum in 30 minutes of fire exposure.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by COR Representative; otherwise, remove and replace damaged items as directed.

C. Store doors and frames under cover at building site. Place units on minimum 100-mm-high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 6-mm spaces between stacked doors to permit air circulation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.

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 or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide doors and frame by one of the following:

1. Steel Doors and Frames:

a. Amweld Building Products, Inc.
b. Ceco Door Products.
c. Curries Company.
d. Deronde Products, Inc.
e. Firedoor Corporation of Florida.
f. Fleming: S. W. Fleming Limited.
g. Steelcraft; a division of Ingersoll-Rand.
h. Tex-Steel Corporation.
i. Approved equivalent.

2. Stainless-Steel Doors and Frames:

a. Curries Company.
b. Deronde Products, Inc.
c. Fleming: S. W. Fleming Limited.
d. Next Door Company.
e. Steelcraft; a division of Ingersoll-Rand.
f. Tex-Steel Corporation.
g. Approved equivalent.

2.2 MATERIALS

A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled.

B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, CS (commercial steel), Type B.

C. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, CS (commercial steel), Type B; with Z180 zinc (galvanized) or ZF180 zinc-iron-alloy (galvannealed) coating.

D. Stainless-Steel Sheets: ASTM A 666, austenitic stainless steel, Type 304.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built to exterior walls, zinc coat according to ASTM A 153/A 153M, Class C or D as applicable.

F. Grout: Comply with ASTM C 476, with a slump of 100 mm for standard steel door frames built into concrete or masonry, as measured according to ASTM C 143/C 143M.

G. Filler: Sound deadening and heat-retarding mineral fiber insulating material. At doors required to have temperature rise rating provide mineral fiberboard core.

H. Glazing and Glazing Felt for fire rated door assemblies: Clear Wire Glass: Type II, Class 1, Form 1, with pattern M2 (square) wire mesh where shown.

1. Fire Resistance Rated Wire Glass: Provide wire glass products that are identical to those tested per ASTM E163 (UL 9) and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 0.4 mm dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

J. Lead Lining: Rolled sheet lead conforming to requirements of FS QQ-L-201, Grade C (Chemical Lead) in sizes and thicknesses indicated.

2.3 DOORS

A. General: Provide flush-design doors, 44 mm 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. Exterior doors to be IGGA (1.5mm) galvanized interior doors 18 GA (1.2mm).

1. Visible joints or seams around glazed or louvered panel inserts are permitted.

2. For single-acting swing doors, bevel both vertical edges 3 mm in 50 mm.
3. For double-acting swing doors, round vertical edges with 54-mm radius.
4. Exterior doors to have flush tops.

B. Metallic Core Construction: Provide the following core construction welded to both door faces:

1. Continuous Truss-Form Inner Core: 0.33-mm- thick steel reinforcement spot welded to face sheets a maximum of 75 mm o.c. vertically and horizontally.

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 150 mm 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: 4.2 mm thick by 38 mm wide by 150 mm longer than hinge, secured by not less than six spot welds.
2. Lock Face, Flush Bolts, Closers, and Concealed Holders: 2.3 mm thick.
3. All Other Surface-Mounted Hardware: 1.3 mm thick.

G. Interior Doors: Fabricate face sheets of doors from two 1.06-mm- thick, cold-rolled, stretcher-leveled steel sheets and other metal components from hot- or cold-rolled steel sheets.

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

H. Exterior Steel Doors: Fabricate face sheets of doors from two 1.3-mm-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.

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).

I. Stainless-Steel Doors: Fabricate face sheets of doors from two 1.3-mm-thick, stainless-steel sheets permanently and continuously bonded to nonmetallic cores or welded to rigid, internal stainless-steel core.

1. Internal Construction: Vertically reinforced with 1.3-mm-thick, stainless-steel sheet sections, spaced not more than 150 mm o.c., extended full-door height, and spot welded to both face sheets at not more than 125 mm o.c.
2. Reinforce tops and bottoms of doors with 1.3-mm-thick, stainless-steel horizontal channels spot welded a maximum of 150 mm o.c. to door faces.

a. For exterior doors, close bottom edge with minimum 1.3-mm-thick, stainless-steel closing channel and top edge with same thickness of stainless-steel filler channel, so webs of channels are flush with bottom and top door edges. Provide weep-hole openings in bottom of doors to permit entrapped moisture to escape. Seal joints in top edges of doors against water penetration.

J. Electrical Requirements: Provisions for installation of electrical items specified elsewhere; arrange so that wiring can be readily removed and replaced.

1. Security System Components: Provide all cutouts and reinforcements required for metal doors to accept security system components.

K. Doors With Electric Hinges: General: Provide with metal conduit raceway to permit wiring from electric hinge to other electric door hardware.

1. Hinge Location: Center for doors less than 2286 mm or 2nd hinge from door bottom for doors greater than 2286 mm; top or bottom electric hinge locations shall not be permitted.

2.4 PANELS

A. Provide panels of same materials, construction, and finish as specified for doors.

2.5 FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile.

B. Fabricate frames of full-welded unit construction, with corners mitered, reinforced, and continuously welded full width of mitre. Knockdown frames are acceptable for drywall construction only.

1. For exterior use, form frames from 1.9-mm-thick, metallic-coated steel sheets galvanized.
2. For interior use, form frames from cold- or hot-rolled steel sheet of the following thicknesses:

a. Openings up to and Including 1200 mm Wide: 1.5 mm.
b. Openings More than 1200 mm Wide: 1.9 mm.

3. For stainless-steel doors, form frames from 1.6-mm-thick, stainless-steel sheets with No. 4 finish.
4. Lead Lined Frames: 1.519 mm thick steel.

C. Hardware Reinforcement: Fabricate from same material as frame. Minimum thickness of steel reinforcing plates for the following hardware:

1. Hinges and Pivots: 4.2 mm thick by 38 mm wide by 150 mm longer than hinge, secured by not less than six spot welds.
2. Strikes, Flush Bolts, and Closers: 2.3 mm.
3. Surface-Mounted Hold-Open Arms and Panic Devices: 2.3 mm.
4. All Other Surface-Mounted Hardware: 1.7 mm.

D. 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.

1. Provide false head member to receive lower ceiling where frames extend to finish ceilings of different heights.

E. Head Reinforcement: Where installed in masonry, leave vertical mullions in frames open top for grouting.

F. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.

G. 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 1.3 mm thick; with leg not less than 50 mm wide by 250 mm long. Furnish at least the number of anchors per jamb according to the following frame heights:

a. Two anchors per jamb up to 1500 mm in height.
b. Three anchors per jamb from 1500 to 2250 mm in height.
c. Four anchors per jamb from 2250 to 2400 mm in height.
d. One additional anchor per jamb for each 600 mm or fraction thereof more than 2400 mm 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 1.0 mm thick. Provide at least the number of anchors for each jamb according to the following heights:

a. Three anchors per jamb up to 1500 mm in height.
b. Four anchors per jamb from 1500 to 2250 mm in height.
c. Five anchors per jamb from 2250 to 2400 mm in height.
d. One additional anchor per jamb for each 600 mm or fraction thereof more than 2400 mm in height.

3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 9-mm-diameter concealed bolts into expansion shields or inserts 150 mm from top and bottom and 650 mm 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.

H. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material as frame, 1.7 mm thick, as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners, welded to bottom of jambs and mullions.
2. Separate Topping Concrete Slabs: Adjustable type with extension clips, allowing not less than 50-mm height adjustment. Terminate bottom of frames at finish floor surface.

I. Head Anchors: Provide two head anchors for frames more than 1066 mm wide and mounted in steel-stud walls.

J. Head Strut Supports: Provide 9-by-50-mm vertical steel struts extending from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or 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.

K. Structural Reinforcing Metals: Provide as part of frame assembly, where indicated at mullions, transoms, or other locations to be built into frame.

L. Head Reinforcement: For frames more than 1200 mm wide in masonry wall openings, provide continuous steel channel or angle stiffener, 2.3 mm thick for full width of opening, welded to back of frame at head.

M. Spreader Bars: Provide removable spreader bar across bottom of frames, tack welded to jambs and mullions.

N. 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.

O. Plaster Guards: Provide 0.4-mm-thick plaster guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware operation.

P. X-Ray Door Frame Struts and Lead Linings:

1. Struts: Provide vertical steel struts, 9.525 mm x 50 mm extended from top of frame at each jamb to supporting structural construction above, unless frame is set in masonry or attached directly to concrete. Bend top of struts at a right angle and attach to supporting structural construction above by bolting. Use inserts or expansion anchors into supporting structural construction above. Provide bolted attachment of struts to frame at jambs to permit height adjustment during installation. Adapt jamb anchor clips at struts to permit adjustment.
2. Lead Lining: All X-ray door frames shall be provided with a minimum 25 mm x 50 mm x 4.76 mm continuous structural angle welded to the full length of the hinge, head, and strike jambs. The door frame and structural angle shall then receive a single 1.5 mm thickness of lead sheet having a width to provide an effective lead lap with the lead of the adjoining wall construction lead shielding materials. Lead sheet shall be factory installed as a continuous lining formed to the contour of the door frame and structural angle and around areas prepared to receive hardware. Lead lining shall be held in place with retaining clip devises.

2.6 LOUVERS

A. Door Louvers: Fabricate louvers and mount flush into doors without overlapping moldings on surface of door face sheets. Provide internal support as recommended by louver manufacturer. Prime paint steel louvers after fabrication.

1. Interior Louvers: Sightproof, stationary type, constructed of inverted Y-shaped blades formed of same material as door.

    a. Steel: 0.8 mm thick.
    b. Stainless Steel: 0.95 mm thick.

2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.8 mm thick, fabricated from same material as door face sheet in which they are installed.

B. Provide stops and moldings around solid, glazed, and louvered panels where indicated.

C. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 16 mm high, unless otherwise indicated.

D. Loose Stops for Glazed Lites in Frames: Provide removable stops and moldings where indicated or required, formed of 0.8-mm-thick steel sheets matching steel frames. Secure with countersunk flat or oval head machine screws spaced uniformly not more than 300 mm o.c. Form corners with butted hairline joints.

E. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

2.8 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. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from galvannealed-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 1.3 mm thick, galvannealed-coated steel channels with channel webs placed even with top and bottom edges. Seal; joints in top edges of doors against water penetration.

C. Interior Door and Panel Faces, and Frames: Fabricate exposed faces of doors, frames and panels, including stiles and rails of nonflush units, from the following material:

    1. Cold-rolled steel sheet, except as indicated below.
    2. Galvannealed-coated steel sheet at the following locations:

        a. Kitchens.
        b. Toilets.
        c. Washrooms.
        d. Locker Rooms.
        e. Showers.

D. For doors with metallic core constructions, weld cores to both door face sheets.

E. Clearances for Non-Fire-Rated Doors: Not more than 3.2 mm at jambs and heads, except not more than 6.4 mm between pairs of doors. Not more than 19 mm at bottom.

F. Exposed Fasteners: Provide countersunk flat or oval heads for exposed screws and bolts, unless otherwise indicated.

G. 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 STM C 236 or ASTM C 976.

1. Provide thermal-rated assemblies with U-factor of 1.7 W/sq. m x K, unless otherwise indicated.

H. Sound-Rated (Acoustical) Assemblies: Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413.

1. Provide acoustical assemblies with STC sound ratings of 33 or better, unless otherwise indicated.

I. Hardware Preparation: Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSIA115 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.”

2.9 GLAZED LIGHT FRAMES

A. Form glazed light frames to the profiles shown. Provide anchors at jambs same as for door frames. Provide closed mullion sections same as for door frames. Fabricate from 1.519 mm thick steel for interior work.

B. Miter, fit, and weld corners of panel moldings for glass panels in sidelights and borrowed lights to form continuous frame around panels. Provide non-removable panel moldings on the exterior. Secure removable moldings with not less than No. 6 x 32 Phillips oval-head countersunk machine screws at 300 mm on center.

C. Provide continuous felt strips cemented in place, on all bed and stop surfaces for interior light frames to be glazed so that at no time does metal touch glass.

1. Glaze light frames with wire glass.

2.10 BULLET RESISTANT ACOUSTICAL DOORS

A. Provide special bullet resistant acoustical doors fabricated from sheet steel where shown with Z180 zinc (galvanized) or ZF180 zinc-iron-alloy (galvannealed) coating or scheduled, compete with frames. Provide a Sound Transmission Class of 49, as determined in accordance with ASTM E413, for each door, threshold and frame assembly when installed. The door and frame assembly shall be designed to withstand a commercially loaded handgun or rifle ammunition, including armor piercing ammunition, having a muzzle velocity not to exceed 1067 m/s and maximum energy of 7118 joules (5,250 foot pounds). The assembly shall be complete with necessary gasketing, thresholds and sound seals to achieve the specified STC rating and bullet resistance. Doors shall be designed for use with standard builder's hardware as scheduled.

B. Basis of Design: Moduline APR Type Single Leaf Personnel Doors Modified to comply with the requirements; Industrial Acoustics Company, or equal.

2.11 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.

2.12 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 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.

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 0.02 mm.

1. Shop Primer: Manufacturer's of fabricator's standard, fast-curing, lead- and chromate-free, primer complying with ANSI A 224.1 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.

2.13 STEEL SHEET FINISHES

A. 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, 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 0.02 mm.

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A 224.1 acceptance criteria; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

2.14 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured polished finish indicated, free cross scratches. Run gain with long dimension of each piece.

1. Bright, Directional Polish: No. 4 finish.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

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 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. Leave 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 approved 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: 2 mm.
2. Meeting Edges, Pairs of Doors: 3 mm.
3. Bottom: 9 mm, if no threshold or carpet.
4. Bottom: 3 mm, at threshold or carpet.

D. Fire-Rated Doors: Install with clearances as specified in NFPA 80.

E. Smoke Control Doors: Install according to NFPA 105.

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.

C. Stainless-Steel Touchup: Immediately after erection, smooth any abraded areas of stainless steel and polish to match undamaged finish.

END OF SECTION 08110