DIVISION 08- DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Standard steel frame products and doors assemblies including glazing, glazing stops and louvers as indicated and scheduled on drawings.

2. Behavioral Health steel frame products and assemblies including glazing and glazing stops as indicated and scheduled on the Drawings.

B. Related Work Described Elsewhere:

1. Finish hardware is specified in Section 08710 - FINISH HARDWARE.

2. Paint Finish is specified in Section 09900 – PAINTING.

1.02 DEFINITIONS

A. Behavioral Health Assemblies: Steel frame assemblies located in areas that are accessible to the patients.

1.03 REFERENCES

A. American National Standards Institute (ANSI)

1. ANSI/NFPA 80, Standard for Fire Doors and Other Opening Protectives.

2. ANSI/UL 10C, Standard for Positive Pressure Fire Tests of Door Assemblies.

B. American Society of Testing and Materials (ASTM)

1. ASTM A 653, Specification for Steel Sheet, Zinc-Coated, (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM A 1008, Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability. Solution Hardened and Bake Hardenable.

3. ASTM A 1011, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength.

C. Hollow Metal Manufacturer’s Association (HMMA)

1. HMMA 805, Recommended Selection and Usage Guide for Hollow Metal Doors and Frames.

2. HMMA 810, Hollow Metal Doors

3. HMMA 820, Hollow Metal Frames

D. Steel Door Institute (SDI)

1. ANSI/SDI A250.8, Specifications for Standard Steel Doors and Frames
2. ANSI/SDI A250.10, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
3. ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames.
4. SDI 117, Manufacturing Tolerances for Standard Steel Doors and Frames.

1.04 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI 100 “Recommended Specifications for Standard Steel Doors and Frames”, Hollow Metal Manufacturer’s Association, HMMA and as herein specified.

B. Manufacturer’s Qualifications: Provide evidence of having personnel and plant equipment capable of fabricating hollow metal door and frame assemblies of the type specified herein.

C. Fire-Rated Assemblies: Where fire-rated assemblies are indicated or required, provide fire-rated door assemblies that comply with NFPA 80 “Standard for Fire Doors and Fire Windows”, and have been tested, listed, and labeled in accordance with UL 10C ‘Positive Pressure Fire Tests of Door Assemblies” and NFPA 252 “Fire Tests of Door Assemblies” by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

D. Fire door assemblies in exit enclosures and exit passageways must have a maximum transmitted temperature end point of not more than 250°F (121°C) above ambient at the end of 30 minutes of the standard fire test exposure.

E. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

1.05 SUBMITTALS

A. Submit under the provisions of Section 01330 – SUBMITTAL PROCEDURES.

B. Manufacturer’s Data: Submit manufacturer’s technical product data substantiating that products comply with requirements.

C. Shop Drawings: Submit for fabrication and installation of steel doors and frames. Include details of each frame type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections, gauges, and finishes. Show anchorage and accessory items.

D. Manufacturer’s recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

E. Manufacturer’s Qualifications.

F. Schedule: Provide a schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

G. Label Construction Certification: For assemblies required to be fire-rated and exceeding sizes of tested assemblies, submit manufacturer's certification for that each frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

H. Contractor responsible for coordination and installation of products covered under this Section shall:

1. Verify and submit to the manufacturer's the actual opening sizes and site conditions by field measurements before fabrication. Coordinate field measurements with fabrication and construction schedules to avoid delays.

2. Verify that substrate conditions, whether existing or installed under other Sections, are as detailed in the Architect's drawings and are acceptable for product installation in accordance with the manufacturer's instructions.

I. Reflect measurements and conditions determined under Section 1.04.G in submittal documents and manufacture product accordingly.

J. Do not proceed with fabrication without receipt of approved submittal drawings and approved hardware schedules.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver hollow metal work cartoned or crated to provide protection during transit and job storage. Strap knock-down frames in bundles. Provide temporary steel spreaders securely fastened to the bottom of each welded frame.

B. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover in a dry, secure place. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chambers.

1.07 COORDINATION

A. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement for door hardware, electric devices and recessed items.

B. Coordinate work with frame opening construction, door and hardware installation.

C. Sequence installation to accommodate required door hardware.

D. Hardware Mounting Heights: The Contractor shall be responsible to coordinate all mounting heights of various finish hardware with all project requirements.

E. Verify field dimensions for factory assembled frames prior to fabrication.

1.08 WARRANTY

A. Provide manufacturer's standard written warranty in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty Period: One (1) year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Galvanized Steel Sheets: Zinc coated commercial quality carbon steel, Type B; suitable for exposed applications, complying with ASTM A 1008. Protective zinc coating to comply with ASTM A 653 coating designation G90 at all doors and frames.

B. Supports and Anchors: Fabricate of not less than 18-gauge galvanized sheet steel.

C. Frame Anchors:

1. Wall Anchors for Attachment to Drywall Partitions:
    a. Use manufacturer's adjustable type compression anchors with knocked down die mitered frames at drywall locations.
    b. Use stud anchors sized to accommodate frame jamb depth and face dimension on all welded frames.
2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
3. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
4. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
5. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    a. Compression Type: Not less than two anchors for each jamb.
    b. Stud Wall Type: Provide three anchors per jamb up to 60-inches in height and four anchors for jambs 60 to 90 inches in height.
    c. Masonry Type: Provide two anchors per jamb up to 60-inches in height and three anchors for jambs 60 to 90 inches in height.
6. Floor Anchors: Angle clip type:
    a. 16 gauge minimum.
        1) Same gauge as door frames for floor anchors used in Behavioral Health assemblies.
    b. To receive 2 fasteners per anchor.
    c. Welded to the bottom of each jamb.

1) Weld floor anchors inside the jamb with at least 4 weld spots per anchor for floor anchors used in Behavioral Health assemblies.

D. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize, complying with ASTM A 153/A 153M "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware", Class C or D as applicable.

E. Factory Applied Primer Paint: Rust-inhibitive enamel paint, either air-drying or baking, suitable as a base for specified finish paints conforming to ANSI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames". Primers shall be free from asbestos, lead, mercury, chromate, and cadmium.

2.02 MANUFACTURERS

A. Standard Steel Door and Frame Manufacturers: Subject to compliance with requirements of this section, provide products from one of the following:

1. Amweld Building Products, Inc.
2. Ceco Door, Assa Abloy
3. Curries Co.
4. Steelcraft
5. Or approved equal.

2.03 FABRICATION, GENERAL

A. Fabricate doors and frames to meet the quality standards and fabrications methods established by the Steel Door Institute (SDI) and the Hollow Metal Manufacturer's Associations (HMMA) and in accordance with the Contract Documents and approved submittal drawings.

B. Fabricate steel doors and frame units to be rigid, neat in appearance and free from defects, warp or buckle.

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, and moldings from galvanized cold-rolled steel.

D. Fabricate all doors and frames from galvanized sheet steel.

E. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames.

F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

G. Finish Hardware Preparation: Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI/SDI A250.6 series specifications for frame preparation for hardware.

1. Reinforce standard doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at

project site. Provide minimum gauge hardware reinforcing for mortise or surface applied hardware as follows:

a. Standard Doors and Frames

1) Mortised Hinges: 0.093-inch.

2) Surface Closers: 0.067-inch.

b. Behavioral Health Assemblies

1) Hinges: 0.167-inch

2) Closers: 0.167-inch

3) Lock Front: 0,093-inch

2. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI-05 “Recommended Locations for Builder’s Hardware for Standard Steel Doors and Frames” and the 2010 ADA Standards for Accessible Design Section 404.2.7.

H. Factory Painting:

1. Clean, phosphatize, and prime paint exposed surfaces of steel doors and frame units, including galvanized surfaces.

2. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

3. Apply factory coat of prime paint to an even consistency to provide a uniformly finished surface ready to receive paint finish specified in Section 09900 – PAINTING.

2.04 STANDARD STEEL DOORS

A. Flush Steel Doors:

1. Provide doors complying with the requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:

a. Interior Doors: Level 2 (18 gauge); Physical Performance Level B (Heavy Duty), Model 1 (Full Flush)

b. Exterior Doors: Level 3 (16 gauge) and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

2. Construction, General:

a. Doors shall be of the types and sizes shown on approved shop drawings.

b. Door face sheets shall be joined at their vertical edges with no visible seems on their faces. Minimum door thickness shall be 1-3/4-inches.

c. Face sheets shall be stiffened by continuous vertical formed steel sections which, upon assembly span the full thickness of the interior space between the door faces. These stiffeners shall be not less than 22 gage, spaced so that the vertical interior webs shall be no more than 6” apart and securely fastened to both face sheets by spot welds

spaced at a maximum of 5” o.c. vertically. Spaces between stiffeners shall be filled with fiberglass or mineral rockwool batt-type material.

d. Door faces shall be joined together at their vertical edges by a continuous weld extending the full height of the door. All such welds to be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.

e. Top and bottom edges of all doors shall be closed with continuous steel channels not less than 16 gage, spot welded to both faces.

f. Edge profiles shall be provided on both vertical edges of doors as follows:

1) Single-acting swing doors - beveled 1/8-inch in 2-inches.

3. Finish: As specified herein.

B. Door Accessories:

1. Door Vision Lite Frames (where scheduled): Steel sheet matching door face material; minimum 0.032-inch base-metal thickness

a. Profile: Flush type, with beveled stops.

b. Corner Construction: Mitered and welded.

c. Fasteners: Countersunk.

d. Fixed-Stop Location: Secure (key) side of door.

e. Fire-Rated Doors: Comply with requirements in NFPA 80.

f. Glass:

1) Non-rated Doors: 1/4” fully tempered clear glass complying with the requirement of Section 08800 – GLAZING.

2) Fire-Rated Doors (20-Minute):

a) Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials. FireLite Plus; TGP, Nippon Electric Glass Co.

b) Fire Rating: 20 minutes

c) Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent.

d) Labeling: Permanently label each piece of fire-rated glass with the appropriate marking.

2. Door Louvers (where scheduled): SDI 111C; steel sheet matching door face material unless otherwise noted

a. Fire-Rated Automatic Louvers: Constructed with movable blades closed by actuating fusible link; listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

b. Storm-Rated Louver: Stationary louvers constructed with 0.063-inch-thick extruded aluminum storm resistant blades, finished to match door. Provide isolation material to prevent galvanic corrosion due to dissimilar metals.

2.05 STANDARD STEEL FRAMES

A. Provide metal frames for doors of type and style as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 16 gauge cold-rolled furniture steel.

1. Fabricate frames with mitered corners in the following type construction:

a. Exterior Door Frames: Full Welded construction.

b. Interior Door Frames: Knock-down (mechanical interlock joint) construction with hairline seam.

2. Form all frames of hot dip galvanized steel.

3. Frames shall comply with ANSI A250.4 “Performance Test Procedures for Steel Door Frames and Frame Anchors”, Level A, one million cycle swing test performance for a 4070-door frame.

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

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

B. Door Silencers: Except on weather-stripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

C. Plaster Guards: Provide 26-gauge steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

D. Template Hardware: Factory cut doors and frames for all template hardware including hinges, bolts, etc.

E. Finish: As specified herein.

2.06 FRAMES IN BEHAVIORAL HEALTH ASSEMBLIES

A. Provide metal frames for doors borrowed lites, transoms and windows of type and style as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14 gauge (0.067-inch) galvanized steel.

1. Fabricate frames with mitered corners in the following type construction:

a. Interior Borrowed Lite, Transom and Window Frames: Full Welded construction.

B. Fabricate frames such that all finished work is neat in appearance, square, and free of defects, warps and buckles. Form pressed steel members such that they are straight and of uniform profile throughout their lengths.

C. Fabricate jamb, header and sill profiles in accordance with the frame schedule and as shown on the approved submittal drawings.

D. Fabricate corner joints such that all of their contact edges are closed tight with faces mitered and stops either butted or mitered. Continuous weld faces and soffits and finish the faces smooth. The use of gussets or splice plates as a substitute for welding is not acceptable.

E. Continuously weld all other face joints and finish them smooth.

F. Provide continuous perimeter sealant using security sealant specified in Section 07925 – SECURITY SEALANTS at patient side to create flush, ligature-resistant condition.

G. Minimum height of stops in door openings are required to be 0.625 in. Height of stops on security glazing openings are required to be as shown on approved submittal drawings.

H. Fabricate frames for multiple openings using mullion members which, after fabrication, are closed shapes conforming to profiles shown on approved submittal drawings, and that have no visible seams or joints. Continuous weld and finish smooth all joints between faces of abutted. Weld all joints between stops of abutted members along the soffit such they are left neat and uniform in appearance.

I. Floor Anchors

1. Where applicable, provide floor anchors with two (2) holes for fasteners and fasten them inside jambs with at least four (4) spot welds per anchor.

2. Where so scheduled, install adjustable floor anchors, that provide not less than 2 -inches height adjustment, and fasten them in place with at least four (4) spot welds per anchor.

3. Fabricate floor anchors of the same material thickness as frame.

J. Jamb Anchors

1. Provide the number of anchors on each jamb as follows:

   a. Borrowed light and Window frames: 2 anchors plus 1 for each 18-inches or fraction thereof over 36-inches, spaced at 18-inches maximum between anchors.

2. Door frames: 2 anchors plus 1 for each 18-inches or fraction thereof over 54-inches, spaced at 18-inches maximum between anchors.

K. Glazing Stops:

1. Where security glazing is scheduled or specified, provide pressed steel angle removable glazing stops of not less than 0.123-inch material thickness. Fabricate angle stops such that they are mitered or butted and tight fitting at the corner joints; and are secured in place using 1/4 – 20 or 1/4 – 28 button head tamper resistant, corrosion-resistant machine screws spaced not less than 2-inch from the ends and 9-inches o.c.

   a. Where applicable don’t locate removable stops on the patient side.

2. Stops in borrowed lite, transom and window frames shall have a height to provide 1-inch security glazing engagement. Stops shall be sized and located to accept 1/2-inch-thick glazing.

L. Glazing: 1/2-inch-thick polycarbonate glazing with UV and abrasions resistant coating.

1. Acceptable Manufacturer's:

a. AZ Polymers, LLC; AZCARB AR 15 Polycarbonate Glazing

b. Plaskolite, LLC; Tuffak 15 Polycarbonate Glazing

c. Polyvantis, LLC, SL4855 Polycarbonate Glazing.

2. Provide setting blocks and continuous glazing tape per glazing manufacturer's recommendations.

2.07 FIRE-RATED ASSEMBLIES

A. Assemblies shall bear the listing identification label of the Underwriters Laboratories, Inc. (UL), Factory Mutual Engineering Corp. (FM), Warnock Hersey International (WHI), or a nationally recognized testing laboratory qualified to perform tests of fire assemblies in accordance with ANSI/UL 10C and NFPA 252 and having a listing for the tested assemblies. Listing identification labels shall be constructed and permanently applied by a method which results in their destruction should they be removed. Labels shall be metal with raised letters and shall bear the name and file number of the frame manufacturer. Labels shall not be painted.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.03 INSTALLATION, DOORS

A. General: Install steel doors and frames in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 “Recommended Erection Instructions for Steel Frames”, unless otherwise indicated.

1. Anchors: Provide sufficient anchorage to attach to wall in accordance with ANSI A250.4 Test compliance Level A of one million cycles, or anchorage as detailed on drawings to specific wall conditions.

2. Except for frames located at in-place concrete and masonry installations, place frames prior to construction of enclosing walls and ceilings. 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.

3. Install fire-rated frames in accordance with NFPA 80.

4. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

5. Glazing: Comply with installation requirements in Section 08800 - GLAZING and with hollow metal door and frame manufacturer's written instructions

C. Door Installation: Fit hollow-metal accurately in frames, with clearances specified in ANSI/SDI 100.

1. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

3.04 TOLERANCES

A. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

1. Squareness: Plus, or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

2. Alignment: Plus, or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

3. Twist: Plus, or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

4. Plumbness: Plus, or minus 1/16 inch, measured at jambs at floor.

3.05 ADJUST AND CLEAN

A. Factory Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of factory coating and apply touch-up of matching air-drying coating.

B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel frames undamaged and in complete and proper operating conditions.

END OF SECTION