SECTION 08 100
STANDARD HOLLOW METAL DOORS AND FRAMES

Part 1: General

1.01 Section includes

A. Steel doors

B. Steel frames

C. Steel architectural stick systems

1.02 Related sections

A. Section 08210: Wood Doors

B. Section 08220: Plastic Doors

C. Section 08710: Door Hardware

D. Section 08800: Glazing

E. Section 09900: Paints and Coatings

F. Section 13710: Intrusion Detection: Security system

G. Section 13800: Building Automation and Control: Building monitoring system

H. Section 16123: Building Wire and Cable: Power supply to electric hardware devices

1.03 References

It is the intent of this specification that all hollow metal and its application will comply or exceed the standards as listed. The latest

published edition of each reference applies.

A. **ASTM**: American Society for Testing and Materials

1. **ASTM A 653/A 653M:** Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated

(Galvannealed) by the Hot-Dip Process.

2. **ASTM A 924:** Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.

3. **ASTM A 1008/A 1008M:** Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, High Strength Low-Alloy, High Strength

Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

4. **ASTM E 90:** Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

5. **ASTM E 413:** Classification for Rating Sound Insulation.

B. **ANSI:** American National Standards Institute

1. **ANSI/DHI A 115:** Specifications for Hardware Preparations in Standard Steel Doors and Frames.

2. **ANSI A156.7:** Hinge Template Dimensions.

3. **ANSI A 250.3: Test Procedure and Acceptance Criteria for Factory Applied F**inish Painted Steel Surfaces for Steel Doors and

Frames.

4. **ANSI A250.4: Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing.**

5. **ANSI A 250.8: SDI-100 Recommended Specifications for Standard Steel Doors and Frames.**

6. **ANSI A 250.10: Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.**

7. **ANSI/SDI 250.11:** Recommended Erection Instructions for Steel Frames

8. **ANSI/DHI A 115.IG:** Installation Guide for Doors and Hardware.

C. **SDI:** Steel Door Institute

1. **SDI 105:** Recommended Erection Instructions for Steel frames.

2. **SDI 111:** Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.

3. **SDI 111-H:** High Frequency Hinge Preparation

4. **SDI 112:** Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames.

5. **SDI 117:** Manufacturing Tolerances for Standard Steel Doors and Frames.

6. **SDI 118:** Basic Fire Door Requirements.

7. **SDI 122:** Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

8. **SDI 124:** Maintenance of Standard Steel Doors and Frames.

D. **NAAMM/HMMA:** Hollow Metal Manufacturers Association

1. **HMMA 840:** Guide Specification for Installation and Storage of Hollow Metal Doors and Frames

2. **HMMA 820 TN01-03:** Grouting Hollow Metal Frames

E. Building Code references

1. **NFPA 80:** Standard for Fire Doors and Other Opening Protectives.

2. **NFPA 105:** Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives

3. **NFPA 252:** Standard Method of Fire Tests of Door Assemblies

4. **ANSI/UL 10C:** Standard for Safety for Positive Pressure Fire Tests of Door Assemblies

5. **UL 1784:** Air Leakage Tests of Door Assemblies
6. **UL:** Building Materials Directory; Underwriters Laboratories Inc.
7. **WH:** Certification Listings; Warnock Hersey International Inc.
8. **Federal Emergency Management Agency** (FEMA) 361 Guidelines
9. **Miami–Dade County** test protocols PA 201, PA 202 and PA 203.
10. **Florida Building Code** test protocols TAS 201, TAS 202 and TAS 203

1.04 Requirements of regulatory agencies

A. Doors and frames to conform to applicable codes for fire ratings. It is the intent of this specification that all hardware and its application comply or exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required by NFPA and UL.

1. Interior vertical stairwell doors will carry a minimum 250°F (121°C) temperature rise rating in addition to the required fire rating.

1.05 Submittals

A. Submit for review six (6) complete copies of the hollow metal shop drawings covering complete identification of items required for the project. Include manufacturer’s names and identification of product. Included six (6) complete copies of catalog cuts and/or technical data sheets and any other data as may be required to show compliance with these specifications.

1. The data on the Shop Drawing will be complete with respect to quantities, dimensions, specified performance, and design criteria, materials and similar data to enable the Architect to review the information as required.

B. Indicate frames configuration, anchor types and spacing, location of cutouts for hardware, reinforcement, to ensure doors and frames are properly prepared and coordinated to receive hardware.

C. Indicate door elevations, internal reinforcement, closure method, and cutouts for glass lights and louvers.

D. Submit manufacturer’s installation instructions, including a copy of ANSI A250.11-2001 as part of the shop drawing submittal.

E. Shop drawings, product data, and samples to bear the Contractor’s stamp verifying they have been coordinated and reviewed for completeness and compliance with the contract documents.

F. Shop drawings submitted without the above requirements will be considered incomplete, will NOT be reviewed, and will be

returned directly to the Contractor.

G. Follow the same procedures for re-submittal as the initial submittal with the appropriate dates revised.

1.06 Quality assurance

A. Select a qualified hollow metal distributor, who is a direct account of the manufacturer of the products furnished. In addition that

distributor must have in their regular employment an Architectural Hardware Consultant (AHC), a Certified Door Consultant (CDC)

or an Architectural Openings Consultant (AOC), who will be available to consult with the Architect and Contractor regarding any

matters affecting the door and frame opening.

B. Furnish materials and work performed in conformity with the contract documents.

C. Conform to requirements of the above reference standards. Submit test reports upon request by the Owner or Architect.

D. Underwriters' Laboratories and Warnock Hersey, labeled fire doors and frames:

1. Label fire doors and frames listed in accordance with Underwriters Laboratories standard UL10C, Positive Pressure Fire Tests of

Door Assemblies and Uniform Building Code Standard 7-2, Fire Tests of Door Assemblies.

2. Construct and install doors and frames to comply with current issue of ANSI/NFPA 80.

3. Manufacture Underwriters' Laboratories labeled doors and frames under the UL factory inspection program and in strict

compliance to UL procedures, and provide the degree of fire protection, heat transmission and panic loading capability

indicated by the opening class.

4. Manufacture Warnock Hersey labeled doors and frames to meet the specific requirements of that labeling agency's current

procedure for the tested hourly rating designated and inspected by representatives of the labeling agency.

5. Affixed physical label or approved marking to fire doors and/or fire door frames, at an authorized facility as evidence of

compliance with procedures of the labeling agency. Label embossment is not permitted.

6. Conform to applicable codes for fire ratings. It is the intent of this specification that hardware and its application comply or

exceed the standards for labeled openings. In case of conflict between types required for fire protection, furnish type required

by NFPA and UL.

7. 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.

F. **Manufacturer Qualifications:** Member of the Steel Door Institute.

G. **Installer:** Minimum five years documented experience installing products specified in this Section.

1.07 Delivery, storage, and handling

A. **Storage of Doors**

1. Store doors vertically in a dry area, under proper cover. Place the units on at least 4˝ high wood sills on floors in a manner

that will prevent rust and damage. Avoid use of non-vented plastic or canvas shelters, which create a humidity chamber and

promote rusting. If the door becomes wet, or moisture appears, remove any protective wrapping immediately. Provide a 4˝

space between the doors to permit air circulation. Proper storage is required to meet the requirements of ANSI/SDI A250.10

and HMMA 840.

B. **Storage of Frames**

1. Store frames in an upright position with heads uppermost under cover on 4˝ wood sills on floors in a manner that will prevent

rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting.

Store assembled frames in a vertical position, five units maximum in a stack. Provide a 2˝ space between frames to permit air

circulation.

2. Provide proper storage for doors and frames, to maintain the quality and integrity of the factory applied paint, and maintain the

requirements of ANSI/SDI A250.10 and HMMA 840.

3. Sand, touch up and clean prime painted surfaces prior to finish painting in accordance with the manufacturer’s instructions.

1.08 Coordination

1. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal cutouts and reinforcement

for door hardware, electric devices and recessed items.

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

3. Sequence installation to accommodate required door hardware.

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

Part 2: Products

2.01 Doors

A. Construct exterior/interior doors to the designs and gauges as specified:

1. Interior Doors: Cold rolled steel, A 1008, 20 gauge [0.032″ (.8mm)], 18 gauge [0.042″ (1mm)], or 16 gauge [0.053″ (1.3mm)]

cold rolled or galvannealed steel.

a. Include galvannealed components and internal reinforcements with galvannealed doors.

2. Factory prime painted doors indicated on door schedule as HM.

3. Hardware Reinforcements:

a. Hinge reinforcements for full mortise hinges: minimum 7 gauge [0.180″ (4.7mm)].

b. Lock reinforcements: minimum 16 gauge [0.053″ (1.3mm)].

c. Closer reinforcements: minimum 14 gauge [0.067″ (1.7mm)], 20″ long.

d. Galvannealed doors include galvanized hardware reinforcements.

e. Projection welded hinge and lock reinforcements to the edge of the door.

f. Provided adequate reinforcements for other hardware as required.

B. Full Flush Type Doors Construction

1. Doors construction conforming to ANSI-A250.4 criteria and tested to 5,000,000 operating cycles.

2. Approved door core constructions:

a. **Honeycomb:** Reinforced, stiffened, sound deadened and insulated with impregnated Kraft honeycomb core completely

filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels

and honeycomb core.

b. **GRAINTECH™ Doors:** Fabricated from steel that has an embossed wood grain pattern extending the full height and width

of the door. Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge

seams. The wood grain embossment minimum .005″ deep. The wood grain face sheets must be cleaned, phosphatized

and prime painted with a stain absorbing primer. Vertical edges must be stained using conventional stains to achieve a

(select 1) [ash, birch, mahogany, maple, oak, walnut,] color. After staining, the door must be clear coated with UV inhibitors.

Applied grain pattern or material will not be permitted

3. **Vertical edge seams:** Provide doors with continuous vertical mechanical inter-locking joints at lock and hinge edges with

visible edge seams, or a one piece full height 14 gauge channel. Apply a continuous bead of structural epoxy in the internal

vertical connection.

Edges seams:

a. **Filled Vertical Edges (F):** Continuous vertical mechanical interlocking joint with internal epoxy seal; edge seams epoxy

filled and ground smooth.

b. Bevel hinge and lock door edges 1/8 inch (3 mm) in 2 inches (50 mm). Square edges on hinge and/or lock stiles are not

acceptable.

c. Reinforce top and bottom of doors with galvannealed 14 gauge, welded to both panels.

E. **Electrical Requirements:**

1. **General:** Coordinate electrical requirements for doors and frames. Make provisions for installation of electrical items arranged

so that wiring can be readily removed and replaced.

2. **Doors with Electric Hinges:**

a. **General:** Furnish conduit raceway to permit wiring from electric door hardware.

b. **Hinge Locations:** Provide electric hinge at intermediate or center location. Top or bottom electric hinge locations are

not acceptable.

c. Refer to 08710 for electrified hardware items.

2.02 Door frames

A. Construct exterior and metal door frames to the profiles, designs and gauges as specified.

1. **Exterior Frames:** Hot-dip galvannealed steel, ASTM A 653, Class A60, 16 gauge [0.053˝ (1.3mm)] or

14 gauge [0.067˝ (1.7mm)] hot dipped galvannealed steel.

a. Include galvannealed components and internal reinforcements with galvannealed frames.

2. **Interior Frames in Masonry:** 16 gauge [0.053˝ (1.3mm)] cold rolled or galvannealed steel.

a. Include galvannealed components and internal reinforcements with galvannealed.

3. **Interior Frames in Drywall:** 16 gauge [0.053″ (1.3mm)] cold rolled frames.

B. **Flush Frames:** knocked down for field assembly or set-up and arc-welded with temporary shipping bars. Factory die-mitered

corner connections reinforced with four integral tabs to secure and interlock at jambs to head. Unless otherwise indicated, frame

will have 2″ faces and 5/8″ stops. Frame depths per the architectural door schedule

1. Provide frames with a minimum of six wall anchors and two adjustable base anchors of manufacturer’s standard design.

C. **Drywall Frames:** same as flush frames, 16 gauge except:

1. Form frames with double return backbends to prevent cutting into drywall surface. Design knock down frames to be securely

installed in the rough opening after wallboard is applied.

a. **Drywall frames:** knocked down for field assembly. Factory die-mitered corner connections reinforced at miters, including

soffit tabs to secure and interlock at jambs to head

2. Locate adjustable anchors in each jamb 4″ from the top of the door opening to hold frame in rigid alignment.

a. Provide security anchor at strike jambs on all frames 7′6″ high and over.

3. **Base anchor:**

a. Weld-in base anchor attaching plate in each jamb for field installation of loose base anchors to allow proper anchoring at

base of frame.

D. Prepare all frames to receive inserted type door silencers (3) per strike jamb on single doors, and (2) per head for pair of doors.

Stick on silencers are not permitted.

E. **Frame Hardware Reinforcements:**

1. Mortise hinge reinforcement: minimum 7 gauge [0.180″ (4.7mm)].

a. Provide high frequency hinge reinforcement for top hinge on all exterior, cross corridor, and stairwell frames, in accordance

with SDI 111-H, Example “A” Application, where full mortise hinges are specified.

2. **Strike reinforcements:** minimum 16 gauge [0.053″ (1.3mm)] and prepared for an ANSI-A115.1-2 strike.

3. **Closer reinforcement:** minimum 14 gauge [0.067″ (1.7mm)] steel.

4. Projection weld hinge and strike reinforcements to the door frame.

5. Provide metal plaster guards for all mortised cutouts.

6. Provide adequate reinforcements for other hardware as required.

7. Include galvanized hardware reinforcements in all galvannealed frames.

F. **Electrical Requirements:**

1. **General:** Coordination all electrical requirements for doors and frames. Make provisions for installation of electrical items arranged so that wiring can be readily removed and replaced.

a. Provide cutouts and reinforcements required for metal door frame to accept electric components.

b. Frame with Electrical Hinges: Weld UL listed grout guard cover box welded over center hinge reinforcing. Top or bottom

hinge locations are not permitted. Contractor to reference 3.01.D, for continuous hinges.

c. Provide cutouts and reinforcements required to accept security system components.

d. Refer to 08710 for electrified hardware items.

2.03 Construction of architectural stick components

A. Fabricate architectural stick frame assemblies from standard frame components, fabricated from 14 gauge galvanized steel A60

for exterior, and 16 gauge cold rolled steel for interior.

B. Construct architectural stick frame assemblies of standard frame components, fabricated as specified.

2. **Interior Frames in Masonry:** 16 gauge [0.053˝ (1.3mm)] cold rolled or galvannealed steel.

a. Include galvannealed components and internal reinforcements with all galvannealed frames.

C. **Frame component requirements:**

1. Prepare required sticks at door openings and frame assemblies for hardware as specified.

2. Fabricate frame assemblies from three basic components:

a. Open Sections (perimeter members) identical in configuration to standard frames

b. Closed sections (intermediate members) with identical jamb depth, face dimensions, and stops as open sections.

c. Sill sections: Fabricated from galvanized steel, flush with both faces of adjacent vertical members. Cut individual

components to length and notched to assure square joints and corners.

3. Welded and ground smooth joints and corners of the frame assembly at the intersecting faces of the sections.

Externally welded face joints at meeting mullions or between mullions and other frame members on the face surfaces only.

4. Ship frame assemblies to the jobsite completely welded. Field joints will be permitted only with the size of the total assembly

exceeds shipping limitations.

5. Field splice joins will be permitted when the fabricated frame assemblies if large openings are subject to shipping limitations.

Oversized frames will be fabricated in sections designated for splicing in the field. Frames to be provided with joint

reinforcements 14 gauge, 8˝ long. Field weld joint reinforcement inside and tack weld outside joint at both faces, grind, and

finish smooth and uniform in appearance, after installation.

6. Pierced and dimpled glazing beads for use with manufacturers' standard fasteners.

7. Provide necessary anchors for jambs, heads, and sills of assemblies.

a. Verification of field dimensions as required. Frame fabrication will not begin until these dimensions have been verified, submitted,

and approved.

2.04 Fabrication

A. **Face Welded Frames:**

1. Continuous face weld the joint between the head and jamb faces along their length either internally or externally.

Grind, prime paint, and finish smooth face joints with no visible face seams.

2. Externally weld, grind, prime paint, and finish smooth face joints at meeting mullions or between mullions and other

frame members as per ANSI/SDI A250.8 – 2003.

3. Provide two temporary steel spreaders (welded to the jambs at each rabbet of door openings) on welded frames

during shipment. Remove temporary steel spreaders prior to installation of the frame.

2.05 Finish

A. Doors, frames and frame components are required to be cleaned, phosphatized, and finished with one coat of baked-on rust

inhibiting prime paint in accordance with the ANSI/SDI A250.10 "Test Procedures and Acceptance Criteria for Prime Painted

Steel Surfaces for Steel Doors and Frames."

Part 3: Execution

3.1 Examination

3.01 Installation

A. Install doors and frames in accordance with Steel Door Institute’s recommended erection instructions for steel frames

ANSI A250.11.

B. Install label doors and frames in accordance with NFPA-80.

C. **Remove temporary steel spreaders prior to installation of frames.**

D. Set frames accurately in position; plumb, align and brace until permanent anchors are set. After wall construction is complete,

remove temporary wood spreaders.

1. Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence

of splicing on exposed faces.

E. Provide full height 3/8″ to 1-1/2″ strip of polystyrene insulation at frames requiring grouting where continuous hinges are specified.

Apply the strip to the back of the frame, where the hinge is to be installed, to allow for field drilling or tapping.

F. Where grouting is required in masonry, provide and install temporary bottom and intermediate wood spreaders to maintain proper

width and avoid bowing or deforming of frame members. Refer to ANSI A250.11-2001, Standard.

1. Hollow Metal Frames to receive grouting comply with ANSI/SDI Standard A250.8.2003, 4.2.2, whereby grout will be mixed

to provide a 4″ maximum slump consistency and hand troweled into place. Do not use grout mixed to a thinner, pumpable

consistency is not recommended and not be used. Refer to HMMA 820 TN01-03 Grouting Hollow Metal Frames

G. Provide a vertical wood brace during grouting of frame at openings over 4´0″ wider, to prevent sagging of frame header.

H. Apply hardware in accordance with hardware manufacturers’ instructions and Section 08710 FINISH HARDWARE of these

Specifications. Install all hardware with only factory provided fasteners. Adjust door installation to provide uniform clearance at

head and jambs, to achieve maximum operational effectiveness and appearance.

3.02 Adjusting

A. **Final Adjustments:** Adjust operating doors and hardware items just prior to final inspection and acceptance by the Owner and

Architect. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames

that are damaged, bowed or otherwise unacceptable.

B. **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.

3.03 Protection

A. Provide protective measures required throughout the construction period to ensure that door and frame units will be without

damage or deterioration, other than normal weathering, at time of acceptance.

- - - E N D - - -