**ANSI/SDI A250.8-2023**
*Revision of ANSI/SDI A250.8-2017*

American National Standard

# *Specifications for Standard Steel Doors and Frames (SDI-100)*


SPONSOR

Steel Door Institute

Approved April 6, 2023

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**ANSI/SDI ®**
**A250.8-2023**
Revision of ANSI/SDI A250.8-2017

American National Standard

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Secretariat
**Steel Door Institute**

Approved April 6, 2023
**American National Standards Institute, Inc.**

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## Foreword (This Foreword is not part of American National Standard A250.8-2023)

The material contained in this document has been developed under the auspices of the ANSI A250 Committee. This committee has a diverse membership of users, producers, and general interest in addition to members of the Steel Door Institute. The committee has been charged with the development of standards, test methods, and other matters relating to steel doors and frames.

The current edition is a revision, and replaces the ANSI/SDI A250.8-2017 document. The contents have been updated to reflect changes that have take place in the steel door and frame industry since the time of the previous publication.

Suggestions for improvement gained in the use of this standard will be welcome, and should be sent to the Steel Door Institute, 30200 Detroit Road, Cleveland, Ohio 44145-1967.

The organizations of the Accredited Standards Committee A250 that have approved this standard are as follows:

Builders Hardware Manufacturers Association
Canadian Steel Door Manufacturers Association
Cedar Valley Associates
D.H. Pace Company
Door Control Services
Door and Hardware Institute
ESTM Technical Services, LLC
HMMA/Division of NAAMM
Intertek
MasterSpec
Ray and Associates
Steel Door Institute
UL Solutions
Vetrotech/Saint-Gobain

The Accredited Standards Committee A250 TC-1 developed this standard had the following personnel at the time of approval:

James Urban, Chairman
J. Jeffery Wherry, Secretary

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American National Standard

# Specifications for Standard Steel Doors and Frames (SDI-100)

## 1 General

### 1.1 Scope

This specification for standard swinging steel doors and frames offers a variety of choices suitable for any commercial application. Specific performance levels of doors and frames are defined herein. SDI-108, *Recommended Selection and Usage Guide for Standard Steel Doors* shall be used as a guide. This Standard shall not act as an obstruction to the development of new, modified or improved products that meet the intent of this specification.

This specification covers sizes, design, materials, general construction requirements and finishing of standard steel doors and frames. SDI-100 is intended to define standard items not subject to variations. The products defined in this standard have demonstrated successful performance to established test procedures and physical usage (see Section 1.2).

It is the user's responsibility to coordinate the information contained herein with applicable building and/or fire code requirements.

### 1.2 Reference Documents

#### 1.2.1 SDI Standards

- SDI-108-2023 *Recommended Selection and Usage Guide for Standard Steel Doors*
- SDI-111-2009 *Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components*
- SDI-112-2008 (R23) *Zinc Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames*
- SDI-113-2013 (R18) *Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies*
- SDI-117-2019 *Manufacturing Tolerances for Standard Steel Doors and Frames*
- SDI-118-2021 *Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements*
- SDI-124-2022 *Maintenance of Standard Steel Doors and Frames*
- SDI-134-2020 *Glossary of Terms for Hollow Metal Doors and Frames*

#### 1.2.2 ANSI Standards

- UL 9 *Standard for Fire Tests of Window Assemblies*, 8th Edition, Dated July 2, 2009, including revisions through March 20, 2020
- UL 10B *Standard for Fire Tests of Door Assemblies*, 10th Edition, February 7, 2008, revisions up to and including May 4, 2020
- UL 10C *Standard for Positive Pressure Fire Tests of Door Assemblies*, 3rd Edition, June 9, 2016, revisions up to and including May 27, 2021
- UL 1784, *Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives*, 4th Edition, February 17, 2015, revisions up to and including February 21, 2020
- NFPA 80-2022 *Standard for Fire Doors and Other Opening Protectives*
- NFPA 252-2022 *Standard Methods of Fire Tests of Door Assemblies*
- NFPA 257-2022 *Standard Methods of Fire Tests of Window Assemblies*
- ANSI/SDI A250.3-2019 *Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames*

– ANSI/SDI A250.4-2022 *Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors*

– ANSI/SDI A250.6-2020 *Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames*

– ANSI/SDI A250.10-2020 *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames*

– ANSI/SDI A250.11-2022 *Recommended Erection Instructions for Steel Frames* (Formerly SDI-105)

– ANSI/BHMA A156.115-2016 *Hardware Preparation in Steel Doors or Steel Frames*

#### 1.2.3 ASTM Standards

– ASTM A1008-2021a *Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable*

– ASTM A568-2019a *Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for*

– ASTM A1011-2018a *Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength*

– ASTM A653-2022 *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*

– ASTM A879-2022 *Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface*

– ASTM A924-2022 *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process*

### 1.3 Approval Drawings and Hardware Schedules

It is intended that approval drawings will not be required for these items and that the manufacturer's published details, together with this standard, will provide all the needed information. When specified, shop drawings shall be submitted for approval prior to manufacturing and/or delivery of product to the site. They shall show elevations of each door design, door construction details, hardware locations, dimensions, and shapes of materials, anchorage and fastening methods, door frame types and details, and finish requirements. SDI-111, *Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components* and SDI-134 *Glossary of Terms for Hollow Metal Doors and Frames* shall be used as guides in the development of the necessary product schedule.

### 1.4 Classification — Level, Performance, Model

For each of the following levels and models, doors, frames, frame anchors, and hardware reinforcings shall be provided to meet the requirements of the performance levels indicated below. The material used in manufacturing these products and components shall comply with Tables 2, 3, and 4 of this document. The physical performance levels are determined by testing assemblies in accordance with ANSI/SDI A250.4, *Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings.* See Section 2.3.1.1 and 2.3.1.2 for a description of Full Flush and Seamless.

**Level 1**
**and Physical Performance Level C**

Standard-duty 1-⅜″ (34.9 mm) and 1-¾″ (44.5 mm)
**Model 1** – Full Flush
**Model 2** – Seamless

**Level 2**
**and Physical Performance Level B**

Heavy-duty 1-¾″ (44.5 mm)
**Model 1** – Full Flush
**Model 2** – Seamless

**Level 3**
**and Physical Performance Level A**

Extra Heavy-duty 1-¾″ (44.5 mm)
**Model 1** – Full Flush
**Model 2** – Seamless
**Model 3** – Stile and Rail

**Table 1 – Standard opening sizes**

**Widths***

| Ft-in | 2′0″ | 2′4″ | 2′6″ | 2′8″ | 2′10″ | 3′0″ | 3′4″ | 3′6″ | 3′8″ | 3′10″ | 4′0″ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 610 | 711 | 762 | 813 | 864 | 914 | 1016 | 1067 | 1118 | 1168 | 1219 |

* Sizes shown are for single doors only; equal pairs of doors use twice the width indicated. Pairs of doors can consist of two unequal widths.

**Heights**

| **1-¾″ Doors** | Ft-in | 6′8″ | 7′0″ | 7′2″ | 7′10″ | 8′0″ | 9′0″ | 10′0″ |
|---|---|---|---|---|---|---|---|---|
| | mm | 2032 | 2134 | 2184 | 2388 | 2438 | 2743 | 3048 |

| **1-⅜″ Doors** | Ft-in | 6′8″ | 7′0″ | 7′2″ |
|---|---|---|---|---|
| | mm | 2032 | 2134 | 2184 |

**Level 4**
**and Physical Performance Level A**

Maximum-duty 1-¾″ (44.5 mm)
**Model 1** – Full Flush
**Model 2** – Seamless

### 1.5 Sizes

Standard doors and frames are sized to fit openings noted in Table 1.

## 2 Products

### 2.1 General

#### 2.1.1 Steel Specifications

All steel used to manufacture doors, frames, anchors, and accessories shall meet at least one or more of the following requirements.

**2.1.1.1** Cold rolled steel shall conform to ASTM A1008, *Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable* and A568, *Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for*.

**2.1.1.2** Hot rolled, pickled and oiled steel shall comply with ASTM A1011, *Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength* and A568, *Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.*

**2.1.1.3** When specified, hot dipped zinc coated steel shall be of the alloyed type and comply with ASTM A924, *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process* and A653, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*. The coating weight shall meet or exceed the minimum requirements for coatings having 0.4 oz/ft² (122 g/m²), total both sides, i.e., A40 (ZF120). See SDI-112 *Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames* for further information.

**2.1.1.4** When zinc coated steel is specified for anchors and accessories, and electrolytically deposited zinc coated steel is provided, it shall comply with ASTM A653 *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*. The minimum coating designation shall be A40 i.e., 0.4 oz/ft² (122 g/m²).

#### 2.1.2 Fire Doors and Related Frames

##### 2.1.2.1 Fire Doors and Frames

When specified for either insurance rating purposes or for compliance to building codes, manufacturers shall provide the type of fire door and frame assembly that has been investigated and/or successfully fire tested in accordance

with the latest revision of UL 9, Fire Tests of Window Assemblies, UL10B, *Standard for Fire Tests of Door Assemblies*, UL10C, *Standard for Positive Pressure Fire Tests of Door Assemblies*, or NFPA 252, *Standard Methods of Fire Tests of Door Assemblies, or NFPA 257 Standard Methods of Fire Tests of Window Assemblies*. The assembly shall be identified by labels and/or an approved identification marking of an agency accepted by the authority having jurisdiction. The door label shall indicate the applicable fire test rating for the door construction furnished. See Appendix "A", and SDI-118, *Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements* for additional information.

#### 2.1.2.2 Smoke Control Doors

When specified, manufacturers shall provide the type of fire door and frame assembly that has been investigated and/or successfully tested in accordance with the latest revision of UL1784 *Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives*. See SDI-118, *Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements* for additional information.

#### 2.1.2.3 Steel Astragals on Fire Doors

Where required by a manufacturer's listing or NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, a steel overlapping astragal shall be provided.

#### 2.1.2.4 Louvers for Fire Doors

When specified, fire doors shall be provided with fire labeled louvers. See SDI-118, *Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements* for acceptable labeling methods.

### 2.1.3 Prime Finish

Doors and frames shall be thoroughly cleaned and chemically treated to ensure paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer, either air-dried or baked-on. The finish shall meet the requirements for acceptance stated in ANSI/SDI A250.10, *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames*. Proper job site storage as outlined in Section 4.1, shall be followed.

### 2.1.4 Factory Applied Finish Paint

When specified, doors and frames shall be finish painted on all surfaces of the door and frame exposed to view. The factory applied finish paint shall meet the performance requirements and acceptance criteria as stated in ANSI/SDI A250.3, *Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames*. Consult individual manufacturers for product availability and color selection. Proper job site storage, as outlined in Section 4.1, shall be followed.

### 2.1.5 Field Applied Finish Paint

Unless doors and frames are factory finish painted, a compatible coat of finish paint shall be applied in the field. The finish paint shall be of a type recommended for use on prime-painted steel. Consult the door and frame manufacturer's literature for description of primer used. The manufacturer of the finish paint should verify compatibility with the primer.

### 2.1.6 Tolerances

SDI-117, *Manufacturing Tolerances for Standard Steel Doors and Frames* shall apply to the standard steel doors and frames specified.

**Note:** All values which do not carry specific tolerances or are not marked maximum or minimum shall have the following tolerances: Linear dimensions shall be ± 1⁄16 in. (1.6 mm). Weight or force shall be ± 2%. Angles shall be ± 2 degrees. Where only minus tolerances are given, the dimensions are permitted to be exceeded at the option of the manufacturers.

### 2.1.7 Test Procedures

The products furnished under this standard shall have demonstrated successful performance to the following established standard test methods:

**ANSI/SDI A250.3** – *Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames*.

**ANSI/SDI A250.4** – *Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcings*.

**ANSI/SDI A250.10** – *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames*.

**Table 2 – Steel thickness / door faces**

| Level | Model | Minimum Thickness | | MSG No. [1] |
|---|---|---|---|---|
| | | Inches | mm | |
| 1 | 1 | 0.032 | 0.8 | 20 |
| | 2 | 0.032 | 0.8 | 20 |
| 2 | 1 | 0.042 | 1.0 | 18 |
| | 2 | 0.042 | 1.0 | 18 |
| 3 | 1 | 0.053 | 1.3 | 16 |
| | 2 | 0.053 | 1.3 | 16 |
| | 3 | See Sec. 2.3.3 Construction Features | | 16 |
| 4 | 1 | 0.067 | 1.7 | 14 |
| | 2 | 0.067 | 1.7 | 14 |

[1] MSG No. to be used for reference purposes only.

**SDI-113** – *Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies*.

**2.1.8 Design Clearances**

**2.1.8.1** The clearance between the door and frame shall be a maximum of ⅛″ (3.2 mm) in the case of both single swing and pairs of doors.

**2.1.8.2** The clearance between the meeting edges of pairs of doors shall be 3⁄16″ (4.8 mm) ± 1⁄16″ (1.6 mm). For fire rated applications, the clearances between the meeting edges of pairs of doors shall be ⅛″ (3.2 mm) ± 1⁄16″ (1.6 mm).

**2.1.8.3** The clearance measured from the bottom of the door to the bottom of the frame or finished floor (Undercut) shall be a maximum of ¾″ (19.1 mm) unless otherwise specified. Fire door undercuts shall comply with NFPA 80, *Standard for Fire Doors and Other Opening Protectives*.

**2.1.8.4** The clearance between the face of the door and the stop shall be 1⁄16″ (1.6 mm) to 3⁄32″ (2.4 mm).

**2.1.8.5** All clearances shall be, unless otherwise specified in this document, subject to a tolerance of ±1⁄32″ (0.8 mm).

**2.1.9 Steel Thickness** (see Table 2)

**2.2 Manufacturers Standard Gauge (MSG) vs. Minimum Steel Thickness**

The minimum steel thickness for each specific gauge is derived from the published figures of UL Solutions, and shall be used for reference purposes only.

**2.3 Construction Features**

**2.3.1 Door Faces and Edge**

**2.3.1.1 Full Flush**

Each door face shall be formed from a single sheet of steel of a thickness as defined by Table 2. There shall be no visible seams on the surface of the faces. A full height vertical seam is permitted on door edges.

**2.3.1.2 Seamless**

In addition to the requirements for full flush doors, no visible seams are permitted along the vertical edges. One of the following methods, at the discretion of the manufacturer, shall be used when a seamless door is specified:

- vertical seam edge filled, dressed smooth
- intermittently welded seams, edge filled, dressed smooth
- continuously welded seam dressed smooth

#### 2.3.1.3 Door Edges

Door edges shall be fabricated utilizing the following different profiles:

- Square Edge – edge of door which is 90° to the face
- Beveled Edge – edge of a door which is not at a 90° angle to the face of the door (standard bevel is ⅛″ (3.2 mm) in 2″ (50.8 mm) – narrow side of door is in contact with stop of frame when door is closed

Unless specified, door edges will be manufactured in accordance with manufacturer's standard for that model.

#### 2.3.1.4 End Channels or Closures

The top and bottom of the door shall be closed with either flush or inverted channels or closures. The channels or closures shall have a minimum material thickness of 0.042″ (1.0 mm).

#### 2.3.1.5 Decorative Faces

When specified, door faces shall be fabricated of textured and/or embossed steel. These materials shall meet the requirements of Table 2.

### 2.3.2 Core Construction

The core design shall be at the discretion of the manufacturer.

Doors of the following core designs have met the performance requirements of the documents listed under Section 2.1.7:

- ***KraftPaper Honeycomb***
- ***Polystyrene***
- ***Polyurethane***
- ***Mineral Board***
- ***Vertical Steel Stiffeners***

This shall not restrict the development of alternate core materials that meet the performance requirements specified above.

The thermal transmittance of the steel door assembly is determined by subjecting the assembly to the testing defined in SDI-113. This standard establishes a specimen size, test conditions and a rating system.

### 2.3.3 Construction Features – Stile and Rail – Flush Panel

Stiles and rails shall be made of steel at a minimum of 0.053″ (1.3 mm) in thickness. Door corners shall be mitered or butted. Mitered joints shall be internally reinforced, welded and ground smooth such that no miter joints appear on door faces. Where specified, intermediate rails shall be butted and either permanently mechanically fastened or internally welded to door stiles. Butted joint seams shall remain visible. Center panels shall be made using steel with a minimum thickness of 0.042″ (1.0 mm), and shall be reinforced with manufacturer's standard core material. Panel faces shall be flush with perimeter surfaces and shall be joined to abutting perimeter members by welding or permanent mechanical fastening. Where specified, panels shall be recessed in lieu of flush. Recessed panels shall be reinforced and fastened as specified for flush panels. Hardware reinforcements shall be as specified in Table 4 and located as specified in Table 5.

### 2.3.4 Vision Lights

When doors are specified to contain glazed openings, the manufacturer's standard light kit shall be supplied unless otherwise specified.

### 2.3.5 Louvered Doors

When specified, doors shall be provided with louvers. SDI-111C, *Recommended Louver Details for Standard Steel Doors* shall be used as a guide in detailing/specifying louvers.

## 2.4 Frames

### 2.4.1 General

Provide steel frames for doors, transoms, sidelights, mullions, interior glazed panels and other openings, where indicated. Provide either knockdown field assembled type, or welded unit type frames as specified.

Performance tests shall be conducted on 3-sided door frames and corresponding door designs. The variety and complexity of openings containing transom, sidelights, or other such configurations preclude the use of these test methods on such designs.

SDI-134 *Glossary of Terms for Hollow Metal Doors and Frames* and SDI-111, *Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components* shall be

**Table 3 – Minimum steel thickness / frames**

| Level | Thickness | | MSG No. [1] |
|---|---|---|---|
| | inches | mm | |
| 1 | 0.042 | 1.0 | 18 |
| 2 | 0.053 | 1.3 | 16 |
| 3 | 0.053 | 1.3 | 16 |
| 4 | 0.067 | 1.7 | 14 |

[1] MSG No. to be used for reference purposes only.

used as guides in the development of frame details.

#### 2.4.1.1 Knockdown Frames

Unless otherwise specified, frames shall be supplied as knockdown, and shall have rigidly interlocked frame joints so as to maintain alignment and assure performance of completed frames when field assembled. These frames can consist of either single rabbet or double rabbet profiles.

#### 2.4.1.2 Frames for Existing Drywall Openings

When frames are specified for installation in existing drywall construction they may be of the slip-on drywall type. These frames are not available with welded corners. A welded frame may be used in an existing opening when butted against wall and/or stud. Frame with existing wall anchors may also be installed in existing drywall wall construction.

#### 2.4.1.3 Welded Frames

Welded frames required to comply with this standard shall be supplied as face welded unless otherwise specified as either full profile welded, fully welded or continuously welded.

**Face Welded:** The joint between the head and jamb faces shall be completely welded along their length either internally or externally. **The remaining elements of the frame profile, i.e., soffit, stops, rabbets, are not welded**. Face joints shall be ground and finished smooth with no visible seam. Face joints at meeting mullions or between mullions and other frame members shall be welded externally, ground, and finished smooth.

**Full Profile Welded:** (Also specified as fully welded or continuously welded.) The joints between all elements of the head and jamb profiles, i.e., soffit, stops, rabbets, faces and returns, shall be completely welded. Faces and returns may be welded either internally or externally, all other frame elements shall be welded internally. Faces and returns shall be ground and finished smooth with no visible seam. The joint at other frame elements shall appear as a hairline seam on the external side. Face joints at meeting mullions or between mullions and other frame members shall be completely externally welded on the faces only, welds shall be ground and finished smooth. The meeting joints of other mullion profile elements are not welded.

Welded frames shall be provided with a temporary spreader bar for shipping and handling purposes only. This temporary spreader bar shall be removed and a setting spreader, supplied by the installer, shall be used for installation of the frame. See ANSI/SDI A250.11, *Recommended Erection Instructions for Steel Frames* for details.

### 2.4.2 Manufacturers Standard Gauges for Frames

Table 3 shall be used to determine the proper gauge thickness for the corresponding door levels.

### 2.4.3 Frames with Mullions and Transom Bars

Mullions and transom bars shall be joined to adjacent members by welding (see 2.4.1.3) or by rigid mechanical connection, so as to maintain alignment of parts and assure performance of completed frames when field assembled. When

**Table 4 – Minimum hardware reinforcing thickness**

| Hardware Item | inches | mm | MSG No. [5] |
|---|---|---|---|
| Mortise Hinge 1-⅜″ [34.9 mm] Door [1] | 0.093 | 2.3 | 12 |
| Mortise Hinge 1-¾″ [44.5 mm] Door [1] [2] | 0.123 | 3.1 | 10 |
| Mortise Lock or Deadbolt [1] | 0.067 | 1.7 | 14 |
| Bored Lock or Deadbolt [1] | 0.067 | 1.7 | 14 |
| Flush Bolt Front [1] | 0.067 | 1.7 | 14 |
| Lock or Dead Bolt | 0.067 | 1.7 | 14 |
| Surface Bolt [3] | 0.067 | 1.7 | 14 |
| Surface Applied Closer | 0.067 | 1.7 | 14 |
| Hold Open Arm [3] | 0.067 | 1.7 | 14 |
| Pull Plates and Bar [3] | 0.053 | 1.3 | 16 |
| Surface Exit Device [3] | 0.067 | 1.7 | 14 |
| Floor Checking Hinge | 0.167 | 4.2 | 7 |
| Pivot Hinge | 0.167 | 4.2 | 7 |
| Continuous Hinge [4] | Not Required | | |
| Kick / Push Plate | Not Required | | |

**Note:** The minimum steel thickness for each specific gauge is derived from the published figures of Underwriters Laboratories LLC.

[1] Thinner steel may be employed as long as tapped holes used for mounting the hardware are extruded to produce an equivalent number of threads.

[2] If reinforcing is angular or channel shaped, 0.093″ (2.3 mm) is permitted.

[3] When reinforcing is omitted on doors, thru-bolting via the use of spacers or sex-bolts is required.

[4] Refer to ANSI/SDI A250.6, *Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames*.

[5] MSG No. to be used for reference purposes only.

specified, vertical mullions shall be provided with floor anchors.

### 2.4.4 Frame Anchors for Wall Conditions

Each jamb for openings up to and including 60 inches (1520 mm) high shall be provided with two anchors, and an additional anchor shall be provided on each jamb for each additional 30 inches (762 mm) of height or fraction thereof. Provide anchors of not less than 0.042″ (1.0 mm) in thickness or 0.167″ (4.2 mm) diameter wire.

#### 2.4.4.1 Slip-On Drywall Frame Anchors

Slip-on drywall frames shall have an anchoring system that allows installation of the frame after the wall has been constructed and finished.

#### 2.4.4.2 Base Anchors

Provide frames, other than slip-on drywall type, with base anchors that are not less than 0.042″ (1.0 mm) in thickness for attachment to the floor. For wall conditions that do not allow for the use of a floor anchor, an additional jamb anchor shall be specified.

### 2.4.5 Glazing Beads

On frame assemblies that incorporate glazed openings, the frame shall be provided with glazing beads designed to receive the glazing materials specified. The glazing beads shall be butted at the corners. Glazing beads shall be of snap-on or screw-applied design.

#### 2.4.6 Terminated Stops

When specified, stops for interior door frames shall be terminated above the floor 6″ (152.4 mm) standard, measured from frame bottom to bottom of terminated stop. The stop is cut at a 45° or 90° angle and closed with a steel filler plate welded in place. Terminated stops on frames for lightproof doors, sound-rated doors, double egress, smoke and draft control, or lead-lined doors are not available.

## 3 Hardware Preparation

### 3.1 Reinforcings

Provide minimum hardware reinforcing gauges as noted in Table 4 and ANSI/SDI A250.6, *Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames*.

#### 3.1.1 Mortise Hardware Preparations

Doors and frames shall be reinforced, drilled and tapped to receive mortised hinges, locks, latches, and flush bolts as required. Preparation shall be in accordance with ANSI/BHMA A156.115 *Hardware Preparation in Steel Doors or Steel Frames* and ANSI/SDI A250.6, *Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames* where applicable.

#### 3.1.2 Surface Applied Hardware

When specified, doors and frames shall be reinforced for surface applied hardware. Drilling and/or tapping shall be completed by others.

#### 3.1.3 Function Holes

The preparation for locks and/or exit devices shall include reinforcements (as shown in Table 4) and function holes. Trim and/or mounting holes are not included.

#### 3.1.4 Anchor or Pivot Reinforced Hinges

Where specified, the appropriate recessing and reinforcing shall be provided. Mounting holes shall be field drilled and tapped by others.

#### 3.1.5 Hinge Preparations

See Table 5. Two reinforcements shall be provided for openings not exceeding 60 inches (1520 mm) in height, an additional reinforcement shall be provided for each additional 30 inches (762 mm) of height or fraction thereof. Exception: 1-3/8″ (34.9 mm) thick, 6′8″ (2032 mm) high non-fire rated doors shall be prepared for a minimum of two hinges.

#### 3.1.6 Hardware Locations

Hardware shall be located in accordance with Table 5.

**Table 5 – Hardware locations**

**Cylindrical and Mortise Deadlock strikes shall be located at 48″ (1219 mm) from bottom of frame unless otherwise specified by local authority.**

| | | |
|---|---|---|
| Locks, Latches, Roller Latches and Double Handle Sets | | 38″ – 42″ (965 mm – 1067 mm) Centerline of Lock Strike from Bottom of Frame |
| Rim and Mortise Panic Devices | | |
| Cylindrical and Mortise Deadlocks | | 48″ (1219 mm) to Centerline of Strike from Bottom of Frame |
| Push Plates | | Centerline 45″ (1143 mm) from Bottom of Frame |
| Pull Plates | | Centerline of Grip @ 42″ (1067) from Bottom of Frame |
| Combination Push Bar | | Centerline of 42″ (1067 mm) from Bottom of Frame |
| Hospital Arm Pull | | Centerline of Lower Base is 45″ (1143 mm) from Bottom of Frame with Grip Open at Bottom |
| Hinges | Top | Up to 11-¾″ (298.5 mm) from Rabbet Section of Frame to Centerline of Hinge |
| | Bottom | Up to 13″ (330.2 mm) from Bottom of Frame to Centerline of Hinge |
| | Intermediate | Equally Spaced Between Top and Bottom Hinges |

Other items of hardware shall be located according to the door and/or hardware manufacturer's directions. This includes, but is not limited to, the door closers, floor hinges, overhead door holders, pocket pivot, and most specialized-purpose hardware.

## 4 Storage, Handling, and Installation

### 4.1 Jobsite Storage

All doors and frames shall be stored vertically under cover. The units shall be placed on at least 4″ (102 mm) high wood sills or in a manner that will prevent rust or damage. The use of non-vented plastic or canvas shelters that can create a humidity chamber shall be avoided. A ¼″ (6.3 mm) space between the doors shall be provided to promote air circulation. If the wrapper on the door becomes wet, it must be removed immediately. Proper jobsite storage is extremely important in maintaining the quality and integrity of the factory applied paint. Improper Storage of material will have an adverse effect on the factory applied paint's ability to meet the requirements of ANSI/ SDI A250.10, *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames* or ANSI/SDI A250.3, *Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames*.

### 4.2 Frame Installation

**4.2.1** Frames shall be installed plumb, level, rigid and in true alignment as recommended in ANSI/SDI A250.11 *Recommended Erection Instructions for Steel Frames*.

All frames, other than drywall slip-on types, shall be fastened to the adjacent structure so as to retain their position and stability. Slip-on drywall frames shall be installed in prepared wall openings in accordance with manufacturer's instructions.

**4.2.2** Where grouting is required in masonry installations, frames shall be braced or fastened in such a way that will prevent the pressure of the grout from deforming the frame members. Grout shall be mixed to provide a 4″ (102 mm) maximum slump consistency and hand troweled into place. Grout mixed to a thinner, "pumpable" consistency shall not be used. Excess water from thin consistency grout will cause premature rusting of steel frames and probable deformation or discoloration of certain wall constructions. Standard mortar protection in frames **is not** intended for thin consistency grout or drywall compound.

Steel Frames, including fire-rated frames do not require grouting. GROUTING SHALL NOT BE USED FOR FRAMES INSTALLED IN DRYWALL WALLS. Exception: Frames for acoustical STC openings are permitted to be pre-grouted prior to installation into drywall walls.

### 4.3 Door Installation

Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Doors shall be adjusted to maintain perimeter clearances as specified in Section 2.1.8. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved. See "How to Shim Door Hinges" article at steeldoor.org.

### 4.4 Hardware Installation

Installation of hardware items shall be in accordance with the hardware manufacturer's recommendations and templates. ANSI/SDI A250.6, *Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames* shall be consulted for other pertinent information.

### 4.5 Installation of Factory Applied Finish Painted Materials

In addition to storage and handling precautions noted in Section 4.1, it is IMPERATIVE that the work of all other rough trades MUST be completed prior to the installation of factory applied finished painted product.

### 4.6 Door and Frame Maintenance

It is the responsibility of the installer or end user to properly maintain the doors and frames in accordance with SDI-124, *Maintenance of Standard Steel Doors and Frames*.

### 4.7 Door and Frame Repair

Any repair required to either the door or frame in a fire rated opening shall be conducted in accordance with NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*

Prior to any repair contact the manufacturer, per NFPA 80.

# Appendix A
(informative)

## Fire Door Considerations

### Fire door testing

There are two primary fire test methods that are used to establish the fire ratings of doors. The first is UL 10B, *Fire Tests of Door Assemblies*, and is referred to as neutral pressure; the second is UL 10C, *Positive Pressure Fire Tests of Door Assemblies*, and is referred to as positive pressure.

The difference between the two test methods concerns the location of a neutral pressure plane in the test furnace. In the late 1990's the test method required in building codes changed to a positive pressure test method. This change was adopted in the Uniform Building Code (UBC) and the International Building Code (IBC) for swinging-type fire doors.

Fire doors required to be tested by either method may be specified by calling out the test method or by indicating that the product must meet a specific section of a model building code.

These tests incorporate two phases: A fire test phase utilizing an established time-temperature curve and a structural integrity phase utilizing a hose stream test conducted under established time-pressure criteria determined by exposure time and area of the assembly. To be a valid fire door assembly, the unit must pass both phases of the test.

In certain instances as permitted by building codes, the integrity portion (hose stream) is deleted. The deletion of this requirement negates the assembly's use as a true fire door.

The fire test procedures also include a measurement of unexposed surface temperatures at regular intervals up to 30 minutes.

The fire test does not address or measure the amount of smoke leakage through the assembly. For this criteria, NFPA-105 *Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives* and UL 1784 *Air Leakage Tests of Door Assemblies* should be consulted.

### Fire door ratings

Swinging steel doors and frames are commonly tested as flush (non-glazed) units for a 3-hour time period. This allows their usage for all lower fire protection ratings. Lights in doors may be permitted based on the performance of flush doors when evaluated with the testing database and experience of the test lab or certifying agency.

Typical hourly ratings for swinging steel fire doors are 3-hours, 1-½-hours, ¾-hours, and ⅓-hour. Usage of these ratings is as follows:

**3-Hour** — Openings in fire walls that divide a single building into fire areas, normally 4-hour rated walls.

**1-½-Hour** — Openings in enclosures of vertical communications through buildings and in 2-hour partitions providing horizontal fire separations. These may also be used as non-glazed doors for openings in exterior walls subject to severe fire exposure from outside of the building.

**1 Hour** — Openings in interior exit stairways, interior exit ramps, and exit passageways (where specified by the code)

**¾-Hour** — Openings in 1-hour rated (or less) partitions between rooms and corridors, or other separation of occupancy. With certain light restrictions these may also be used in exterior walls subject to moderate or light fire exposure from outside of the building. The ¾-hour fire door may also be used as a smoke and draft control door.

**⅓-Hour (20 minute)** — Doors of this rating are used for the protection of openings bet ween living quarters and corridors and where smoke control is a primary concern. They may also be used as a smoke partition across corridors.

## Fire door temperature rise

In addition, a temperature rise rating may be required by building codes in areas such as enclosures of vertical communications or in areas of storage for hazardous materials. Temperature rise ratings indicate the maximum temperature, above ambient, of the unexposed surface at 30 minutes into the fire test. Two ratings, 250°F (139°C) or 450°F (250°C) are recognized, with the 250°F (139°C) rating being the most thermally efficient. Ratings over 450°F (250°C) are not recognized as temperature rise doors.

## Fire door labeling

Doors and frames may bear labels or marks of a recognized third party certification agency, acceptable to the authority having jurisdiction. Fire door labels must indicate the hourly rating and either the latch throw for single point locks or must bear a notation “Fire door to be equipped with fire exit hardware”. Fire door labels may also indicate the temperature rise rating.

Door labels may be of metal (installed by welding, riveting, adhesive or drive screw) or of mylar. The existence of a label is the only method of verification that the door is rated.

Frame labels, except in specific instances, may not indicate hourly ratings. Fire door frames assume the rating of the fire door installed or a rating that corresponds to the rating of the wall in which it is installed, whichever is less.

Frame labels may be of metal (installed by welding, riveting, adhesive, or drive screw), mylar, or may be embossed into the frame.

Door and/or frame labels may be of the same or different certifying agencies. A door assembly may consist of labeled components of different manufacturers.

## Other fire door considerations

The effectiveness of a fire door assembly is dependent on the use of listed or labeled items for all components. These may include glazing material, locks, hinges, closers, latches, light frames, other hardware items, etc. The substitution of a non-rated component or one that is rated less than the intended fire protection rating of the assembly results in a corresponding decrease in rating or the loss of the rating in its entirety.

For further information, see SDI-118 *Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements* or NFPA 80 *Standard for Fire Doors and Other Opening Protectives*.

For information on fire doors used in a means of egress consult NFPA-101 *Life Safety Code®*.

# Appendix B
(informative)

# General Considerations

## Steel coating types

ASTM A924, *Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process* and A653, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process* provide specifications for both galvannealed (A Type) and Galvanized (G Type) coatings. For purposes of this standard, G type coatings are not recommended due to problems related to paint adhesion and welding. In addition, heavier coating weights, i.e., G60 and G90 are known to experience cracking and peeling of the coating resulting in potential performance failures under ANSI/SDI A250.10, *Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames* and ANSI/SDI A250.3, *Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames*.

## Steel thickness

When ordering steel directly from the mill, manufacturers order sheet and coil to a minimum decimal thickness and not a nominal gauge. This thickness is generally at the low end of the range for a specific gauge. For example, the nominal thickness of 16 gauge is 0.059″ (1.5 mm). The thickness tolerance permitted by ASTM A568, *Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for*, is ± .006″ (0.15 mm). Therefore the minimum ordering dimension would then become 0.053″ (1.3 mm) as shown in Table 2. These minimum values meet the requirements of Underwriters Laboratories LLC. Steel gauges, or MSG numbers may be used for reference purposes only.

## Thermal bow

Thermal bow is a condition which may occur in metal doors due to an inside / outside temperature differential. It is warping of the top and bottom of the lock edge of the door either toward or away from the frame stop. This condition may result in force on the latch that increases the difficulty of opening the door and may increase the air leakage of the opening.

This condition, and the degree of bowing, depends on the door color, construction, length of exposure, temperature, etc. Thermal bow can often be alleviated by painting the exposed surface a light color. In some cases of extreme cold, this condition may also occur in reverse.

## Thermal transmittance

The thermal transmittance of the steel door assembly is determined by subjecting the assembly to the testing defined in SDI 113. This standard establishes a specimen size, test conditions and a rating system.

## Metric disclaimer

Values stated without parenthesis are the requirement. Values in the parenthesis are explanatory or informative information.

## Aesthetics

The production of steel doors and frames relies on a variety of manufacturing processes including spot welding, projection welding, arc welding ground smooth, grinding, filling, etc. These processes may result in a show-through after application of finished paint. These characteristics are inherent in production and are not to be considered as manufacturing defects.

The show-through characteristics increase as the paint gloss increases. This standard recommends a maximum paint gloss rating of 20% reflectance, measured using a 60° gloss meter, which should be suitable for most applications. Translucent paints may emphasize show-through characteristics and their use is not recommended. The 20% reflectance is equivalent to a Master Painters Institute (MPI) gloss rating description of a traditional “eggshell-like” finish.

## Water penetration

Borrowed light, transom, sidelight, and combination transom sidelight frames are not factory sealed to prevent water penetration. In situations where this is a concern, the contractor must seal all joints that are exposed to the elements after the frame assembly is installed.

Whenever possible, it is strongly recommended that glass and glazing be installed on the exterior rabbet of the frame assembly, which will help act as a deterrent to water penetration. It should be noted that a fully welded corner does not ensure a water tight condition.

The member companies of the hollow metal industry cannot control the workmanship associated with the frame installation and therefore, this work must be specified in the installation/glazing/caulking section of the specifications. It is the responsibility of the contractor to assure all steps are taken by the installer, glazer, or others to prevent water penetration.

## Back coating of frames

Some architectural specifications require steel frames to have their throat areas coated with a material that improves corrosion protection or sound control performance. This material can be a bituminous coating or other more environmentally friendly products. Back coating, bituminous coating, etc., may or may not be offered by the manufacturer. Consult manufacturer for availability and specifications.

# Appendix C
(informative)

## Section 081113 Hollow Metal Doors and Frames
## (intended as a sample specification)

### GENERAL NOTES TO SPECIFIER

This Specification Section has been prepared by the Steel Door Institute www.steeldoor.org to assist design professionals in the preparation of project specific, or office master, specifications. It follows the guidelines of the Construction Specifications Institute's (CSI) "SectionFormat" and "PageFormat," and therefore may be used with most commercial guide specification systems with minor editing.

Edit to suit project requirements by deleting and inserting appropriate text. Green text proceeded by **** and ending with **** offers suggestions on editing this Section. Delete the **** green text **** before publication of specification.

Verify that referenced section numbers and titles are coordinated with remainder of Project Manual. Section numbers and titles used in this specification are based on CSI's MasterFormat 2020 edition.

Select and/or delete **[bracketed]** options as appropriate for the door assemblies applicable for the Project.

ANSI/SDI and SDI standards used in this specification are available for free from the SDI website www.steeldoor.org

SDI is not liable in any way for revisions to, or use of, this specification by any end user.

Contact the Steel Door Institute at info@steeldoor.org regarding questions or comments.

### PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Interior standard hollow-metal doors and frames.
2. Exterior standard hollow-metal doors and frames.
3. Interior borrowed lites.

B. Related Requirements:

1. Section 087100 - Door Hardware, for door hardware applicable for hollow-metal door and frames.
2. Section 088000 - Glazing, for glazing installed in hollow-metal door and frames.
3. Section 099100 - Painting, for field painting of hollow-metal door and frames.

1.02 REFERENCES

**** After editing specification, retain only references below that remain in the specification. Consider deleting "Reference" Article, in its entirety, if Project Manual includes Section 014200 - References and Section 014200 includes all references incorporated into the edited version of this Section. ****

A. American National Standards Institute (ANSI):

1. ANSI/BHMA A156.115-2016: Hardware Preparation in Steel Doors and Steel Frames.
2. ANSI/SDI A250.3-2019: Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames.
3. ANSI/SDI A250.4-2022: Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors.
4. ANSI/SDI A250.6-2020: Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
5. ANSI/SDI A250.8-2017: Specifications for Standard Steel Doors and Frames (SDI-100).
6. ANSI/SDI A250.10-2020: Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
7. ANSI/SDI A250.11-2022: Recommended Erection Instructions for Steel Frames.

B. ASTM International (ASTM):

1. ASTM A153/A153M-16a: Standard Specification for Zinc(Hot-Dip) on Iron and Steel Hardware.
2. ASTM A568/A568M-19a: Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
3. ASTM A653/A653M-20: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A879/A879M-22: Standard Specification for Steel Sheet, Zinc-Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
5. ASTM A924/A924M-22: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
6. ASTM A1008/A1008M-21a: Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.
7. ASTM A1011A1011M-18a: Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
8. ASTM C518-21: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
9. ASTM C665-17: Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
10. ASTM C1363-19: Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
11. ASTM E136-19a: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C.
12. ASTM E1423-21: Standard Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.

C. Code of Federal Regulations:

1. 16 CFR 1201-2012: Safety Standard for Architectural Glazing Materials.

D. National Fire Protection Association (NFPA):

1. NFPA 80-2022: Standard for Fire Doors and Other Opening Protectives.
2. NFPA 252-2022: Standard Methods of Fire Tests of Door Assemblies.

3. NFPA 257-2022: Standard on Fire Test for Window and Glass Block Assemblies.

E. Steel Door Institute (SDI):

1. SDI 108-2023: Recommended Selection and Usage Guide for Standard Steel Doors.
2. SDI 111-2009: Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components.
3. SDI 112-2008 (Reaffirmed 2023): Zinc-Coated (Galvanized/Galvannealed) Steel Doors and Frames.
4. SDI 113-2013 (Reaffirmed 2018): Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
5. SDI 117-2023: Manufacturing Tolerances for Standard Steel Doors and Frames.
6. SDI 118-2021: Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements.
7. SDI 124-2022: Maintenance of Standard Steel Doors and Frames.

F. Underwriters Laboratories, Inc. (UL):

1. UL9-2020: Standard for Fire Tests of Window Assemblies.
2. UL 10B-2020: Standard for Fire Tests of Door Assemblies.
3. UL 10C-2021: Standard for Positive Pressure Fire Tests of Door Assemblies.
4. UL 1784-2020: Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.03 ADMINISTRATIVE REQUIREMENTS

**** Preinstallation Conference in first paragraph below is typically not required. Retain for complex installations. If retaining, consider adding text describing purpose of conference, and required attendees. ****

A. Preinstallation Conference: Conduct conference at Project site.

1.04 ACTION SUBMITTALS

A. Product Data: For the following, include material descriptions, core descriptions, construction details, [**Fire-resistance ratings**,] [**Temperature-rise ratings**,] and factory finishes:

1. Doors.
2. Frames.
3. Frame anchors.
4. [**Vision panel frames**.]
5. [**Louvers**.]

B. Shop Drawings: Include the following:

1. Elevation of each door type.
2. Details of each type of door, including the following:
   a. Vertical and horizontal edge details.
   b. Metal thicknesses.
3. Details of each type of frame, including the following:
   a. Frame profile and dimensions.
   b. Metal thicknesses.
4. Locations of hardware reinforcing.

5. [**Details of electrical raceways**.]
6. [**Details of door and frame preparations for electrified door hardware**.]
7. [**Details of vision panel frames**.]
8. [**Details of louvers**.]
9. Details of filed splices.
10. Jamb and head details of each type of wall opening.
11. Details of frame anchorages and spacing.

C. Product Schedule: Prepared by or under the supervision of supplier.

1. Format: Use same door numbers indicated on Drawings.
2. Content: Include the following:
   a. Opening location.
   b. Opening size.
   c. Door thickness.
   d. Door type.
   e. Door material.
   f. Frame type.
   g. Frame material.
   h. Fire-rating.
   i. Hand of door.

D. Samples: For doors and frames specified to be factory color finished.

E. Certificates:

**** Retain first subparagraph below if Project includes oversize fire-rated openings. ****

1. Oversize Opening Certification: For fire-rated door assemblies exceeding limitations of labeled openings.
2. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
3. For manufacturer, indicating Steel Door Institute certification.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Statements:

1. For manufacturer.

**** Retain first subparagraph below if Project includes fire-rated openings. ****

2. For fire-rated door inspector.

**** Retain first paragraph below if Project includes fire-rated openings. ****

B. Field Quality Control Submittals:

1. Field quality control reports.

C. Sustainable Design Submittals:

**** Retain first two subparagraphs below and insert additional submittal requirements if applicable to Project's sustainability program. ****

1. Recycled Content: Indicate postconsumer and preconsumer recycled content and cost.
2. Energy Performance Certificates: For each type of exterior door, from manufacturer, stating NFRC-certified energy performance values, including air leakage rate, U-value and SHGC.

1.06 CLOSEOUT SUBMITTALS

**** Retain first paragraph below if Project includes fire-rated openings. ****

A. Record Drawings: For fire-rated doors, listing door numbers and applicable room names and numbers to which fire-rated door accesses.

1.07 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Certified under the Steel Door Institute's certification program.

**** Retain first paragraph below if Project includes fire-rated openings. ****

B. Fire-Rated Door Inspector Qualifications: Comply with qualifications listed in NFPA 80, section 5.2.3.1, and one of the following:
   1. Certified under the Door and Hardware Institute's Fire and Egress Door Assembly Inspector (FDAI).
   2. Certified under Door Safety, LLC's Door Safety Inspector (DSI).

**** Retain first paragraph below if Project is designed under NFPA 101. ****

C. Egress Door Inspector Qualifications: Comply with qualifications listed in NFPA 101, section 7.2.1.14.4, and one of the following:
   1. Certified under the Door and Hardware Institute's Fire and Egress Door Assembly Inspector (FDAI).
   2. Certified under Door Safety, LLC's Door Safety Inspector (DSI).

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames in a manner that provides protection during transit and Project site storage.
   1. Mark each door and frame with Architect's opening number.
   2. Do not use non-vented plastic of canvas for packaging.
   3. Provide welded frames with temporary bottom spreaders welded to jambs and mullions.

B. Store doors and frames vertically under cover, placed on at least 4-inch (102-mm) high wood blocking or in a manner that will promote air circulation and prevent rust or damage.
   1. Provide a minimum ¼-inch (6.3 mm) space between doors to promote air circulation.
   2. Remove and replace damaged or wet packaging material immediately.

## PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Republic Doors & Frames/Allegion
   2. Steelcraft/Allegion
   3. Ceco, An ASSA ABLOY Group Company

4. Curries, An ASSA ABLOY Group Company
5. Pioneer, An ASSA ABLOY Group Company
6. DCI
7. Deansteel Manufacturing Company
8. De La Fontaine Industries, Inc.
9. Hollow Metal Express (HMX)
10. Mesker Door
11. MPI
12. Premier Steel Doors and Frames
13. Stiles, An ASSA ABLOY Group Company

## 2.02 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Comply with NFPA 80, and be listed and labeled by either Underwriters Laboratories, Inc. (UL) or Intertek Group plc, as acceptable to authorities having jurisdiction, for the fire-protection ratings [**and temperature-rise limits**] indicated on the Drawings, based on positive pressure testing in accordance with NFPA 252 or UL 10C.

1. Oversize Fire-Rated Assemblies: For assemblies exceeding sizes of tested assemblies, provide certification by a qualified testing agency, acceptable to authorities having jurisdiction, certifying that doors and frames comply with the construction requirements for tested and labeled fire-rated assemblies except for size.
2. Temperature-Rise Limit: At locations indicated on Drawings, provide door assemblies that have a maximum transmitted temperature end point of not more than 450 degrees F (250 degrees C) above ambient after 30 minutes of standard fire-test exposure.

B. Smoke and Draft Control Assemblies: Comply with NFPA 105, and be listed and labeled by either Underwriters Laboratories or Intertek Group plc, as acceptable to authorities having jurisdiction, based testing in accordance with UL 1784.

C. Fire-Rated Borrowed-Lite Assemblies: Comply with NFPA 80, and be listed and labeled by either Underwriters Laboratories or Intertek Group plc, as acceptable to authorities having jurisdiction, for the fire-protection ratings indicated on Drawings, based on testing in accordance with NFPA 257 or UL 9.

D. Thermally-Rated Door Assemblies: For exterior locations, provide door assemblies with U-factor of not more than [**0.60 degrees Btu per degree per hour per square foot (2.84 W/K per square meter)**] [**Insert U-factor**] when tested in accordance with ASTM C518, ASTM C1363, or ASTM E1423.

## 2.03 EXTERIOR DOORS AND FRAMES

A. Standard Exterior Doors: Comply with ANSI/SDI A250.8 as follows:

**** Select one of four Classification Levels below and coordinate with Physical Endurance Level. Classification Level 1, for standard-duty doors, is associated with Physical Endurance Level C; Classification Level 2, for heavy-duty doors, is associated with Physical Endurance Level B; Classification Level 3, for extra heavy-duty doors, is associated with Physical Endurance Level A; and Classification Level 4, for maximum-duty doors, is associated with Physical Endurance Level A. ****

1. Classification Level: [**1**] [**2**] [**3**] [**4**].
2. Model: [**1, Full flush**] [**2, Seamless**] [**3, Stile and rail**].

3. Physical Endurance: When tested in accordance with ANSI/SDI A250.4, pass the following:
   a. Swing Test: [**Level A**] [**Level B**] [**Level C**].
   b. Twist Test: [**Level A**] [**Level B**] [**Level C**].
4. Door Type: As indicated on Drawings.
5. Door Thickness: 1-3/4 inches (44.4 mm).
6. Face: ASTM A653/A653M, [**A40**] [**A60**], Commercial Steel (CS), Type B, metallic-coated steel sheet.

**** Face thickness is associated with Classification Level above. First option is for Level 1; second option is for Level 2; third option is for Level 3; and fourth option is for Level 4. First option represents the outdated "20 gauge"; second option represents the outdated "18 gauge"; third option represents the outdated "16 gauge"; and the fourth option represents the outdated "14 gauge." ****

   a. Thickness: [**0.032 inches (0.8 mm)**] [**0.042 inch (1.0 mm)**] [**0.053 inches (1.3 mm)**] [**0.067 inch (1.7 mm)**].
7. Edge Design: [**Manufacturer's standard design**] [**Square**] [**Beveled**].
8. Core: [**Polyurethane**] [**Polystyrene**] [**Polyisocyanurate**] [**Kraft-paper honeycomb**] [**Mineral board**] [**Vertical steel stiffeners with insulation**].
   a. Fire-Rated Doors: As required to provide fire-protection rating indicated on Drawings.
9. Top Closure: 0.042-inch (1.0 mm) thick flush channel.
10. Bottom Closure: 0.042-inch (1.0 mm) thick [**flush**] [**inverted**] channel.

B. Standard Exterior Door Frames: Comply with ANSI/SDI A250.8 as follows:
1. Classification Level: [**1**] [**2**] [**3**] [**4**].
2. Material: ASTM A653/A653M, [**A40**] [**A60**], Commercial Steel (CS), Type B, metallic-coated steel sheet.

**** Material thickness is associated with Classification Level above. First option is for Level 1; second option is for Level 2 and Level 3; third option for Level 4. First option represents the outdated "18 gauge"; second option represents the outdated "16 gauge"; and the third option represents the outdated "14 gauge." ****

   a. Thickness: [**0.042 inch (1.0 mm)**] [**0.053 inches (1.3 mm)**] [**0.067 inch (1.7 mm)**].
3. Sidelite [**and Transom**] Frames: Same material and thickness as door frame.
4. Constructed: [**Face welded**] [**Full profile welded**] [**Knockdown**].

## 2.04 INTERIOR DOORS AND FRAMES

A. Standard Interior Doors: Comply with ANSI/SDI A250.8 as follows:

**** Select one of four Classification Levels below and coordinate with Physical Endurance Level. Classification Level 1, for standard-duty doors, is associated with Physical Endurance Level C; Classification Level 2, for heavy-duty doors, is associated with Physical Endurance Level B; Classification Level 3, for extra heavy-duty doors, is associated with Physical Endurance Level A; and Classification Level 4, for maximum-duty doors, is associated with Physical Endurance Level A. ****

1. Classification Level: [**1**] [**2**] [**3**] [**4**].
2. Model: [**1, Full Flush**] [**2, Seamless**] [**3, Stile and rail**].
3. Physical Endurance: When tested in accordance with ANSI/SDI A250.4, pass the following:

a. Swing Test: [**Level A**] [**Level B**] [**Level C**].

b. Twist Test: [**Level A**] [**Level B**] [**Level C**].

4. Door Type: As indicated on Drawings.

5. Door Thickness: 1-3/4 inches (44.4 mm).

6. Face: [**ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011. A1011M, Commercial Steel (CS), Type B] [ASTM A653/A653M, A40, Commercial Steel (CS), Type B, metallic-coated steel sheet**].

**** Face thickness is associated with Classification Level above. First option is for Level 1; second option is for Level 2; third option is for Level 3; and fourth option is for Level 4. First option represents the outdated "20 gauge"; second option represents the outdated "18 gauge"; third option represents the outdated "16 gauge"; and the fourth option represents the outdated "14 gauge." ****

a. Thickness: [**0.032 inches (0.8 mm)**] [**0.042 inch (1.0 mm)**] [**0.053 inches (1.3 mm)**] [**0.067 inch (1.7 mm)**].

7. Edge Design: [**Manufacturer's standard design**] [**Square**] [**Beveled**].

8. Core: [**Polyurethane**] [**Polystyrene**] [**Polyisocyanurate**] [**Kraft-paper honeycomb**] [**Mineral board**] [**Vertical steel stiffeners with insulation**].

a. Fire-Rated Doors: As required to provide fire-protection rating indicated on Drawings.

9. Top Closure: 0.042-inch (1.0 mm) thick [**flush**] [**inverted**] channel.

10. Bottom Closure: 0.042-inch (1.0 mm) thick [**flush**] [**inverted**] channel.

B. Standard Interior Door Frames: Comply with ANSI/SDI A250.8 as follows:

1. Classification Level: [**1**] [**2**] [**3**] [**4**].

2. Material: [**ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011. A1011M, Commercial Steel (CS), Type B] [ASTM A653/A653M, A40, Commercial Steel (CS), Type B, metallic-coated steel sheet**].

**** Material thickness is associated with Classification Level above. First option is for Level 1; second option is for Level 2 and Level 3; third option for Level 4. First option represents the outdated "18 gauge"; second option represents the outdated "16 gauge"; and the third option represents the outdated "14 gauge." ****

a. Thickness: [**0.042 inch (1.0 mm)**] [**0.053 inches (1.3 mm)**] [**0.067 inch (1.7 mm)**].

3. Sidelite [**and Transom**] Frames: Same material and thickness as door frame.

4. Constructed: [**Face welded**] [**Full profile welded**] [**Knockdown**].

2.05 BORROWED LITE FRAMES:

A. Material: [**ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011.A1011M, Commercial Steel (CS), Type B**] [**ASTM A653/A653M, A40, Commercial Steel (CS), Type B, metallic-coated steel sheet**].

1. Thickness: [**0.042 inch (1.0 mm)**] [**0.053 inches (1.3 mm)**].

B. Construction: [**Face welded**] [**Full profile welded**] [**Knockdown**].

2.06 ACCESSORIES

A. Hollow-Metal Panels: Match material, construction, and finish of adjacent door.

B. Interior Louvers: Comply with SDI-111C.

1. Frames: ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011.A1011M, Commercial Steel (CS), Type B.
   a. Thickness: 0.032 inch (0.8 mm).
2. Blade: ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011.A1011M, Commercial Steel (CS), Type B.
   a. Thickness: 0.024 inch (0.6 mm).
   b. Style: [**Inverted "V"**] [**"Z" Blade**] [**Inverted "Y"**] [**Chevron-type**] [**Lightproof**] [**Adjustable blade**].
3. Fire-Rated Automatic Louvers: Fusible-link, self-closing at 135 degrees F (57 degrees C).
   a. Fire-Rating: Comply with fire-rating of door assembly; UL or Intertek Group plc listed.

C. Vision Lite Frames:
1. Material:
   a. Exterior Locations: ASTM A653/A653M, [**A40**] [**A60**], Commercial Steel (CS), Type B, metallic-coated steel sheet.
      1) Thickness: 0.032 inch (0.8 mm).
   b. Interior Locations: ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011.A1011M, Commercial Steel (CS), Type B.
      1) Thickness: 0.032 inch (0.8 mm).
2. Profile: Flush type, with [**Square**] [**Beveled**] stops.
3. Corner Construction: [**Butted**] [**Mitered**], welded.
4. Fasteners: Countersunk type.
5. Locate fixed stops as follows:
   a. Exterior Doors: Interior side.
   b. Interior Doors: Keyed side.
6. Fire-Rated Doors: Comply with NFPA 80, and NFPA 252 or UL 10C.

D. Frame Anchors: Comply with ANSI/SDI A250.4.
1. Material:
   a. Exterior Locations: ASTM A653/A653M, [**A40**] [**A60**], Commercial Steel (CS), Type B, metallic-coated steel sheet.
      1) Thickness: 0.042 inch (1.0 mm) for sheet metal anchors and 0.167-inch (4.2 mm) diameter for wire anchors.
   b. Interior Locations: ASTM A1008/A1008M, Commercial Steel (CS), Type B or ASTM A1011.A1011M, Commercial Steel (CS), Type B.
      1) Thickness: 0.042 inch (1.0 mm) for sheet metal anchors and 0.167-inch (4.2 mm) diameter for wire anchors.
2. Jamb Anchors:, Suitable for adjoining wall construction.
   a. Quantity: Other than at slip-on drywall frames, provide the following:
      1) Frames Up to 7'-6" in Height: Three anchors per jamb.
      2) Frames Over 7'-6" in Height: Three anchors per jamb plus one additional anchor per jamb for each 2 feet of additional height.
   b. Floor Anchors: Provide one floor anchor for each jamb and mullion extending to floor.

E. Mineral-Fiber Insulation: ASTM C665, Type I.

1. Combustibility: Pass ASTM E136.

F. Glazing: As specified in Section 088000 - Glazing.

G. Shop Primer: Door manufacturer's standard lead and chromate free primer complying with ANSI/SDI A250.10, compatible with field-applied finishes.

H. Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

1. Power-Actuated Fasteners in Concrete: Type applicable for required installation; corrosive-resistant material.

2.07 FABRICATION

A. Fabrication of Doors [**and Hollow-Metal Panels**]: Comply with ANSI/SDI A250.8.

1. Form metal to sizes and profiles required, with minimum radius for thickness of metal.
2. Factory cut glazed lite openings in doors.
3. Door Astragals: When required to comply with fire-rating of door assembly, provide overlapping astragal on inactive leaf of pairs of doors.
4. Hardware Preparation: Comply with ANSI/BHMA A156.115,where applicable.
5. Hardware Reinforcing: Comply with ANSI/SDI A250.6 and ANSI/SDI A250.8, Table 4.

**** Retain first two paragraphs below for exterior doors. ****

6. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
7. Seal joints in top edges of exterior doors to prevent water intrusion.
8. Attach fire-rating label to each fire-rated door.
9. Attach S label to each smoke and draft control door.

B. Fabrication of Frames: Comply with ANSI/SDI A250.8.

1. Form metal to sizes and profiles required, with minimum radius for thickness of metal.
2. Fabricate frames in single unit, except where handling and transporting limitations require multiple units.
    a. Provide concealed alignment plates at each joint for multiple unit frames.
3. Termination Stops: Where indicated on Drawings, terminate stops 6 inches (152 mm) above finish floor at a 45 degree downward angle.
    a. Close open end of stop with metal to match material and thickness of door frame.
    b. Fill open portion of frame below termination stop with metal to match material and thickness of door frame.
    c. Weld all joints with welds ground smooth and flush with adjacent frame.
4. Door Silencers: Except for doors scheduled to receive weatherstripping or sound seals specified under Section 087100, drill frame stops to receive door silencers.
    a. Quantity:
        1) Single Door Frames: Three holes in strike jamb stop.
        2) Double Door Frames: Two holes in head stop.
5. Hardware Preparation: Comply with ANSI/BHMA A156.115,where applicable.
6. Hardware Reinforcing: Comply with ANSI/SDI A250.6 and ANSI/SDI A250.8, Table 4.
7. Attach fire-rating label to each fire-rated frame.
8. Attach S label to each smoke and draft control frame.

C. Fabrication Tolerances: Comply with SDI-117 and ANSI/SDI A250.8.

2.08 SHOP FINISHING

A. Primer Finish:

1. Clean and prepare doors and frames to receive shop primer.
2. Shop finish in compliance with ANSI/SDI A250.10.

## PART 3 – EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Examination areas and conditions under which Work is to be performed and identify conditions detrimental to proper and timely completion.

1. Verify rough-in openings and built-in anchorage are correctly sized, installed, and located.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove factory-installed welded-in door frame shipping spreaders.

1. Restore appearance and finish of door frames at weld locations to result in a smooth, flush surface.
   a. Touch-up primer using same primer as applied in shop.
2. Drill and tap doors and frames schedule to receive field-applied non-templated, mortised, and surface-mounted hardware.

3.03 INSTALLATION

A. Installation of Frames: Comply with ANSI/SDI A250.11.

1. Fire-Rated Assemblies: Comply with NFPA 80.
2. Smoke Control Assemblies: Comply with NFPA 105.
3. Install frames plumb and level, in alignment with adjacent construction.
4. Provide temporary supports and braces for frames installed prior to wall erection.
   a. Remove temporary supports and braces after wall erection is completed.
5. At field splices, secure separate units of frames by continuous welds.
   a. Restore appearance and finish of frames at weld locations to result in a smooth, flush surface.
   b. Touch-up primer using same primer as applied in shop.
6. At STC-rated walls, install mineral-fiber insulation inside frames.
7. At in-place concrete and masonry walls, secure frames using post-installed anchors with spacer tube between frame and wall.
   a. Countersink anchors, and fill recess to create a smooth, flush surface.

B. Installation of Doors:

1. Install doors in frames using hardware specified in Section 087100.
2. Install doors to within specified installation tolerances.
   a. Shim as necessary using metal shims.
3. Fire-Rated Assemblies: Comply with NFPA 80.

4. Smoke Control Assemblies: Comply with NFPA 105.

C. Installation Tolerances for Doors and Frames:

1. Non-Fire-Rated Assemblies: Comply with ANSI/SDI A250.8.
2. Fire-Rated Assemblies: Comply with NFPA 80.

3.04 REPAIR

A. Immediately after installation, repair rusted and damages areas of shop primer.

B. Touch-up primer using same primer as applied in shop.

C. FIELD QUALITY CONTROL

**** Retain this Article for fire-rated assemblies ****

D. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports.

E. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

**** Retain "Egress Door Inspections" Subparagraph below for projects under NFPA 101, for Assembly, Educational, Day-Care, and Residential Board and Care occupancies. ****

2. Egress Door Inspections: Inspect each door equipped with exit panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements, in accordance with NFPA 101, Section 7.2.1.15.

F. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

G. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

H. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in [**NFPA 80**] [**and**] [**NFPA 101**].

3.05 ADJUSTING

A. Adjust doors to function smoothly and correctly.

3.06 CLEANING

A. Clean exposed surfaces, hardware [**, and glass materials**].

END OF SECTION

# AVAILABLE PUBLICATIONS

**Specifications**

| | |
|---|---|
| **ANSI/SDI A250.6** | Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames |
| **ANSI/SDI A250.8** | Specifications for Standard Steel Doors and Frames (SDI-100) |
| **SDI-108** | Recommended Selection & Usage Guide for Standard Steel Doors |
| **SDI-118** | Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements |
| **SDI-128** | Guidelines for Acoustical Performance of Standard Steel Doors and Frames |
| **SDI-129** | Hinge and Strike Spacing |
| **SDI-133** | Guideline for Specifying Steel Doors & Frames for Blast Resistance |
| **SDI-136** | Guideline for Specifying Windstorm Products |

**Test Procedures**

| | |
|---|---|
| **ANSI/SDI A250.3** | Test Procedure & Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames |
| **ANSI/SDI A250.4** | Test Procedure & Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors |
| **ANSI/SDI A250.10** | Test Procedure & Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames |
| **ANSI/SDI A250.13** | Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies for Protection of Building Envelopes (Not applicable for FEMA 320/361 or ICC-500 Shelters) |
| **SDI-113** | Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies |
| **SDI-131** | Accelerated Physical Endurance Test Procedure for Steel Doors |

**Construction Details**

| | |
|---|---|
| **ANSI/SDI A250.11** | Recommended Erection Instructions for Steel Frames |
| **SDI-110** | Standard Steel Doors & Frames for Modular Masonry Construction |
| **SDI-111** | Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components |
| **SDI-122** | Installation Troubleshooting Guide for Standard Steel Doors & Frames |

**Miscellaneous Documents**

| | |
|---|---|
| **SDI-112** | Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors and Frames |
| **SDI-117** | Manufacturing Tolerances for Standard Steel Doors and Frames |
| **SDI-124** | Maintenance of Standard Steel Doors & Frames |
| **SDI-127** | Industry Alert Series (A-L) |
| **SDI-130** | Electronic Hinge Preparations |
| **SDI-134** | Glossary of Terms for Hollow Metal Doors and Frames |
| **SDI-135** | Guidelines to Measure for Replacement Doors in Existing Frame Openings |

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