
USACE / NAVFAC / AFCEC / NASA UFGS-08 11 13 (February 2010)
Change 3 - 11/18

Preparing Activity: NAVFAC Superseding
UFGS-08 11 13 (August 2008)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated January 2019

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SECTION 08 11 13

STEEL DOORS AND FRAMES 02/10

NOTE: This guide specification covers steel doors and frames. Some paragraphs may need to be supplemented to meet project requirements.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

NOTE: On the drawings, show:

1. Sizes of door openings, thicknesses of doors, swings, and travels of doors, and design of doors, whether flush panel, full flush, paneled, glazed, or louvered. It is recommended that standard door-type nomenclature, SDI 106, be used to indicate designs (e.g., F, L, G, GL in lieu of A, B, C).

2. Details of nonstructural mullions, mullion covers, and removable mullions.

3. Type and thickness of glazing required; whether or not insulating glass units are required.

4. Method, type, and spacing required for anchoring door frames to adjoining construction.

5. Lintels and reinforcement required to support walls or partitions above doors.
6. Type of shop finish on steel surfaces.
7. Free area for louvers in doors.
8. Complete door schedule. Schedule should assign a separate number for each opening and should indicate door type and style, material, design, size, thickness, glazed or unglazed, class fire rating for fire doors, hardware set number, threshold material, if any, and material for frames, mullions, and transom bars.

PART 1 GENERAL

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2015; Errata 1 2015; Errata 2 2016)
	Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A653/A653M	(2017) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
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ASTM A879/A879M	(2012) Standard Specification for Steel
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Sheet, zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface

ASTM A924/A924M	(2018) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM C578	(2018) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C591	(2017) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C612	(2014) Mineral Fiber Block and Board Thermal Insulation
ASTM D2863	(2017a) Standard Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
ASTM E1300	(2016) Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM E283	(2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM F2248	(2012) Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.115	(2016) Hardware Preparation in Steel Doors and Steel Frames
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NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM HMMA 810	(2009) Hollow Metal Doors
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105	(2016; TIA 16-1) Standard for Smoke Door Assemblies and Other Opening Protectives
NFPA 252	(2017) Standard Methods of Fire Tests of Door Assemblies
NFPA 80	(2016; TIA 16-1) Standard for Fire Doors and Other Opening Protectives

STEEL DOOR INSTITUTE (SDI/DOOR)

SDI/DOOR 111	(2009) Recommended Selection and Usage Guide for Standard Steel Doors, Frames and Accessories
SDI/DOOR 113	(2001; R2006) Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies
SDI/DOOR A250.11	(2001) Recommended Erection Instructions for Steel Frames
SDI/DOOR A250.3	(2007; R 2011) Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames
SDI/DOOR A250.4	(2011) Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing
SDI/DOOR A250.6	(2003; R2009) Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames
SDI/DOOR A250.8	(2003; R2008) Recommended Specifications for Standard Steel Doors and Frames

UNDERWRITERS LABORATORIES (UL)

UL 10C	(2016) UL Standard for Safety Positive Pressure Fire Tests of Door Assemblies
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1.2 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office

(Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" following a submittal item indicates that the submittal is required for the Sustainability eNotebook to fulfill federally mandated sustainable requirements in accordance with Section 01 33 29 SUSTAINABILITY REPORTING. Locate the "S" submittal under the SD number that best describes the submittal item.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

NOTE: When weatherstripping is specified in Section 08 71 00 FINISH HARDWARE delete the bracketed item "Weatherstripping".

SD-02 Shop Drawings

Doors; G[, [_____]]

Recycled Content for Steel Door Product; S

Frames; G[, [_____]]

Recycled Content for Steel Frame Product; S

Accessories

[Weatherstripping

] Show elevations, construction details, metal gages, hardware provisions, method of glazing, and installation details.

Schedule of Doors; G[, [_____]]

Schedule of Frames; G[, [_____]]

Submit door and frame locations.

NOTE: When weatherstripping is specified in Section

08 71 00 FINISH HARDWARE delete the bracketed item
"Weatherstripping".

SD-03 Product Data

Doors; G[, [_____]]

Frames; G[, [_____]]

Accessories

- [Weatherstripping
-] Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. When "custom hollow metal doors" are provided in lieu of "standard steel doors," provide additional details and data sufficient for comparison to SDI/DOOR A250.8 requirements.

[SD-04 Samples

Factory-applied enamel finish; G[, [_____]]

Where colors are not indicated, submit manufacturer's standard colors and patterns for selection.

]1.3 DELIVERY, STORAGE, AND HANDLING

Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging.[Strap knock-down frames in bundles.][Provide temporary steel spreaders securely fastened to the bottom of each welded frame.] Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 6 mm 1/4 inch airspace between doors. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

NOTE: Include the bracketed option below regarding exterior glazing when personnel density is greater than one person per 40 square meters 430 square feet and the minimum AT/FP standoff distances are met. This does not include guard type facilities or single and duplex detached family housing. These requirements are specified in UFC 4-010-01 "DoD Minimum Antiterrorism Standards for Buildings".

SDI/DOOR A250.8, except as specified otherwise. Prepare doors to receive door hardware as specified in Section 08 71 00. Undercut where indicated. Provide exterior doors with top edge closed flush and sealed to prevent water intrusion. Provide doors at 44.5 mm 1-3/4 inch thick, unless otherwise indicated. Provide door material that uses a minimum of 25 percent recycled content. Provide data indicating percentage of recycled

content for steel door product.[Provide exterior glazing in accordance with ASTM F2248 and ASTM E1300.]

2.1.1.1 Classification - Level, Performance, Model

NOTE: When a door level is not required, delete the entire paragraph for that level. Door levels for various locations should be determined in accordance with the following list and sound judgment.

Closet doors (without locks)	Level 1
Individual offices, storage rooms, classrooms, patients' rooms, bathrooms, and bedrooms (except BEQ bedrooms)	Level 2
BEQ sleeping room entrance doors and interior egress doors	Level 3
Exterior Main entrance and circulation doors and other locations	Level 4

Model designations are as follows:

Model 1 Full Flush Design
Model 2 Seamless Design
Model 3 Stile and Rail

Where appearance is important and edge seams are objectionable, use Model 2.

Core constructions must be at the manufacturer's discretion and are as follows:

- a. Kraft/Paper Honeycomb
- b. Polyurethane Modified Polyisocyanurate
- c. Polystyrene
- d. Mineral Board
- e. Vertical Steel Stiffeners

2.1.1.1.1 Standard Duty Doors

SDI/DOOR A250.8, Level 1, physical performance Level C, Model [1] [2], of size(s) and design(s) indicated and core construction as required by the manufacturer. Provide [where shown][for doors No. [____]].

2.1.1.1.2 Heavy Duty Doors

SDI/DOOR A250.8, Level 2, physical performance Level B, Model [1][2], with core construction as required by the manufacturer [for interior doors][and][for exterior doors], of size(s) and design(s) indicated. [Where vertical stiffener cores are required, the space between the stiffeners must be filled with mineral board insulation.][Provide Level 2 [where indicated][for doors No. [____]].]

2.1.1.1.3 Extra Heavy Duty Doors

SDI/DOOR A250.8, Level 3, physical performance Level A, Model [1][2][3] with core construction as required by the manufacturer [for interior

doors][and][for indicated exterior doors], of size(s) and design(s) indicated.[Where vertical stiffener cores are required, the space between the stiffeners must be filled with mineral board insulation.][Provide Level 3 [where indicated] [for doors No. [____]].]

2.1.1.4 Maximum Duty Doors

SDI/DOOR A250.8, Level 4, physical performance Level A, Model [1][2] with core construction as required by the manufacturer [for interior doors][and][for indicated exterior doors], of size(s) and design(s) indicated.[Where vertical stiffener cores are required, the space between the stiffeners must be filled with mineral board insulation.][Provide Level 4 [where indicated] [for doors No. [____]].]

2.2 CUSTOM HOLLOW METAL DOORS

NOTE: Custom hollow metal doors should be included in projects as a Contractor option to standard hollow metal doors. The cost of these doors is considered competitive with standard doors having comparable quality of construction.

Provide custom hollow metal doors where nonstandard steel doors are indicated. At the Contractor's option, custom hollow metal doors may be provided in lieu of standard steel doors. Provide standard steel doors in the door size(s), design(s), materials, construction, gages, and finish as specified for standard steel doors and complying with the requirements of NAAMM HMMA 810. Fill all spaces in doors with insulation. Close top and bottom edges with steel channels not lighter than 1.5 mm thick 16 gage.[Close tops of exterior doors flush with an additional channel and seal to prevent water intrusion.] Prepare doors to receive hardware specified in Section 08 71 00 DOOR HARDWARE.[Undercut doors where indicated.] Provide doors at 44.5 mm 1-3/4 inch thick, unless otherwise indicated.

2.3 INSULATED STEEL DOOR SYSTEMS

NOTE: Insulated steel doors and frames are recommended for entrances to dwelling units. They may also be specified as a Contractor's option to Level 1 standard hollow metal doors. Edit or delete the paragraph to suit the project.

[At the option of the Contractor, insulated steel doors and frames may be provided in lieu of Level 1 standard steel doors and frames. Provide insulated steel doors in the door size(s), design, and material as specified for standard steel doors.]Provide insulated steel doors with a core of polyurethane foam; face sheets, edges, and frames of galvanized steel not lighter than 0.7 mm thick 23 gage, 1.5 mm thick 16 gage, and 1.5 mm 16 gage respectively; magnetic weatherstripping; nonremovable-pin hinges; thermal-break aluminum threshold; and vinyl door bottom. Provide to doors and frames a phosphate treatment, rust-inhibitive primer, and baked acrylic enamel finish. Test doors in accordance with SDI/DOOR A250.4 and meet the requirements for Level C. Prepare doors to receive specified hardware. Provide doors 44.5 mm 1-3/4 inch thick.[Provide insulated steel doors and frames [at entrances to dwelling units][where

shown][____].]

[2.4 SOUND RATED STEEL DOORS

Provide sound rated doors with a Sound Transmission Class (STC) [of
[____]][as indicated on the drawings].

]2.5 ACCESSORIES

2.5.1 Shelves for Dutch Doors

SDI/DOOR 111. Fabricate shelves of steel not lighter than 1.5 mm thick 16
gage, [[____] mm inches wide][of the size indicated]. Provide brackets of
stock type fabricated of the same metal used to fabricate shelves.

2.5.2 Louvers

NOTE: Interior and exterior louvers are applied to
steel doors differently. Interior door louvers are
removable on side by molding flange and exterior
door louver frames are permanently welded to the
door and provided with removable bird screen or
insect screen.

NOTE: Avoid louvers on exterior doors in humid
locations or project locations with Environmental
Severity Classifications (ESC) of C3 thru C5 as they
are very susceptible to weather deterioration.
Humid locations are those in ASHRAE climate zones
0A, 1A, 2A, 3A, 3C, 4C and 5C (as identified in
ASHRAE 90.1). See UFC 1-200-01 for determination of
ESC for project locations. Consider other means of
providing the venting function.

Ensure that louvers in doors are drainable,
weatherproof and factory primed. Doors with
factory-installed louvers are also recommended.

2.5.2.1 Interior Louvers

NOTE: Lightproof louvers are used when light
transmission must be avoided. However, these
provide a minimal free air flow.

SDI/DOOR 111. Where indicated, provide louvers of stationary [sightproof][
and][lightproof] type[where scheduled].[Louvers for lightproof must
shall not transmit light.] Detachable moldings on room or non security
side of door; on security side of door, moldings to be integral part of
louver. Form louver frames of 0.9 mm thick 20 gage steel and louver blades
of a minimum 0.6 mm 24 gage.[Louvers for lightproof doors must have
minimum of 20 percent net-free opening.][Sightproof louvers to be
inverted ["V" blade design with minimum 55][and][inverted ["Y"] blade
design with minimum 40] percent net-free opening.]

2.5.2.2 Exterior Louvers

NOTE: Use aluminum screens in humid locations or project locations with Environmental Severity Classifications (ESC) of C3 thru C5. Humid locations are those in ASHRAE climate zones 0A, 1A, 2A, 3A, 3C, 4C and 5C (as identified in ASHRAE 90.1). See UFC 1-200-01 for determination of ESC for project locations.

Provide louvers of the inverted ["Y"]["V"]["Z"] type with minimum of [30][55][35] percent net-free opening. Weld or tenon louver blades to continuous channel frame and weld assembly to door to form watertight assembly. Form louvers of hot-dip galvanized steel of same gage as door facings. At louvers provide steel-framed [insect][bird] screens secured to room side and readily removable. Provide [aluminum wire cloth, 7 by 7 per 10 mm or 7 by 6 per 10 mm 18 by 18 or 18 by 16 inch mesh, for insect screens][galvanized steel, 13 by 13 mm 1/2 by 1/2 inch mesh hardware cloth, for bird screens]. Net-free louver area to be before screening.

2.5.3 Astragals

For pairs of exterior steel doors which will not have aluminum astragals or removable mullions, as specified in Section 08 71 00 DOOR HARDWARE provide overlapping steel astragals with the doors.[For interior pairs of [fire rated][and][smoke control] doors, provide stainless steel astragals complying with NFPA 80 for fire rated assemblies][and][NFPA 105 for smoke control assemblies].

2.5.4 Moldings

Provide moldings around glass of interior and exterior doors and louvers of interior doors. Provide nonremovable moldings on outside of exterior doors and on corridor side of interior doors. Other moldings may be stationary or removable. Secure inside moldings to stationary moldings, or provide snap-on moldings. Provide muntins that interlock at intersections and are fitted plus welded to stationary moldings.

2.6 INSULATION CORES

Provide insulating cores of the type specified, and provide an apparent U-factor of .48 in accordance with SDI/DOOR 113 and conforming to:

- a. Rigid Cellular Polyisocyanurate Foam: ASTM C591, Type I or II, foamed-in-place or in board form, with oxygen index of not less than 22 percent when tested in accordance with ASTM D2863; or
- b. Rigid Polystyrene Foam Board: ASTM C578, Type I or II; or
- c. Mineral board: ASTM C612, Type I.

2.7 STANDARD STEEL FRAMES

NOTE: Designate whether frames are to be welded or knock-down field-assembled type. Welded frames must

be built in. Slip-on drywall frames must be knock-down type. When both types are required for the project, modify paragraph to specify both types and locations where required.

SDI/DOOR A250.8, Level [1][2][3][4], except as otherwise specified. Form frames to sizes and shapes indicated, with [welded corners][or][knock-down field-assembled corners]. Provide steel frames for doors, [transoms,] [sidelights,] [mullions,] [cased openings,][and][interior glazed panels,] unless otherwise indicated. Provide frame product that uses a minimum of 25 percent recycled content. Provide data indicating percentage of recycled content for steel frame product.

2.7.1 Welded Frames

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

Weld frames in accordance with the recommended practice of the Structural Welding Code Sections 1 through 6, AWS D1.1/D1.1M and in accordance with the practice specified by the producer of the metal being welded.

2.7.2 Knock-Down Frames

Design corners for simple field assembly by concealed tenons, splice plates, or interlocking joints that produce square, rigid corners and a tight fit and maintain the alignment of adjoining members. Provide locknuts for bolted connections.

2.7.3 Mullions and Transom Bars

Provide mullions and transom bars of closed or tubular construction with heads and jambs butt-welded together[or knock-down for field assembly]. Bottom of door mullions must have adjustable floor anchors and spreader connections.

2.7.4 Stops and Beads

Form stops and beads from 0.9 mm thick 20 gage steel. Provide for glazed and other openings in standard steel frames. Secure beads to frames with oval-head, countersunk Phillips self-tapping sheet metal screws or concealed clips and fasteners. Space fasteners approximately 300 to 400 mm 12 to 16 inch on center. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

2.7.5 Terminated Stops

NOTE: Specify or indicate when stops (rabbet strips) are required to be terminated above the floor; generally, terminated stops are used in hospitals and similar buildings to eliminate projections on which wheels of beds and carts are caught and to eliminate small, dirt-catching corners.

Where indicated, terminate interior door frame stops 150 mm 6 inch above floor.[Do not terminate stops of frames for [lightproof,] [soundproof,]

[or lead-lined] doors.]

2.7.6 Cased Openings

Fabricate frames for cased openings of same material, gage, and assembly as specified for metal door frames, except omit door stops and preparation for hardware.

2.7.7 Anchors

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 1.2 mm thick 18 gage.

2.7.7.1 Wall Anchors

Provide at least three anchors for each jamb. For frames which are more than 2285 mm 7.5 feet in height, provide one additional anchor for each jamb for each additional 760 mm 2.5 feet or fraction thereof.

- a. Masonry: Provide anchors of corrugated or perforated steel straps or 5 mm 3/16 inch diameter steel wire, adjustable or T-shaped;
- b. Stud partitions: Weld or otherwise securely fasten anchors to backs of frames. Design anchors to be fastened [to wood studs with nails,] [to closed steel studs with sheet metal screws, and to open steel studs by wiring or welding];
- c. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts in accordance with SDI/DOOR 111; and
- d. Solid plaster partitions: Secure anchors solidly to back of frames and tie into the lath. Provide adjustable top strut anchors on each side of frame for fastening to structural members or ceiling construction above. Provide size and type of strut anchors as recommended by the frame manufacturer.

2.7.7.2 Floor Anchors

NOTE: Extension clips at bottom of frames are usually required in locations where floor fill occurs on top of structural slabs, and the metal frames and partitions are installed before the fill is placed. In such cases, the drawings or specifications should indicate the distance required between the rough slab and finished floor.

Provide floor anchors drilled for 10 mm 3/8 inch anchor bolts at bottom of each jamb member. [Where floor fill occurs, terminate bottom of frames at the indicated finished floor levels and support by adjustable extension clips resting on and anchored to the structural slabs.]

2.8 FIRE [AND] [SMOKE] DOORS AND FRAMES

NOTE: For each opening requiring labeled doors,

specify or indicate the hourly rating of fire doors, as established by the National Fire Protection Association. When labeled doors are necessary on both sides of a fire wall, provide adequate details. Labels cannot be obtained for double-acting doors or for steel angle frames. Metal frames to receive labeled wood fire doors must also be labeled.

NFPA 80 [and] [NFPA 105] and this specification. The requirements of NFPA 80 [and] [NFPA 105] takes precedence over details indicated or specified.

2.8.1 Labels

Provide fire doors and frames bearing the label of Underwriters Laboratories (UL), Factory Mutual Engineering and Research (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing must be in accordance with NFPA 252 or UL 10C. Provide labels that are metal with raised letters, bearing the name or file number of the door and frame manufacturer. Labels must be permanently affixed at the factory to frames and to the hinge edge of the door. Do not paint door and labels.

2.8.2 Oversized Doors

For fire doors and frames which exceed the size for which testing and labeling are available, furnish certificates stating that the doors and frames are identical in design, materials, and construction to a door which has been tested and meets the requirements for the class indicated.

2.8.3 Astragal on Fire [and Smoke] Doors

On pairs of labeled fire doors, conform to NFPA 80 and UL requirements.[
On smoke control doors, conform to NFPA 105.]

2.9 WEATHERSTRIPPING

NOTE: Weatherstripping is specified in Section 08 71 00 DOOR HARDWARE because it is usually furnished by the hardware supplier. Delete the bracketed subparagraph if it is not applicable.

As specified in Section 08 71 00 DOOR HARDWARE.

NOTE: If weatherstripping is specified in this section, delete the previous statement above and the brackets below and provide the following data:
Maximum air leakage rates are 2.19 by 10⁻⁵ cms per sq. m 0.5 cfm per sq. ft. of door area for residential swinging doors and 5.48 by 10⁻⁵ cms per sq. m 1.25 cfm per sq. ft. of door area for non-residential swinging doors.

[2.9.1 Integral Gasket

Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals specified in Section 08 71 00 DOOR HARDWARE. Insert gasket in groove after frame is finish painted. Provide doors where air leakage of weatherstripped doors does not exceed [2.19 by 10-5] [5.48 by 10-5] cubic meters per second of air per square meter [0.5] [1.25] cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283.

]2.10 HARDWARE PREPARATION

Provide minimum hardware reinforcing gages as specified in SDI/DOOR A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI/DOOR A250.8 and SDI/DOOR A250.6. For additional requirements refer to ANSI/BHMA A156.115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI/DOOR A250.8, as applicable. Punch door frames [, with the exception of frames that will have weatherstripping [or] [lightproof] [or] [soundproof] gasketing,] to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

2.11 FINISHES

NOTE: Specify the type finish required for the type of steel used for fabrication of doors and frames. Specify hot-dip zinc-coated steel for metal doors and frames in humid locations or project locations with Environmental Severity Classifications (ESC) of C3 thru C5. Humid locations are those in ASHRAE climate zones 0A, 1A, 2A, 3A, 3C, 4C and 5C (as identified in ASHRAE 90.1). See UFC 1-200-01 for determination of ESC for project locations. Galvannealed steel is suitable for interior doors and frames in most buildings. Unless factory finish coating is required, specify finish coating will be applied by field painting in Section 09 90 00 PAINTS AND COATINGS.

[2.11.1 Factory-Primed Finish

Thoroughly clean all surfaces of doors and frames then chemically treat and factory prime with a rust inhibiting coating as specified in SDI/DOOR A250.8.[, or paintable A25 galvannealed steel without primer. Where coating is removed by welding, apply touchup of factory primer.]

]2.11.2 Hot-Dip Zinc-Coated and Factory-Primed Finish

Fabricate [exterior][interior][scheduled] doors and frames from hot dipped zinc coated steel, alloyed type, that complies with ASTM A924/A924M and ASTM A653/A653M. The coating weight must meet or exceed the minimum

requirements for coatings having 0.4 ounces per square foot 122 grams per square meter, total both sides, i.e., A40ZF120. Repair damaged zinc-coated surfaces by the application of zinc dust paint. Thoroughly clean and chemically treat to insure maximum paint adhesion. Factory prime as specified in SDI/DOOR A250.8.[Provide for [exterior doors][and][interior doors][door openings No. [_____]]].

]2.11.3 Electrolytic Zinc-Coated Anchors and Accessories

Provide electrolytically deposited zinc-coated steel in accordance with ASTM A879/A879M, Commercial Quality, Coating Class A. Phosphate treat and factory prime zinc-coated surfaces as specified in SDI/DOOR A250.8.

[2.11.4 Factory-Applied Enamel Finish

NOTE: Use this paragraph if field coatings as specified in Section 09 90 00 PAINTS AND COATINGS are not required or provided. One coat of factory-applied enamel finish is readily available in standard colors. Two coats and special colors add to cost and to delivery time.

Provide coatings that meet test procedures and acceptance criteria in accordance with SDI/DOOR A250.3. After factory priming, apply [one coat][two coats] of [low-gloss][medium-gloss] enamel to exposed surfaces. Separately bake or oven dry each coat. Drying time and temperature requirements must be in accordance with the coating manufacturer's recommendations. Provide finish coat color(s) [as indicated][_____] to match approved color sample(s).

]2.12 FABRICATION AND WORKMANSHIP

Provide finished doors and frames that are strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Provide molded members that are clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints must be well formed and in true alignment. Conceal fastenings where practicable.[Frames for use in solid plaster partitions must be welded construction.][On wraparound frames for masonry partitions, provide a throat opening 3 mm 1/8 inch larger than the actual masonry thickness.][Design[other] frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive caulking compound.]

2.12.1 Grouted Frames

For frames to be installed in exterior walls and to be filled with mortar or grout, fill the stops with strips of rigid insulation to keep the grout out of the stops and to facilitate installation of stop-applied head and jamb seals.

2.13 PROVISIONS FOR GLAZING

Materials are specified in Section 08 81 00, GLAZING.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Frames

Set frames in accordance with SDI/DOOR A250.11. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. [Where frames require ceiling struts or overhead bracing, anchor frames to the struts or bracing.] [Backfill frames with mortar. Coat inside of frames with corrosion-inhibiting bituminous material. For frames in exterior walls, ensure that stops are filled with rigid insulation before grout is placed.]

3.1.2 Doors

Hang doors in accordance with clearances specified in SDI/DOOR A250.8. After erection and glazing, clean and adjust hardware.

3.1.3 Fire [and Smoke] Doors and Frames

Install fire doors and frames, including hardware, in accordance with NFPA 80.[Install[fire rated] smoke doors and frames in accordance with [NFPA 80][and][NFPA 105].]

3.2 PROTECTION

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.3 CLEANING

Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

3.4 SCHEDULE

Some metric measurements in this section are based on mathematical conversion of inch-pound measurements, and not on metric measurement commonly agreed to by the manufacturers or other parties. The inch-pound and metric measurements are as follows:

PRODUCTS	INCH-POUND	METRIC
Door thickness	1-3/4 inch	44.5 mm
Steel channels	16 gage	1.5 mm

<u>PRODUCTS</u>	<u>INCH-POUND</u>	<u>METRIC</u>
Steel Sheet	23 gage	0.7 mm
	16 gage	1.5 mm
	20 gage	0.9 mm
	18 gage	1.2 mm
Anchor bolts	3/8 inch	10 mm

-- End of Section --