SECTION 08 11 13

STEEL DOORS AND FRAMES
08/20

PART 1 GENERAL

1.1 REFERENCES

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 NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/SDI A250.8	(2017) Specifications for Standard Steel Doors and Frames

JAPANESE STANDARDS ASSOCIATION (JSA)

JIS A 1516	(1998) Windows and Doorsets - Air Permeability Test
JIS A 4702	(2021) Doorsets
JIS G 3302	(2022) Hot Dip Zinc Coated Steel Sheet and Strip
JIS G 3313	Electrolytic Zinc-Coated Steel Sheet and Strip
JIS G 3317	(2019) Hot-Dip Zinc-5 Percent Aluminum Allot-Coated Steel Sheet and Strip
JIS Z 3420	(2003) Specification and Approval of Welding Procedures for Metallic Materials - General Rules

MINISTRY OF LAND, INFRASTRUCTURE, TRANSPORT AND TOURISM (MLIT)

MLIT SS Chapter 16	(2019) Building Construction Standard Specifications - Chapter 16 Opening Construction

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105	(2016; TIA 16-1) Standard for Smoke Door Assemblies and Other Opening Protectives
NFPA 252	(2022) Standard Methods of Fire Tests of Door Assemblies
NFPA 80	(2022) Standard for Fire Doors and Other Opening Protectives

UNDERWRITERS LABORATORIES (UL)

UL 10C	(2016) UL Standard for Safety Positive

Pressure Fire Tests of Door Assemblies

1.2 SUBMITTALS

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:

SD-02 Shop Drawings

Doors; G[, [_____]]

Frames; G[, [_____]]

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.

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 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

JIS A 4702, except as specified otherwise. Prepare doors to receive door hardware as specified in Section 08 71 00 DOOR HARDWARE. Undercut where indicated. Provide exterior doors with top edge closed flush and sealed to prevent water intrusion. Provide doors at 44.5 mm thick, unless otherwise indicated. Provide door material that uses a minimum of 25 percent recycled content. [Provide exterior glazing in accordance with project load resistance requirement.]

2.1.1 Classification - Level, Performance, Model

2.1.1.1 Standard Duty Doors (Level 1)

35 mm to 45 mm door thickness, 0.8 mm door faces steel thickness, 1.0 mm frames steel thickness [full flush] of size(s) and design(s) indicated and core construction as required by the manufacturer. Provide door classification label per JIS A 4702.

2.1.1.2 Heavy Duty Doors (Level 2)

45 mm door thickness, 1.0 mm door faces steel thickness, 1.3 mm frames steel thickness [full flush] [seamless], 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 board insulation.][Provide door classification label per JIS A 4702.]

2.1.1.3 Extra Heavy Duty Doors (Level 3)

45 mm door thickness, 1.3mm door faces and frames steel thickness, [full flush] [seamless] [stile and rail] 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 door classification label per JIS A 4702.]

2.1.1.4 Maximum Duty Doors (Level 4)

45 mm door thickness, 1.7mm door faces and frames steel thickness, [full flush] [seamless] 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 door classification label per JIS A 4702.]

2.2 CUSTOM HOLLOW METAL DOORS

Provide custom hollow metal doors where nonstandard steel doors are indicated. Provide custom steel doors in the door size(s), design(s), materials, construction, gages, and finish as specified for custom steel doors and complying with the requirements. Fill all spaces in doors with insulation. Close top and bottom edges with steel channels not lighter than 1.5 mm thick.[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 45 mm thick, unless otherwise indicated.

2.3 INSULATED STEEL DOOR SYSTEMS

[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, 1.5 mm thick, and 1.5 mm 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. Door shall meet JIS A 4702 and tested for 500,000 cycles. Prepare doors to receive specified hardware. Provide doors 44.5 mm 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 Transmission Loss (TL) [of [_____]][as indicated on the drawings].

]2.5 ACCESSORIES

2.5.1 Shelves for Dutch Doors

Fabricate shelves of steel not lighter than 1.5 mm thick, [[_____] mm wide][of the size indicated]. Provide brackets of stock type fabricated of the same metal used to fabricate shelves.

2.5.2 Louvers

2.5.2.1 Interior Louvers

Where indicated, provide louvers of stationary [sightproof][and][lightproof] type[where scheduled].[Louvers for lightproof must 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 1 mm thick steel and louver blades of a minimum 0.6 mm.[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

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 mesh, for insect screens][galvanized steel, 13 by 13 mm 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.

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.

2.6 INSULATION CORES

Provide insulating cores of the type specified, and provide an apparent U-factor per insulation requirements in accordance with JIS A4702, [H-_____]

2.7 STANDARD STEEL FRAMES

Provide hardware reinforcing thickness per ANSI/SDI A250.8 requirement. 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 Welding Code per JIS Z 3420 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

Provide form and loose stops and beads from 0.9 mm thick 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 on center. Miter molded shapes at corners. Butt or miter square or rectangular beads at corners.

2.7.5 Terminated Stops

Where indicated, terminate interior door frame stops 150 mm 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 not lighter than 1.2 mm thick.

2.7.7.1 Wall Anchors

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

a. Masonry: Provide anchors of corrugated or perforated steel straps or 5 mm 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 JIS A 4702; 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

Provide floor anchors drilled for 10 mm 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

Provide fire[and smoke] doors and frames in accordance with NFPA 80[and][NFPA 105] and this specification.[Include insulated core materials in fire doors where indicated in the door schedule.]

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. Use of Japanese tested and labeled fire doors, up to 20 minutes, is permitted. NFPA 252 paragraph 6.2.2 requires hose stream test for fire rated doors greater than 20 minutes.

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 EXTERIOR FRAMES

Provide thermal insulation in all exterior frames. Provide frames of a minimum Level 4, with frames of a minimum thickness of 1.7 mm, 14 gage.

2.10 WEATHERSTRIPPING

As specified in Section 08 71 00 DOOR HARDWARE.

[2.10.1 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 of door area when tested in accordance with JIS A 1516.

]2.11 HARDWARE PREPARATION

Provide minimum hardware reinforcing gages as specified in JIS A 4702. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of JIS A 4702. 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 JIS A 4702, 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.

2.12 FINISHES

[2.12.1 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 JIS A 4702.[, or paintable A25 galvannealed steel without primer. Where coating is removed by welding, apply touchup of factory primer.]

][2.12.2 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 JIS G 3302 and JIS G 3317. The coating weight must meet or exceed the minimum requirements for coatings having zinc-5 percent. 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 JIS A 4702.[Provide for [exterior doors][and][interior doors][door openings No. [_____]]].

]2.12.3 Electrolytic Zinc-Coated Anchors and Accessories

Provide electrolytically deposited zinc-coated steel in accordance with

JIS G 3313, Commercial Quality, Coating Class A. Phosphate treat and factory prime zinc-coated surfaces as specified in JIS A 4702.

[2.12.4 Factory-Applied Enamel Finish

Provide coatings that meet test procedures and acceptance criteria in accordance with JIS A 4702. 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).

]2.13 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 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.]

2.13.1 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.

2.14 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 JIS A 4702 and MLIT SS Chapter 16. 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.]

3.1.2 Doors

Hang doors in accordance with clearances specified in JIS A 4702 and MLIT SS Chapter 16. 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.

-- End of Section --