SECTION 081119 – STAINLESS-STEEL DOORS AND FRAMES

Revise this Section by deleting and inserting text to meet Project-specific requirements.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Stainless steel doors and frames.

Stainless steel panels.

* + - * 1. Related Requirements:

Refer to sections listed below for cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections. Sections listed below are for spec editor’s and design team coordination and are to remain as Editor’s Notes. Remove referenced specification sections within the body of the specification.

**Section 087100 "Door Hardware"** for door hardware for stainless steel doors.

* + - 1. COORDINATION
         1. Coordinate anchorage installation for stainless steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
         2. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.
      2. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at **Project site.**
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified, as noted below, and tabbed (for combined submittals).
         4. Product Data: For each type of product.

Include construction details, material descriptions, core descriptions, [**fire-resistance ratings,**] [**temperature-rise ratings,**] and finishes.

Include manufacturer’s installation instructions.

* + - * 1. Sustainable Design Submittals:

Retain "Product Data" subparagraph below to require minimum recycled content for LEED 2009 MR Credit 2 - "Recycled Content."

Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

* + - * 1. Shop Drawings: Include the following:

Elevations of each door type.

Details of doors, including vertical and horizontal edge details and metal thicknesses.

Frame details for each frame type, including dimensioned profiles and metal thicknesses.

Locations of reinforcement and preparations for hardware.

Details of each different wall opening condition.

Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.

Details of anchorages, joints, field splices, and connections.

Details of accessories.

Details of moldings, removable stops, and glazing.

* + - * 1. Samples:

Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.

Doors: Show vertical-edge, top, and bottom construction; core construction; [**glazing;**]and hinge and other applied hardware reinforcement.

Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

* + - * 1. Door and Frame Schedule: For stainless steel doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

Include a Cover Sheet that lists:

OGS project name, project number, and project address.

Manufacturer’s name, address, and telephone number.

Distributor’s name, address, and telephone number.

Shop drawing preparer’s name, and telephone number and e-mail address.

Submission date.

List by opening:

Door and Frame number and location by building and room name. Use same

reference numbers for openings and as those shown on Contract Drawings.

Door width, height, thickness, type, gage, and options

Frame type, width, height, jamb depth, gage, anchor type and options.

Door and frame elevations; head and jamb profiles and details; welding

requirements; and reinforcements.

Fire Rating.

Glass type.

Undercut.

Electric preparations, if any.

Hardware Set.

* + - * 1. Quality Control Submittals

Qualification Data: For door inspector.

Retain one of or both "Fire-Rated Door Inspector" and "Egress Door Inspector" subparagraphs below, or delete first two subparagraphs and retain third subparagraph. First paragraph applies to the IBC and NFPA 101. Second subparagraph applies to NFPA 101. Certification in third subparagraph below should be acceptable by all authorities having jurisdiction. See the Evaluations.

Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.

Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.

Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

* + - * 1. Product Test Reports: For each type of [**fire-rated stainless steel door and frame assembly**] [**fire-rated borrowed-lite assembly**] [**and**] [**windborne-debris impact resistance door**] for tests performed by a qualified testing agency indicating compliance with performance requirements.

Retain "Oversize Construction Certification" paragraph below for oversized fire-rated assemblies.

* + - * 1. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.
        2. Field quality control reports.
      1. CLOSEOUT SUBMITTALS
         1. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.
      2. QUALITY ASSURANCE
         1. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

Retain subparagraph below if requiring fire door inspectors to be certified under DHI's certification program. Verify, with authorities having jurisdiction, if other DHI certifications are acceptable, such as Architectural Hardware Consultant (AHC), Certified Door Consultant (CDC), and Architectural Openings Consultant (AOC).

Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

* + - * 1. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

Retain subparagraph below if requiring egress door inspectors to be certified under DHI's certification program. Verify, with authorities having jurisdiction, if other DHI certifications are acceptable, such as AHC, CDC, and AOC.

Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

* + - 1. DELIVERY, STORAGE, AND HANDLING
         1. Deliver stainless steel doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

Retain first paragraph below if required for welded frames. Temporary spreader bars are intended for shipping and handling purposes only.

* + - * 1. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
        2. Store stainless steel doors and frames under cover at Project site with head up. Place units on minimum 4-inch- high wood blocking.
        3. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

1. PRODUCTS

Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. MANUFACTURERS
      2. PERFORMANCE REQUIREMENTS

Revise "Fire-Rated Door Assemblies" paragraph below to allow neutral pressure testing if required and as acceptable to authorities having jurisdiction. Retain option if temperature-rise-rated assemblies are required.

* + - * 1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, acceptable to authorities having jurisdiction for fire-protection ratings[**and temperature-rise limits**] indicated on Drawings, based on testing at positive pressure according to NFPA 252 or UL 10C.

Retain "Oversize Fire-Rated Door Assemblies" subparagraph below if required by authorities having jurisdiction.

Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

Retain "Temperature-Rise Limit" subparagraph below if required, and coordinate with option in "Fire-Rated Assemblies" paragraph above. The IBC allows an exception for buildings equipped throughout with fire-suppression sprinklers.

Temperature-Rise Limit: [**Where indicated on Drawings**] [**At vertical exit enclosures and exit passageways**], provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

Retain "Smoke- and Draft-Control Door Assemblies" paragraph below if required. The IBC requires fire door assemblies to comply with smoke- and draft-control requirements in corridors, smoke barriers, and smoke partitions.

* + - * 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for some and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

Retain "Fire-Rated, Borrowed-Lite Frame Assemblies" paragraph below if applicable. Sidelites and transoms connected to door frames are tested with the doors as assemblies where required to be fire rated.

* + - * 1. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

Retain "Windborne-Debris Impact Resistance" paragraph below to suit Project. The IBC establishes criteria for buildings in hurricane-prone locations. In paragraph, "enhanced" option applies to essential facilities and has additional requirements. Verify requirements of authorities having jurisdiction. Verify which manufacturers have tested products and can demonstrate compliance. New York State is located in Wind Zone 2, edit if different requirements are needed for the Project.

* + - * 1. Windborne-Debris Impact Resistance: Passes ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone [**1**] [**2**] [**3**] [**4**] for [**basic**] [**enhanced**] protection.

Insert increased height if different from option in "Large-Missile Test" subparagraph below.

Large-Missile Test: For glazed openings located within [**30 feet**] <**Insert dimension**> of grade.

* + - 1. STAINLESS STEEL DOORS AND FRAMES
         1. Construct stainless steel door and frame assemblies to comply with NAAMM-HMMA 866 for the application indicated, including materials, fabrication methods, hardware reinforcement, tolerances, and clearances, and as specified. Comply with SDI ANSI/A250.4, for Physical Performance Level A.

NAAMM-HMMA 866 defines four applications for stainless steel doors and frames based on environment type: highly corrosive, moderately corrosive, clean room, and aesthetic. Retain "Doors and Frames for Highly Corrosive Environments," "Doors and Frames for Moderately Corrosive Environments," "Doors and Frames for Clean Room Environments," or "Doors and Frames for Aesthetic Environments" paragraph below to suit Project. See the Evaluations.

Retain "Doors and Frames for Highly Corrosive Environments" paragraph below for doors used in highly corrosive environments, or where doors and frames of that type of construction are required.

* + - * 1. Doors and Frames for Highly Corrosive Environments: [**At locations indicated in the Door and Frame Schedule**] <**Insert locations**>.

Stainless Steel Doors:

Type: As indicated in the Door and Frame Schedule.

Thickness: 1-3/4 inches.

Metal thickness options in "Face Sheets" subparagraph below correspond to obsolete 18, 16, and 14 gage, respectively. Minimum sheet thickness per NAAMM-HMMA 866 is 0.042 inch, but most manufacturers offer thicker sheets; verify availability with manufacturers. Thicknesses indicated are for stainless steel sheet, although NAAMM-HMMA 866 uses thickness for uncoated steel sheet.

Face Sheets: Type 316 stainless steel sheet, minimum thickness [**0.050 inch**] [**0.062 inch**] [**0.078 inch**].

Edge Construction: Continuously welded with no visible seam.

Retain first option in "Top and Bottom Edges" subparagraph below if using welded steel stiffeners. Retain second option if using laminated core.

Top and Bottom Edges: Closed with continuous stainless steel channels with minimum thickness of 0.062 inch, [**welded**] [**adhesive laminated**] to face sheets.

Provide flush top and bottom closures for exterior doors, with weep holes at bottom edge.

NAAMM-HMMA 866 indicates that welded steel stiffeners in "Core Construction" subparagraph below can mark face sheets and should only be used if finished appearance is not a concern. Revise second option if a specific foam-insulation core is required.

Core Construction: [**Welded steel-stiffened core**] [**Polyisocyanurate, polystyrene, or polyurethane laminated to face sheets**] [**Steel-stiffener core laminated to face sheets**].

Retain "Fire-Rated Core" subparagraph below in addition to any of last three subparagraphs above if required.

Fire-Rated Core: Manufacturer's standard [**vertical steel stiffener**] [**laminated mineral board**] core for fire-rated [**and temperature-rise-rated**]doors.

Stainless Steel Frames:

Materials: Type 316 stainless steel sheet.

Metal thickness options in "Door Frames for Openings 48 Inches Wide or Less" subparagraph below correspond to obsolete 16, 14, and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings 48 Inches Wide or Less: Fabricate from stainless steel sheet, minimum thickness [**0.062 inch**] [**0.078 inch**] [**0.109 inch**].

Metal thickness options in "Door Frames for Openings More Than 48 Inches Wide" subparagraph below correspond to obsolete 14 and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings More Than 48 Inches Wide: Fabricate from stainless steel sheet, minimum thickness [**0.078 inch**] [**0.109 inch**].

NAAMM-HMMA 866 recommends that knocked-down and slip-on frames be used only in drywall partitions, and that welded frames be used for transoms, sidelites, and borrowed lites. Revise "Construction" subparagraph below if knocked-down or slip-on frames are required for drywall partitions and welded frames for other applications.

Construction: [**Face welded**] [**Full profile welded**] [**Knocked down**] [**Slip on**].

Hardware Reinforcement: Stainless steel sheet.

Some manufacturers offer additional finishes.

Finish: ASTM A480 [**No. 4, Directional Satin**] [**No. 6, Dull Satin**] [**No. 8, Mirrorlike Reflective, Nondirectional Polish**] [**No. 2B, Bright, Cold-Rolled, Unpolished**].

Retain "Doors and Frames for Moderately Corrosive Environments" paragraph below for doors used in moderately corrosive environments, or where doors and frames of that type construction are required.

* + - * 1. Doors and Frames for Moderately Corrosive Environments: [**At locations indicated in the Door and Frame Schedule**] <**Insert locations**>.

Stainless Steel Doors:

Type: As indicated in the Door and Frame Schedule.

Thickness: 1-3/4 inches.

Metal thickness options in "Face Sheets" subparagraph below correspond to obsolete 18, 16, and 14 gage, respectively. Minimum sheet thickness per NAAMM-HMMA 866 is 0.042 inch, but most manufacturers offer thicker sheets; confirm availability of thicker sheet with manufacturers. Thicknesses indicated are for stainless steel sheet, although NAAMM-HMMA 866 used thickness for uncoated steel sheet.

Face Sheets: Type 304 stainless steel sheet, minimum thickness [**0.050 inch**] [**0.062 inch**] [**0.078 inch**].

Edge Construction: [**Continuously welded with no visible seam**] [**Interlocking or lock tab visible seam**] [**Intermittently welded visible seam**].

Retain first option in "Top and Bottom Edges" subparagraph below if using welded steel stiffeners. Retain second option if using laminated core.

Top and Bottom Edges: Closed with continuous stainless steel channels with minimum thickness of 0.062 inch, [**welded**] [**adhesive laminated**] to face sheets.

Provide flush top and bottom closures for exterior doors, with weep holes at bottom edge.

NAAMM-HMMA 866 indicates that welded steel stiffeners in "Core Construction" subparagraph below can mark face sheets and should only be used if finished appearance is not a concern. Revise second option if a specific foam-insulation core is required.

Core Construction: [**Welded steel-stiffened core**] [**Polyisocyanurate, polystyrene, or polyurethane laminated to face sheets**] [**Steel-stiffener core laminated to face sheets**].

Retain "Fire-Rated Core" subparagraph below in addition to any of last three subparagraphs above if required.

Fire-Rated Core: Manufacturer's standard [**vertical steel stiffener**] [**laminated mineral board**] core for fire-rated [**and temperature-rise-rated**]doors.

Stainless Steel Frames:

Materials: Type 304 stainless steel sheet.

Metal thickness options in "Door Frames for Openings 48 Inches Wide or Less" subparagraph below correspond to obsolete 16, 14, and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings 48 Inches Wide or Less: Fabricate from stainless steel sheet, minimum thickness [**0.062 inch**] [**0.078 inch**] [**0.109 inch**].

Metal thickness options in "Door Frames for Openings More Than 48 Inches Wide" subparagraph below correspond to obsolete 14 and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings More Than 48 Inches Wide: Fabricate from stainless steel sheet, minimum thickness [**0.078 inch**] [**0.109 inch**].

NAAMM-HMMA 866 recommends that knocked-down and slip-on frames be used only in drywall partitions, and that welded frames be used for transoms, sidelites, and borrowed lites. Revise "Construction" subparagraph below if knocked-down or slip-on frames are required for drywall partitions and welded frames for other applications.

Construction: [**Face welded**] [**Full profile welded**] [**Knocked down**] [**Slip on**].

Hardware Reinforcement: Stainless steel sheet.

Some manufacturers offer additional finishes.

Finish: ASTM A480 [**No. 4, Directional Satin**] [**No. 6, Dull Satin**] [**No. 8, Mirrorlike Reflective, Nondirectional Polish**] [**No. 2B, Bright, Cold-Rolled, Unpolished**].

Retain "Doors and Frames for Clean Room Environments" paragraph below for doors used in clean room environments, or where doors and frames of that type construction are required.

* + - * 1. Doors and Frames for Clean Room Environments: [**At locations indicated in the Door and Frame Schedule**] <**Insert locations**>.

Stainless Steel Doors:

Type: As indicated in the Door and Frame Schedule.

Thickness: 1-3/4 inches.

Metal thickness options in "Face Sheets" subparagraph below correspond to obsolete 18, 16, and 14 gage, respectively. Minimum sheet thickness per NAAMM-HMMA 866 is 0.042 inch, but most manufacturers offer thicker sheets; verify availability of thicker sheet with manufacturers. Thicknesses indicated are for stainless steel sheet, although NAAMM-HMMA 866 used thickness for uncoated steel sheet. Retain option for Type 316 stainless steel for increased corrosion resistance.

Face Sheets: [**Type 304**] [**Type 316**] stainless steel sheet, minimum thickness [**0.050 inch**] [**0.062 inch**] [**0.078 inch**].

Edge Construction: Continuously welded with no visible seam.

Retain first option in "Top and Bottom Edges" subparagraph below if using welded steel stiffeners. Retain fourth option if using laminated core. Retain continuously welded or sealed bottom options for locations requiring no seams to retain contaminants.

Top and Bottom Edges: Closed with continuous stainless steel channels with minimum thickness of 0.062 inch, [**intermittently welded**] [**intermittently welded and sealed**] [**continuously welded**] [**adhesive-laminated and sealed**] to face sheets.

NAAMM-HMMA 866 indicates that welded steel stiffeners in "Core Construction" subparagraph below can mark face sheets and should only be used if finished appearance is not a concern. Revise second option if a specific foam-insulation core is required. NAAMM-HMMA 866 recommends not using insulation in cores because they may absorb contaminants.

Core Construction: [**Welded steel-stiffened core, without insulation**] [**Polyisocyanurate, polystyrene, or polyurethane laminated to face sheets**] [**Steel-stiffener core laminated to face sheets**].

Retain "Fire-Rated Core" subparagraph below in addition to any of last three subparagraphs above if required.

Fire-Rated Core: Manufacturer's standard [**vertical steel stiffener**] [**laminated mineral board**] core for fire-rated [**and temperature-rise-rated**]doors.

Stainless Steel Frames:

In "Materials" subparagraph below, retain option for Type 316 stainless steel for increase corrosion resistance.

Materials: [**Type 304**] [**Type 316**] stainless steel sheet.

Metal thickness options in "Door Frames for Openings 48 Inches Wide or Less" subparagraph below correspond to obsolete 16, 14, and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches (1.34 mm), based on uncoated steel sheet.

Door Frames for Openings 48 Inches Wide or Less: Fabricate from stainless steel sheet, minimum thickness [**0.062 inch**] [**0.078 inch**] [**0.109 inch**].

Metal thickness options in "Door Frames for Openings More Than 48 Inches Wide" subparagraph below correspond to obsolete 14 and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings More Than 48 Inches Wide: Fabricate from stainless steel sheet, minimum thickness [**0.078 inch**] [**0.109 inch**].

Construction: Full profile welded.

Hardware Reinforcement: [**Stainless steel**] [**Uncoated steel**] [**Metallic-coated steel**] sheet.

Some manufacturers offer additional finishes.

Finish: ASTM A480 [**No. 4, Directional Satin**] [**No. 6, Dull Satin**] [**No. 8, Mirrorlike Reflective, Nondirectional Polish**] [**No. 2B, Bright, Cold-Rolled, Unpolished**].

Retain "Doors and Frames for Aesthetic Environments" paragraph below for doors used in aesthetic environments, or where doors and frames of that type construction are required.

* + - * 1. Doors and Frames for Aesthetic Environments: [**At locations indicated in the Door and Frame Schedule**] <**Insert locations**>.

Stainless Steel Doors:

Type: As indicated in the Door and Frame Schedule.

Thickness: 1-3/4 inches.

Metal thickness options in "Face Sheets" subparagraph below correspond to obsolete 18, 16, and 14 gage, respectively. Minimum sheet thickness per NAAMM-HMMA 866 is 0.042 inch, but most manufacturers offer thicker sheets; verify availability of thicker sheet with manufacturers. Thicknesses indicated are for stainless steel sheet, although NAAMM-HMMA 866 used thickness for uncoated steel sheet.

Face Sheets: Type 304 stainless steel sheet, minimum thickness [**0.050 inch**] [**0.062 inch**] [**0.078 inch**].

Edge Construction: Continuously welded with no visible seam.

Retain first option in "Top and Bottom Edges" subparagraph below if increased corrosion resistance is required. Retain third option if using welded steel stiffeners. Retain fourth option if using laminated core.

Top and Bottom Edges: Closed with continuous [**0.062-inch-thick stainless steel**] [**0.053-inch-thick metallic-coated steel**] channels**,** [**welded**] [**adhesive laminated**] to face sheets.

Provide flush top and bottom closures for exterior doors, with weep holes at bottom edge.

Revise second option in "Core Construction" subparagraph below if a specific foam-insulation core is required.

Core Construction: [**Honeycomb kraft paper**] [**Polyisocyanurate, polystyrene, or polyurethane**] [**Steel-stiffener core**] laminated to face sheets.

Retain "Fire-Rated Core" subparagraph below in addition to any of last three subparagraphs above if required.

Fire-Rated Core: Manufacturer's standard [**vertical steel stiffener**] [**laminated mineral board**] core for fire-rated [**and temperature-rise-rated**]doors.

Stainless Steel Frames:

Materials: Type 304 stainless steel sheet.

Metal thickness options in "Door Frames for Openings 48 Inches Wide or Less" subparagraph below correspond to obsolete 16, 14, and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings 48 Inches Wide or Less: Fabricate from stainless steel sheet, minimum thickness [**0.062 inch**] [**0.078 inch**] [**0.109 inch**].

Metal thickness options in "Door Frames for Openings More Than 48 Inches Wide" subparagraph below correspond to obsolete 14 and 12 gage, respectively. Thicknesses indicated are for stainless steel sheet; the minimum recommended thickness in NAAMM-HMMA 866 is 0.53 inches, based on uncoated steel sheet.

Door Frames for Openings More Than 48 Inches Wide: Fabricate from stainless steel sheet, minimum thickness [**0.078 inch**] [**0.109 inch**].

NAAMM-HMMA 866 recommends that knocked-down and slip-on frames be used only in drywall partitions, and that welded frames be used for transoms, sidelites, and borrowed lites. Revise "Construction" subparagraph below if knocked-down or slip-on frames are required for drywall partitions and welded frames for other applications.

Construction: [**Face welded**] [**Full profile welded**] [**Knocked down**] [**Slip on**].

In "Hardware Reinforcement" subparagraph below, retain second option for increased corrosion resistance.

Hardware Reinforcement: [**Uncoated steel**] [**Metallic-coated steel**] sheet.

Some manufacturers offer additional finishes.

Finish: ASTM A480/A480M [**No. 4, Directional Satin**] [**No. 6, Dull Satin**] [**No. 8, Mirrorlike Reflective, Nondirectional Polish**].

* + - 1. MATERIALS

Type 304 stainless steel in "Stainless Steel Sheet" paragraph below is most commonly used stainless steel alloy; Type 316 provides greater corrosion resistance. Other alloys are available for specialty applications; verify with manufacturer. Coordinate with door applications selected in "Stainless Steel Door and Frames" Article.

* + - * 1. Stainless Steel Sheet: ASTM A240, austenitic stainless steel, [**Type 304**] [**Type 316**] [**Type 304 or 316 as indicated**] <**Insert type**>.

Retain "Steel Sheet" paragraph below if uncoated steel is acceptable for internal components of doors.

* + - * 1. Steel Sheet: ASTM A1008 or ASTM A1011, commercial steel, Type B.

Retain "Metallic-Coated Steel Sheet" paragraph below if metallic-coated steel is acceptable for internal components of doors.

* + - * 1. Metallic-Coated Steel Sheet: ASTM A653, commercial steel, Type B; with minimum G60 or A60 metallic coating.

Retain "Foam-Plastic Insulation" paragraph below if retaining foam-plastic insulation core.

* + - * 1. Foam-Plastic Insulation: Manufacturer's standard [**polystyrene**] [**urethane**] board insulation with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84. Enclose insulation completely within door.

Retain "Mineral-Fiber Insulation" paragraph below for filling spaces between vertical steel stiffeners if retaining steel-stiffened core.

* + - * 1. Mineral-Fiber Insulation: Insulation made of rock-wool fibers, slag-wool fibers, or glass fibers.
        2. Inserts, Bolts, and Anchor Fasteners:

Retain one of the two subparagraphs below. Retain first subparagraph for stainless steel inserts, bolts, and anchor fasteners; retain second if steel inserts, bolts, and anchor fasteners are acceptable.

Stainless steel components complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2for bolts and nuts.

Hot-dip galvanized steel according to ASTM A153 or ASTM F2329.

* + - 1. STAINLESS STEEL PANELS

Retain this article for flush, hollow-core, stainless steel panels similar in construction to doors.

* + - * 1. Stainless Steel Panels: Same construction, materials, and finish as specified for adjoining stainless steel doors.
      1. FRAME ANCHORS
         1. Provide anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
         2. Postinstalled Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
         3. Number and Spacing:

Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c.

Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

Compression Type: Not less than two anchors in each jamb.

Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

* + - * 1. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

Retain "Floor Anchors for Concrete Slabs with Underlayment" subparagraph below when using flowable underlayment over slabs or floor structure.

Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

* + - * 1. Material:

Retain one of two subparagraphs below.

Stainless steel sheet. Same type as door face.

[**Steel sheet**] [**Metallic-coated steel sheet**], hot-dip galvanized according to ASTM A153, Class B.

* + - 1. FABRICATION
         1. Stainless Steel Door Fabrication: Provide doors rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.

Tolerances: Fabricate doors to tolerances indicated in NAAMM-HMMA 866.

Stops and Moldings: Factory cut openings in doors. Provide minimum 0.038-inch-thick, stainless steel stops and moldings around glazed lites. Form corners of stops and moldings with butted or mitered hairline joints.

Glazed Lites: Provide fixed stops and moldings welded on secure side of door.

Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

* + - * 1. Stainless Steel Frame Fabrication: Provide stainless steel frames rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal.

Tolerances: Fabricate frames to tolerances indicated in NAAMM-HMMA 866.

Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

Metal thickness options in "Borrowed-Lite Frames" subparagraph below correspond to obsolete 16, 14, and 12 gage, respectively.

Borrowed-Lite Frames: Fabricate from [**0.062-inch-**] [**0.078-inch-**] [**0.109-inch-**] thick, stainless steel sheet.

[**Sidelite**] [**and**] [**Transom**] Frames: Fabricate from stainless steel sheet of same thickness as adjacent door frame.

[**Mullions**] [**Rails**] [**and**] [**Transom Bars**]: Provide closed tubular members with no visible face seams or joints. Fasten members at crossings and to jambs by butt welding according to joint designs in NAAMM-HMMA 820.

Provide countersunk, flat-, or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

Door Silencers: Except on weather-stripped and gasketed frames, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.

Single-Door Frames: Drill stop in strike jamb to receive three door silencers.

Double-Door Frames: Drill stop in head jamb to receive two door silencers.

Stops and Moldings: Provide stops and moldings formed integrally with stainless steel frames around [**glazed lites**] [**and**] [**solid panels**], minimum 5/8 inch high unless otherwise indicated. Form corners of stops and moldings with butted or mitered hairline joints.

Loose Stops for Glazed Lites[**and Panels**]: 0.038-inch-thick, stainless steel.

Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.

Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each lite is capable of being removed independently.

Coordinate rabbet width between fixed and removable stops with type of glazing[**or panel**] and type of installation.

Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

Retain "Terminated Stops" subparagraph below if required. Do not use for labeled or other restricted openings. Terminated stops are also called "hospital stops."

Terminated Stops: Where indicated on Drawings for interior door frames, terminate stops 6 inches above finish floor with a [**45**] [**90**]-degree angle cut, and close open end of stop with stainless steel sheet closure. Cover opening in extension of frame with welded-stainless steel filler plate, with welds ground smooth and flush with frame.

Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

Grouted Frames:

Plaster Guards: Weld guards to frame at back of hardware mortises and mounting holes in frames to be grouted.

Reinforcement in "Head Reinforcement" subparagraph below is not a lintel for masonry construction.

Head Reinforcement: For frames more than 48 inches wide, provide continuous head reinforcement for full width of opening, welded to back of frame at head.

* + - * 1. Hardware Preparation: Factory prepare stainless steel doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule, and templates.

Reinforce doors to receive nontemplated mortised and surface-mounted door hardware.

Comply with ANSI/BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

* + - 1. FINISHES
         1. Stainless Steel Finishes: Remove tool and die marks and stretch lines, or blend into finish. Grind and polish surfaces to produce uniform finish, free of cross scratches. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
         2. Grain Direction: For finishes exhibiting grain, run grain vertically on door faces and frame jambs.
      2. ACCESSORIES
         1. Glazing: Comply with requirements in Section 088000 "Glazing."

Retain "Grout" and "Mineral-Fiber Insulation" paragraphs below if grouting of frames is required; delete both if grouting is not required. See the Evaluations for discussion.

NAAMM-HMMA 866 recommends that the maximum slump for grout be that indicated in "Grout" paragraph below because thinner grout will leak into grout-protected areas regardless of precautions.

* + - * 1. Grout: Comply with ASTM C476, with a slump of not more than 4 inches as measured according to ASTM C143.
        2. Mineral-Fiber Insulation: Insulation made of rock-wool fibers, slag-wool fibers, or glass fibers.

1. EXECUTION
   * + 1. PREPARATION

Retain first two paragraphs below for welded frames. Shipping spreaders in first paragraph are installed at the factory for temporary protection during shipping.

* + - * 1. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

Installation spreaders in first paragraph below are temporarily placed at frame bottom during installation to ensure alignment.

* + - * 1. Prior to installation and with installation spreaders in place, adjust and securely brace stainless steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

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

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

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

Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

* + - * 1. Drill and tap doors and frames to receive nontemplated mortised and surface-mounted door hardware.
      1. INSTALLATION
         1. Install stainless steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with approved Shop Drawings and with manufacturer's written instructions.
         2. Stainless Steel Frames:

Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, without damage to completed Work.

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

Install frames with removable glazing stops located on secure side of opening.

Fire-Rated Openings: Install frames according to NFPA 80.

Floor Anchors: Secure with postinstalled expansion anchors.

Retain first subparagraph below if permitted.

Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

Solidly pack mineral-fiber insulation inside frames.

In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors.

Installation Tolerances: Adjust stainless steel frames for squareness, alignment, twist, and plumb to the following tolerances:

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

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

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

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

Add text if grouting frames is required. Industry recommendations discourage grouting. See the Evaluations.

* + - * 1. Stainless Steel Doors: Fit and adjust stainless steel doors accurately in frames within clearances specified below:

Non-Fire-Rated Doors: Comply with NAAMM-HMMA 841 and NAAMM-HMMA 866.

Retain "Fire-Rated Doors" or "Smoke-Control Doors" subparagraph below if required.

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

Smoke-Control Doors: Install doors according to NFPA 105.

* + - * 1. Glazing: Install glazing in sidelites, transoms, and borrowed lites to comply with installation requirements in Section 088000 "Glazing."
      1. FIELD QUALITY CONTROL
         1. Inspection Agency: [] [**Engage**] a qualified inspector to perform inspections and to furnish reports to Director’s Representative.
         2. Inspections:

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.

Egress Door Inspections: Inspect each door equipped with 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 according to NFPA 101, Section 7.2.1.15.

* + - * 1. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
        2. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.
        3. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in [**NFPA 80**] [**and**] [**NFPA 101**].
      1. ADJUSTING AND CLEANING
         1. Clean grout and other bonding material off stainless steel doors and frames immediately after installation.
         2. Stainless Steel Touchup: Immediately after erection, smooth any scratched or damaged areas of stainless steel; polish to match undamaged finish.

END OF SECTION 081119