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DIVISION 08 - OPENINGS

SECTION 08 13 73.00 40

SLIDING METAL DOORS

06/06

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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.

ASTM INTERNATIONAL (ASTM)

ASTM A 307	(2004) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 325	(2004b) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 325M	(2004b) Standard Specification for Structural Steel Bolts, Steel, Heat Treated 830 Mpa Minimum Tensile Strength (Metric)
ASTM A 36/A 36M	(2005) Standard Specification for Carbon Structural Steel
ASTM B 136	(2003) Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum
ASTM B 137	(1995; R 2004) Standard Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum
ASTM B 209	(2004) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(2004) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM F 568M	(2004) Standard Specification for Carbon and Alloy Steel Externally Threaded Metric Fasteners

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2003) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 1	(2000; R 2005) Standard for Industrial Control and Systems General Requirements

NEMA ICS 2 (1996; R 2004) Standard for Industrial Control and Systems: Controllers, Contractors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC: Part 8 - Disconnect Devices for Use in Industrial Control Equipment

NEMA ICS 6 (2001) Standard for Industrial Controls and Systems Enclosures

U.S. DEPARTMENT OF DEFENSE (DOD)

MS MIL-A-8625 (2003f) Anodic Coatings, for Aluminum and Aluminum Alloys

MS MIL-R-3065 (2000e) Rubber, Fabricated Products

UNDERWRITERS LABORATORIES (UL)

UL 506 (2005) Standard for Specialty Transformers

1.2 PERFORMANCE REQUIREMENTS

Design Analysis and Calculations must meet design specifications as required by referenced standards within this section.

Equipment and Performance data for Sliding Door Assemblies and Hardware and Accessories must meet design specifications as required by referenced standards within this section.

1.2.1 Door Performance

Provide an electrically operated door with manual mechanism, industrial type constructed of ASTM A 36/A 36M [structural steel sections] [formed plates] sized for loads specified.

Provide doors of the [one-way sliding] [and] [biparting double-leaf] type as indicated [supported on recessed rails set in floor with top guides]. Furnish doors complete with hardware, tracks, guides, and accessories.

Leaves of exterior biparting doors must be designed as follows:

- a. Windload of [2400] [_____] pascal [50] [_____] pounds per square foot (psf)
- b. Windload deflection not to exceed [_____] [the door height in millimeter inches divided by 120] [_____].
- c. Interior horizontal sliding doors must withstand designed an internal pressure of [500] [_____] pascal, [10] [_____] psf, both directions.
- d. Door operating speed must be [0.15] [_____] meter per second [30] [_____] feet per minute (fpm) maximum and [0.08] [_____] meter per second [15] [_____] fpm minimum.

Doors must require operating personnel to walk with leaf as it moves. Each door leaf must have separate drive units, [driving one or more wheels]. Each leaf must have [motor-mounted, spring-set,] [_____]

[solenoid-released] motor brake. Each leaf must move independently from other leaves.

[Personnel door must be interlocked to prevent movement of the leaf, or group in which it is located, when the personnel door is open.]

1.2.2 Seal Performance

Pressure must keep doors closed and hold center seals tight. When power fails, a braking device must hold each door shut and maintain seals.

When pressure is applied to the OPEN button, seals must automatically deflate before doors open. Upon deflation of pressure in each seal switches [connected in series] must energize door-open controller. Every seal must deflate properly before permitting doors to move. Coordinate controls with this operating sequence for seals and door movement.

1.3 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. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" 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.

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.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submit the following drawings in accordance with paragraph entitled, "Drawings," of this section.

Fabrication Drawings
Installation Drawings

Submit the following for electrical door operating units in accordance with paragraph entitled, "Electrical Power Operators for Sliding Doors," of this section.

Connections Diagrams
Schematics

SD-03 Product Data

Submit manufacturer's catalog product data for the following items:

Insulation
Doors
Electric Power Operators
Pneumatic Seals
Weatherstripping
Flush Doors
Rails
Hardware and Accessories
Paint

SD-05 Design Data

Equipment and performance data for the following items must be in accordance with the requirements stated in the paragraph entitled, "Performance Requirements," of this section.

Sliding Door Assemblies
Hardware and Accessories

Submit [Design Analysis and Calculations](#) in accordance with paragraph entitled, "Performance Requirements," of this section.

SD-07 Certificates

Submit certificates for the following showing conformance with referenced standards contained in this section.

Insulation
Doors
Electric Power Operators
Pneumatic Seals
Rails
Hardware and Accessories
Paint

SD-10 Operation and Maintenance Data

Submit [Operation and Maintenance Manuals](#) for sliding door assemblies in accordance with paragraph entitled, "Operation and

Maintenance," of this section.

1.4 GENERAL REQUIREMENTS

NOTE: If Section 26 00 00.00 40 ELECTRICAL is not included in the project specifications, applicable requirements therefrom should be inserted and the following paragraph deleted.

Section 26 00 00.00 40 ELECTRICAL applies to work specified in this section.

Conform to the requirements of Underwriters Laboratories, Inc., for motors.

Conform to the requirements of Underwriters Laboratories, Inc., for wiring.

Conform to the requirements of Underwriters Laboratories, Inc., for controls.

1.5 DRAWINGS

Provide Fabrication Drawings with framing member details, welding details, and finish and painting details for sliding door assemblies.

Provide Installation Drawings with type and location of hardware, framing details, and rough opening dimensions and details for horizontal door and biparting door systems.

1.6 OPERATION AND MAINTENANCE

Contractor shall submit [6] [_____] copies of the Operation and Maintenance Manuals for sliding door assemblies. Update data and resubmit for final approval no later than 30 calendar days prior to contract completion.

Operation and Maintenance Manuals must be consistent with manufacturer's standard brochures, schematics, printed instructions, general operating procedures, and safety precautions. Test data must be legible and of good quality. Light-sensitive reproduction techniques are acceptable, provided finished pages are clear, legible, and not subject to fading. Pages for vendor data and manuals must have 10 millimeter 3/8 inch holes and be bound in 3-ring, loose-leaf binders. Data must be organized by separate index and tabbed sheets, in a loose-leaf binder. Binder must lie flat with printed sheets that are easy to read. Caution and warning indications must be clearly labeled.

Contractor shall provide classroom and field instructions in operation and maintenance of systems equipment where required by the technical provisions. These services shall be directed by the Contractor, using the manufacturer's factory trained personnel or qualified representatives. Contracting Officer shall be given 7 calendar days written notice of scheduled instructional services. Instructional materials belonging to the manufacturer or vendor, e.g., lists, static exhibits, visual aids, shall be made available to the Contracting Officer.

PART 2 PRODUCTS

2.1 INSULATION

Cement insulation with a thermal conductance of [0.74] [_____] watt per square meter per degrees C U-factor of [0.13] [_____] using [mastic] [_____] applied to the interior face of exterior doors.

2.2 DOORS

Leaf sections must be welded construction. Provide joints to develop 100 percent of the strength of the framing members. Members may be prefabricated for field assembly. When using bolts, conform to ASTM A 325M ASTM A 325 for fastening main members. Bolts conforming to ASTM F 568M ASTM A 307 are permitted for fastening secondary members.

Vertical members must be continuous throughout the height of the door. Members adjoining each other at splices must be made to facilitate field assembly. Framing members must be true to dimensions and square in all directions. No leaf must be out of line in vertical or horizontal plane of the door opening by [3 millimeter in 6100 millimeter 1/8 inch in 20 feet] [_____] maximum.

Provide [full-depth members] [gusset plates at the one-third points] for lateral support to all main vertical members. Diagonal bracing must support the leaf assembly to withstand shipping, assembly, and operational loads. Provide ground smooth welds.

Fabricate cover sheets from [1.2] millimeter [0.050] inch [_____] thick (minimum) [aluminum] [_____] facing, [Alloy 3003] [_____] , meeting ASTM B 209M ASTM B 209 requirements. Provide [ribbed] [fluted] finish. Joints must be the [butt] [_____] type showing a minimum crack. Reinforce to ensure rigid construction and prevent warping and sagging.

Seal cover sheets with an approved calking compound. Fasten to frame with corrosion-resistant [steel] [_____] fasteners [230] millimeter [9] inch [_____] on center. Where flat sheets are attached as either covering or linear sheets, do not exceed [2.3] square meter [25] square feet [_____] for unsupported areas.

2.3 ELECTRICAL POWER OPERATORS FOR SLIDING DOORS

Connections Diagrams for electric-power operators must show complete wiring details.

Schematics must indicate recommended voltages and amperage for wiring systems.

Furnish electric power operators complete with electric motor, reduction gearing, brackets, cables, brakes, controls, starter, limit switches, and accessories for door operation.

Door operator must allow motor to be removed without affecting limit switch system and auxiliary operators. Provision must be made for manual door operation.

Motors must operate at [480] [_____] volts, [3] [_____] -phase, 60 hertz and of sized to move the doors in either direction from any position.

Provide motor overload relays as indicated. Provide weatherproof enclosures for motors and gear systems.

2.3.1 Controls

Each door motor must have an enclosed, reversing [across-the-line magnetic] starter and include: disconnect switches, thermal overload protection, limit switches, [two remote control switches,] and [solenoid operated] brake. Enclosure must be NEMA 250, Type 1 or Type 12. Conform to NEMA ICS 1 and NEMA ICS 2 for control equipment.

Equip control doors with [_____] [constant pressure pushbuttons mounted on door leaves. Removing pressure from button shall stop movement of leaves]. [Pushbuttons must be full-guarded.] [Interior pushbuttons shall be mushroom head type, mounted in heavy duty, oil tight enclosures conforming to NEMA ICS 6, Type 13.] [Exterior pushbuttons must be in watertight enclosures conforming to NEMA ICS 6, Type 4.]

Provide weatherproof [remote control switches mounted on exterior of a building, key operated type having a [corrosion resistant metal] cover.]

Limit switches must stop doors in the fully opened and closed positions. Limit switches must be readily adjustable.

2.3.2 Transformer

Conform to UL 506 for control transformers.

2.3.3 Safety Device

Provide door bottom [2100] millimeter [7] feet [_____] of door leaf must have door edge devices. Attach at each end of each leaf. Devices must stop door upon contact with obstructions. Do not substitute safety devices for limit switches. Coordinate safety devices with the sealing requirements at the meeting rails of the door.

2.4 PNEUMATIC SEALS AND WEATHERSTRIPPING

Fabric reinforced seals fabricated from butyl compound must meet the requirements of MS MIL-R-3065 [and capable of withstanding 3 parts per million ozone in air for 50 hours, elongated 100 percent at 38 degrees C 100 degrees F].

Operate seals using a [_____] [1200 kilopascal 175-pound per square inch (psi)] pressure system regulated to [0 to 100] kilopascal [0-15] psi [_____] operating pressure. System must be capable of inflating [1-1/2] inches [40] millimeter [_____] from a deflated height of 25 millimeter 1 inch to seal an overall gap of 50 millimeter 2 inch maximum.

Mold corners of seals to form bonded corners. Hold seals in place by [extruded aluminum] [_____] retainers and anchor to an [adjusting angle] [_____] with [corrosion resistant steel] [_____] fasteners [set in calking] and spaced at intervals of [150] millimeter [6] inch [_____] .

Center seals between leaves on biparting doors must be [smooth-surfaced compressible rubber strips] [_____] at leading edges. [Rubber must have a compressibility of [25] [_____] percent with recovery factor of [90] [_____] percent.]

Provide weatherstripping with [aluminum] [corrosion-resistant steel]
[_____] brake metal strips at head, sills, and jambs of doors.

Provide a removable [aluminum] [_____] hood over each door track and door
operating mechanism. [Aluminum hood must be same as for door cover sheets].

Sliding doors must have a deflating valve for pneumatic seals.

Provide a release for "hold shut" brake.

Hand-operated valves in each air line must permit manual deflation of each
door seal.

2.5 PERSONNEL DOORS

**NOTE: Delete the following paragraph when personnel
doors are not required.**

Provide manufacturer's standard **Flush Doors** of [aluminum type,] [_____] size as indicated, complete with hardware and airtight seals.

2.6 RAILS

Provide [steel] [_____] rails for horizontal sliding doors of [18 kilogram
40 pound ASCE] [as indicated].

2.7 HARDWARE AND ACCESSORIES

2.7.1 Hardware

Hardware must consist of top guide rollers, bottom rollers, track cleaners, toe guards, and manual operators as part of the finished door, with other items noted or required for a complete installation.

2.7.2 Top Guide Rollers

Provide top guide rollers of the [horizontal] [_____] type [with single wheel] [as indicated]. Provide rollers of [steel] [malleable iron] [cast iron] and sized for load conditions. Rollers must have [permanently lubricated] [_____] anti-friction bearings. Construct assemblies allowing removal. Construct top roller assemblies to transmit the load from the door to the building structure.

2.7.3 Bottom Rollers

Provide bottom rollers of [double-flanged cast steel] [welded pressed steel] [_____] having minimum tread diameter of [455] millimeter [18] inch [_____] . When the door leaf height-to-width exceeds 3, provide adjustable rollers. Construct rollers for removal without removing the door leaf from rail.

Treads must have bearing seats. Horizontal clearance between the wheel and the rail must be [3] millimeter [1/8] inch [_____] maximum at the bottom and [6] millimeter [1/4] inch [_____] maximum at edge of flanges.

Provide bearing seats must fit meeting the bearing manufacturer's requirements. Bearings of [ball] [roller] type arranged to ensure that

vertical loads and horizontal wind loads will be transmitted from leaves to wheels. Bearings with seals must retain grease and prevent the entrance of dirt. Equip bearings with high-pressure grease fittings.

2.7.4 Track Cleaners

Provide door leaves of cleaners to clear debris from the rail head and wheel flange grooves as the leaf is moved.

2.7.5 Toe Guards

Attach an adjustable full-length flexible toe guard reaching to the floor to the exterior bottom edge of each leaf of biparting doors.

2.7.6 Warning Device

Provide alarms with each leaf which signals door movements. Device must be [electronically] [electrically] [mechanically] activated.

2.7.7 Track Bumpers

When limit switch fails, bumpers must limit door travel and will automatically stop the door.

2.7.8 Drive Clutch

When power is not applied, disengage a clutch the door drives.

2.7.9 Manual Operators

A manual [removable crank] [hand wheel] device that open doors. [Door leaf must have readily accessible brackets for crank storage.]

2.8 SPECIAL FINISHES

Provide surfaces of [aluminum] [_____] doors with [an anodic] [_____] coating conforming to [MS MIL-A-8625, Type II] [_____] ; coating must be sealed. Weight and effectiveness of sealing and coating(s) must be determined in accordance with [ASTM B 137 and ASTM B 136] [_____] . Apply [_____] coat(s) of [a clear [methacrylate lacquer] [_____]] to [_____] surfaces prior to shipment.

2.9 SHOP PAINTING

Paint [steel] [_____] portions of doors with [_____] coats of manufacturer's standard [rust-inhibitive] [Paint](#).

Paint [aluminum] [_____] surfaces which contact dissimilar metals with bituminous paint.

PART 3 EXECUTION

3.1 INSTALLATION

Prepare openings prior to door installation in accordance with drawings. Install doors in accordance with manufacturer's directions and as shown on drawings.

3.2 TESTING

Test doors in the presence of a representative of the door manufacturer and the Contracting Officer. Testing must consist of [10] complete opening and closing cycles for each individual door, each pair of doors, and [three] complete manual cycles. On the fifth and tenth cycles, check, the inflatable seals for wear and leakage. Switches must function properly, and operation of doors must be smooth.

A successful soap-bubble test made with the doors closed must show an airtight condition.

-- End of Section --