SECTION 08 36 13

SECTIONAL OVERHEAD DOORS

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 in the text by the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A227/A227M	(2006; R 2011) Standard Specification for Steel Wire, Cold-Drawn for Mechanical Springs
ASTM A229/A229M	(2012) Standard Specification for Steel Wire, Oil-Tempered for Mechanical Springs
ASTM A36/A36M	(2014) Standard Specification for Carbon Structural Steel
ASTM A653/A653M	(2015; E 2016) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B221	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2013) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM E330/E330M	(2014) Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference

DOOR AND ACCESS SYSTEM MANUFACTURERS ASSOCIATION (DASMA)

ANSI/DASMA 102	(2011) Specifications for Sectional Overhead-Type Doors
ANSI/DASMA 108	(2005) Standard Method for Testing Sectional Garage Doors and Rolling Doors: Determination of Structural Performance Under Uniform Static Air Pressure Difference

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 500	(2006) Metal Finishes Manual

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	(2000; R 2015) Standard for Industrial Control and Systems: General Requirements
NEMA ICS 2	(2000; R 2005; Errata 2008) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2011) Industrial Control and Systems: Enclosures
NEMA MG 1	(2016) Motors and Generators
NEMA ST 20	(1992; R 1997) Standard for Dry-Type Transformers for General Applications

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2017) National Electrical Code

UNDERWRITERS LABORATORIES (UL)

UL 325	(2013; Reprint Dec 2016) UL Standard for Safety Door, Drapery, Gate, Louver, and Window Operators and Systems

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

SD-02 Shop Drawings

Doors; G

Show types, sizes, locations, metal gages including minimum metal decimal thickness, hardware provisions, installation details, and other details of construction. For electrically-operated doors, include supporting brackets for motors, location, type, and ratings of motors, switches, and safety devices.

SD-03 Product Data

Doors; G

Electric operators; G

For electrically motor-operated doors, submit manufacturer's wiring diagrams for motor and controls.

SD-08 Manufacturer's Instructions

Doors

SD-10 Operation and Maintenance Data

Doors; G

Submit Data Package 2 in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.3 DELIVERY, STORAGE, AND HANDLING

Protect doors and accessories from damage during delivery, storage, and handling. Clearly mark manufacturer's brand name. Store doors in dry locations with adequate ventilation, free from dust and water. Remove damaged items and provide new. Provide easy access for inspection and handling of overhead doors prior to installation.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Hard-Drawn Springwire

ASTM A227/A227M.

2.1.2 Oil-Tempered Springwire

ASTM A229/A229M.

2.1.3 Steel Sheet

ASTM A653/A653M.

2.1.4 Steel Shapes

ASTM A36/A36M.

2.1.5 Aluminum Extrusions

ASTM B221, Alloy 6063-T5.

2.1.6 Aluminum Sheets and Strips

ASTM B209, alloy and temper best suited for the purpose.

2.1.7 Glass

Fully tempered, clear float glass 1/8 inch thick.

2.2 DOORS

Doors shall comply with ANSI/DASMA 102. Metal doors to have horizontal sections hinged together which operate in a system of tracks to completely close the door opening in the closed position and make the full width and height of the door opening available for use in the open position. Provide a permanent label on the door indicating the name and address of the manufacturer. Provide doors with one of the following (as specified in contract drawings):

a. standard lift type designed to slide up and back into a horizontal overhead position and requiring a maximum of 16 inch of headroom for 2 inch tracks and 21 inch of headroom for 3 inch tracks;

b. low headroom type designed to slide up and back into a horizontal overhead position and requiring a maximum of 10 inch of headroom for 2 inch tracks and 12 inch of headroom for 3 inch tracks;

c. high lift type designed to slide up and back into a combination vertical and horizontal position;

d. vertical lift type designed to slide upward into a vertical position.

Doors operate by lifting handles; by hand chain with gear or sprocket reduction; by hand crank with gear or sprocket reduction; or by electric power with auxiliary hand chain operation (as specified in the contract drawings).

2.3 DESIGN REQUIREMENTS

Design wind load shall conform to the design wind load for the building of door area without damage. Doors shall be tested in accordance with either ASTM E330/E330M or ANSI/DASMA 108 and shall meet the acceptance criteria of ANSI/DASMA 108.

2.4 FABRICATION

2.4.1 Steel Overhead Doors

Form door sections of hot-dipped galvanized steel not lighter than 20 gage with longitudinal integral reinforcing ribs or 24 gage with longitudinal integral reinforcing ribs and flat bottom V-grooves. Install sections not less than 2 inch in thickness. Meeting rails to have interlocking joints to ensure a weathertight closure and alignment for full width of the door. Provide sections of the height indicated or the manufacturer's standard. Do not exceed thick 24 inch height for intermediate sections. Bottom sections may be varied to suit door height. Do not exceed 30 inch height for bottom section. Provide glass panels if indicated and install panels using manufacturer's standard for rubber gaskets.

2.4.1.1 Insulated Sections

Insulate door sections with plastic foam or other material providing a "U" factor of 0.27 or less. Cover interior of door sections with steel sheets

of not lighter than 27 gage to completely enclose the insulating material.

2.4.1.2 Aluminum Sections

At the Contractor's option, door sections may be constructed of aluminum in lieu of steel. Provide the same structural and thermal properties for aluminum sections as specified for steel sections.

2.4.2 Tracks

Provide galvanized steel tracks not lighter than 14 gage thick for 2 inch tracks and not lighter than 12 gage thick for 3 inch tracks. Provide galvanized steel vertical tracks with continuous galvanized steel angle not lighter than 13 gage for installation to walls. Incline vertical track through use of adjustable brackets to obtain a weathertight closure at jambs. Reinforce horizontal track with galvanized steel angle; support from track ceiling construction with galvanized steel angle and cross bracing to provide a rigid installation.

2.4.3 Hardware

Provide hinges, brackets, rollers, locking devices, and other hardware required for complete installation. Install roller brackets and hinges with 14 gage galvanized steel. Provide rollers with ball bearings and case-hardened races. Provide reinforcing on doors where roller hinges are connected. Provide a positive locking device and cylinder lock with two keys on manually operated doors.

2.4.4 Counterbalancing

Counterbalance doors with an oil-tempered, helical-wound torsional spring mounted on a steel shaft. Provide adjustable spring tension, connect spring to doors with cable through cable drums. Provide cable safety factor of at least 5 to 1.

2.5 MANUAL OPERATORS

2.5.1 Pushup Operators

Provide lifting handles on both sides of door. Do not exceed the lesser of 10 percent of the door weight or 25 pounds for the maximum lifting force of required to operate the door. Provide pulldown straps or ropes at bottom of doors over 7 feet high.

2.5.2 Chain Hoist Operators

Provide a galvanized, endless chain operating over a sprocket. Extend chain to within 4 feet of the floor and mount on inside of building. Obtain reduction by use of roller chain and sprocket drive or gearing. Provide chain cleat and pin for securing operator chain. Allow for future installation of power operators to chain hoist operator. Do not exceed the maximum lifting force of 35 pounds required to operate the door.

2.6 ELECTRIC OPERATORS

2.6.1 Operator Features

Operators shall be labeled and listed to the requirements of UL 325. Provide operators of the drawbar type or side mount (jack shaft) type as

recommended by the manufacturer. Include operators with electric motor, machine-cut reduction gears, steel chain and sprockets, magnetic brake, brackets, pushbutton controls, limit switches, magnetic reversing contactor, a manual chain hoist operator for emergency use, and other accessories necessary for operation. Design electric operator so motor may be removed without disturbing the limit switch timing and without affecting the manual operator. Provide the operator with slipping clutch coupling to prevent stalling the motor. Provide a clutch controlled emergency manual operator so that it may be engaged and disengaged from the floor; do not affect limit switch timing by operation. The manual operator is not required if door can be manual-pushup operated with a force not to exceed 25 pounds. Provide an electrical or mechanical device that disconnects the motor from the operating mechanism when the manual operator is engaged.

2.6.2 Motors

NEMA MG 1, high-starting torque, reversible type with sufficient horsepower and torque output to move the door in either direction from any position. Provide a motor to produce a door travel speed of not less than 8 inch or more than one foot per second without exceeding the rated capacity. Motors shall be operate on current of the characteristics indicated at not more than 3600 rpm. Single-phase motors shall not have commutation or more than one starting contact. Provide motor enclosures with drip-proof type or NEMA TENV type.

2.6.3 Controls

Provide a motor for each door with an enclosed, across-the-line type, magnetic reversing contactor, thermal overload and undervoltage protection, solenoid-operated brake, limit switches, and control switches. Locate control switches at least 5 feet above the floor so the operator will have complete visibility of the door at all times. Provide control equipment to conform to NEMA ICS 1 and NEMA ICS 2. Provide control enclosures with NEMA ICS 6, Type 12 or Type 4, except that contactor enclosures may be Type 1. Provide a three-button type control switch stations with buttons marked "OPEN," "CLOSE," and "STOP." The "OPEN" and "STOP" buttons shall require only momentary pressure to operate. The "CLOSE" button shall require constant pressure to maintain the closing motion of the door. If the door is in motion and the "STOP" button is pressed or the "CLOSE" button released, the door shall stop instantly and remain in the stop position; from the stop position, the door may be operated in either direction by the "OPEN" or "CLOSE" button. Pushbuttons shall be full-guarded to prevent accidental operation. Provide limit switches to automatically stop doors at the fully open and closed positions. Limit switch positions shall be readily adjustable.

2.6.4 Entrapment Protection Devices

Entrapment protection devicesshall be provided for electrically-operated doors in accordance with UL 325. These devices shall immediately stop and reverse the door in its closing travel upon sensing an obstruction in the door opening or upon failure of the device or any component of the control system. Any momentary door-closing circuit shall be automatically locked out and the door shall be operable manually or with constant pressure controls until the failure or damage has been corrected. No entrapment protection device shall be used as a limit switch, unless its function is specifically intended to do so.

2.6.5 Control Transformers

NEMA ST 20. Provide transformers in power circuits as necessary to reduce the voltage on the control circuits to 120 volts or less.

2.6.6 Electrical Components

NFPA 70. Furnish manual or automatic control and safety devices, including extra flexible Type SO cable and spring-loaded automatic takeup reel or equivalent device, for operation of the doors. Conduit wiring and mounting of controls are specified in the corresponding electrical specification section.

2.6.7 Hazardous Locations

Conform to NFPA 70 In addition to meeting other requirements specified, electrical materials, equipment, and devices for installation in hazardous locations and be specifically approved by Underwriters Laboratories or by an independent testing agency using equivalent standards, for the particular chemical group and the class and division of hazardous location involved.

2.7 WEATHER SEALS AND SENSING EDGES

Provide exterior doors with weatherproof joints between sections by means of tongue-and-groove joints, rabbetted joints, shiplap joints, or wool pile, vinyl or rubber weatherstripping; a rubber, or vinyl adjustable weatherstrip at the top and jambs; and a compressible neoprene or rubber weather seal attached to the bottom of the door. On exterior doors that are electrically operated, where a sensing edge is employed, the bottom seal shall be combination compressible weather seal and sensing edge for stopping and reversing door movement. On interior doors that are electrically operated , where a sensing edge is employed, the bottom seal shall be a compressible type of sensing edge for stopping and reversing door movement.

2.8 FINISHES

Hot-dip galvanize concealed metal surfaces and tracks in accordance with ASTM A123/A123M. Hot-dip galvanized and other ferrous metal surfaces, except rollers and lock components, which are galvanized or plated shop primed.

2.8.1 Galvanized and Shop Primed

Provide a zinc coating on specified surfaces, a phosphate treatment, and a shop prime coat of rust-inhibitive paint. Conform to ASTM A653/A653M for galvanized coating, coating designation G60, for steel sheets, and ASTM A123/A123M for assembled steel products. The weight of coatings for assembled products shall be as designated in Table I of ASTM A123/A123M for the class of material to be coated. Provide a prime coat especially developed for materials treated by phosphates and adapted to application by dipping or spraying. Repair damaged zinc-coated surfaces with galvanizing repair paint and spot prime. At the Contractor's option, a two-part system including bonderizing, baked-on epoxy primer, and baked-on enamel topcoat may be applied in lieu of prime coat specified.

2.8.2 Aluminum

Provide a clear anodized finish to aluminum surfaces in accordance with AA-M10-C22-A41 contained in AA DAF45 and NAAMM AMP 500. Pretreat exposed surfaces and apply a baked-on enamel finish in accordance with manufacturer's standard.

PART 3 EXECUTION

3.1 INSTALLATION

NFPA 70. Install doors in accordance with approved shop drawings and manufacturer's written installation instructions. Lubricate and adjust doors to operate freely.

Provide a weathertight installation and free from warp, twist, or distortion. Adjust and lubricate doors to operate freely.

Provide all items and accessories for a complete installation in every respect.

3.2 ELECTRICAL WORK

NFPA 70. Conduit, wiring, and mounting of controls.

3.3 TESTING

After installation is complete, operate doors to demonstrate installation and function of operators, safety features, and controls. Correct deficiencies.

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