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proprietary profile.

7. Size and location of glazed panels

8. Location of motors and control stations.

PART 1 GENERAL

1.1 REFERENCES

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

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

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

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

ALUMINUM ASSOCIATION (AA)

AA DAF-45	(2003) Designation System for Aluminum Finishes
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ASTM INTERNATIONAL (ASTM)

ASTM A 36/A 36M	(2004) Standard Specification for Carbon Structural Steel
ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 227/A 227M	(1999) Steel Wire, Cold-Drawn for Mechanical Springs
ASTM A 229/A 229M	(1999) Steel Wire, Oil-Tempered for Mechanical Springs
ASTM A 653/A 653M	(2004a) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or

	Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM B 209M	(2004) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B 209	(2004) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 221M	(2002) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B 221	(2002) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM C 1363	(1997) Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus
ASTM E 330	(2002) Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

DOOR AND ACCESS SYSTEM MANUFACTURERS ASSOCIATION (DASMA)

DASMA 102	(1996) Sectional Overhead Type Doors
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NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MFM	(1988) Metal Finishes Manual
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NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	(2000) Industrial Control and Systems General Requirements
NEMA ICS 2	(2000) Industrial Control and System: Controllers, Contractors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993; R 2001) Industrial Control and Systems Enclosures
NEMA MG 1	(2003) Motors and Generators
NEMA ST 20	(1992; R 1997) Dry-Type Transformers for General Applications

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005) National Electrical Code 2005 Edition
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1.2 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions

in Section 01330 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 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors[; G][; 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][; G, [_____]]

[Electric operators[; G][; 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][; G, [_____]]

Submit Data Package 2 in accordance with Section 01781 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 A 227/A 227M.

2.1.2 Oil-Tempered Springwire

ASTM A 229/A 229M.

2.1.3 Steel Sheet

ASTM A 653/A 653M.

2.1.4 Steel Shapes

ASTM A 36/A 36M.

2.1.5 Aluminum Extrusions

ASTM B 221MASTM B 221, Alloy 6063-T5.

2.1.6 Aluminum Sheets and Strips

ASTM B 209MASTM B 209, alloy and temper best suited for the purpose.

2.1.7 Glass

Fully tempered, clear float glass [3] [1/8] [_____] mm inch thick.

2.2 DOORS

NOTE: DASMA 102 designates doors as follows:

Residential. Intended for use in residential garage, normally operated less than 1,500 cycles per year.

Commercial. Intended for vehicular use at entrances of commercial buildings such as loading docks and service stations, normally operated less than 5,000 cycles per year.

Industrial. Intended for vehicular use at entrances of parking garages, factories, and manufacturing plants, normally operated in excess of 5,000 cycles per year.

If profile is indicated and there is a requirement for matching, add "Profile of panels match profile indicated."

DASMA 102. [Residential] [Commercial] [Industrial] doors. 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 [standard lift type designed to slide up and back into a horizontal overhead position and requiring a maximum of 400 mm 16 inch of headroom for 50 mm 2 inch tracks and 535 mm 21 inch of headroom for 75 mm 3 inch tracks] [low headroom type designed to slide up and back into a horizontal overhead position and requiring a maximum of 250 mm 10 inch of headroom for 50 mm 2 inch tracks and 300 mm 12 inch of headroom for 75 mm 3 inch tracks] [high lift type designed to slide up and back into a combination vertical and horizontal position] [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] [by electric power with auxiliary hand chain operation].

2.3 DESIGN REQUIREMENTS

NOTE: Insert design wind load for the building if not shown on the drawings.

Conform to DASMA 102 [and] [conform to the design mind load for the building] [except that design wind load [[_____] kilopascals pounds per square foot]]. Provide doors to remain operable and undamaged after conclusion of tests conducted in accordance with ASTM E 330 using the design wind load.

2.4 FABRICATION

NOTE: Choose this paragraph and subparagraphs or the paragraph below entitled "Aluminum Panel Overhead Doors."

2.4.1 Steel Overhead Doors

Form door sections of hot-dipped galvanized steel not lighter than [1.5 mm thick 16 gage with flush surface without ribs or grooves] [or] [0.9 mm thick 20 gage with longitudinal integral reinforcing ribs] [or] [0.6 mm thick 24

gage with longitudinal integral reinforcing ribs and flat bottom V-grooves]. Install sections not less than 50 mm 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 600 mm thick 24 inch height for intermediate sections. Bottom sections may be varied to suit door height. Do not exceed 750 mm 30 inch height for bottom section. [Provide glass panels and install panels using manufacturer's standard for rubber gaskets.]

2.4.1.1 Insulated Sections

Insulate door sections with fibrous glass or plastic foam to provide a "U" factor of 0.14 or less when tested in accordance with ASTM C 1363. Cover interior of door sections with steel sheets of not lighter than 0.6 mm thick 24 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 Aluminum Panel Overhead Doors

Provide door panel construction with extruded aluminum stiles and rails with aluminum [and glass] panels. Stiles and rails has a minimum wall thickness of 1.5 mm 0.060 inch. Meeting rails shall have interlocking joints to ensure a weathertight closure and alignment for full width of door. Provide sections to the height indicated or the manufacturer's standard, but the height of an intermediate section not to exceed 600 mm 24 inch. Bottom sections may be varied to suit door height, but to not exceed 750 mm 30 inch in height. Provide aluminum panels not less than 1.0 mm 0.040 inch in thickness. Install panel using a continuous vinyl gasket and snap-in type of aluminum or vinyl glazing bead. [Install glass panels as specified for aluminum panels.]

] 2.4.3 Tracks

Provide galvanized steel tracks not lighter than 1.8 mm thick for 50 mm 14 gage for 2 inch tracks and not lighter than 2.5 mm thick for 75 mm 12 gage for 3 inch tracks. Provide vertical tracks with continuous steel angle not lighter than 2.1 mm thick 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.

2.4.4 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.

2.4.5 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 7 to 1.

2.5 MANUAL OPERATORS

2.5.1 Pushup Operators

Provide lifting handles on both sides of door. Do not exceed the maximum lifting force of 11.25 kilograms 25 pounds required to operate the door. Provide pulldown straps or ropes at bottom of doors over 2130 mm 7 feet high.

2.5.2 Chain Hoist Operators

Provide a galvanized, endless chain operating over a sprocket. Extend chain to within 1200 mm 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 15.75 kilograms 35 pounds required to operate the door.

2.6 ELECTRIC OPERATORS

NOTE: Indicate location of motors and control switches when electric operators are required. Specify three-phase motors whenever three-phase electric service is specified. Locate control stations at least 1500 mm 5 feet above floor line, so operator will have complete visibility of door at all times. Place one control station about 600 mm 2 feet from door jamb, guide, or track.

2.6.1 Operator Features

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 11.25 kilograms 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 200 mm 8 inch or more than 300 mm one foot per second without exceeding the rated capacity. Motors shall be operate on current of the characteristics indicated at not more than 377 rad/s 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 1500 mm 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 Safety Device

Provide a pneumatic or electric type safety device on the bottom edge of electrically-operated doors. The device shall immediately stop and reverse the door movement during the closing travel upon contact with an obstruction in the door opening or upon failure of any component of the control system. Provide for an automatic lock-out on the door closing circuit and a manually operable door until the failure or damage has been corrected.

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

NOTE: Ensure that labor and materials for
connecting motors and controls are specified in the
electrical section, e.g., SECTIONAL OVERHEAD DOORS:
Mount controls, including Type SO cable and takeup
reels furnished by the door manufacturer, and
provide necessary conduit, conductors, and devices
in accordance with the door manufacturer's wiring
diagrams."

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

**NOTE: Delete this paragraph if not applicable. If
applicable, identify doors.**

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 SAFETY DEVICE]

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, wool pile, or vinyl, adjustable weatherstrip at the top and jambs; and a compressible neoprene, rubber, wool pile, or vinyl weather seal attached to the bottom of the door. [On exterior doors that are electrically operated, the bottom seal shall be combination compressible weather seal and safety device for stopping [and reversing] door movement.] [Interior doors that are electrically operated shall have a compressible type of safety device for stopping [and reversing] door movement.]

2.8 FINISHES

Hot-dip galvanize concealed metal surfaces and tracks in accordance with ASTM A 123/A 123M. Hot-dip galvanized and other ferrous metal surfaces, except rollers and lock components, which are 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 A 653/A 653M for galvanized coating, coating designation Z180 G60, for steel sheets, and ASTM A 123/A 123M for assembled steel products. The weight of coatings for assembled products shall be as designated in Table I of ASTM A 123/A 123M 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 DAF-45 and NAAMM MFM. Pretreat exposed surfaces and apply a [white] [_____] 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.

-- End of Section --