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USACE / NAVFAC / AFCEA UFGS-08370 (August 2001)  
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Preparing Activity: NAVFAC Superseding  
UFGS-08370 (September 1999)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

Latest change indicated by CHG tags

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DIVISION 08 - DOORS AND WINDOWS

SECTION 08370

VERTICAL LIFT DOORS

08/01

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SECTION 08370

VERTICAL LIFT DOORS  
08/01

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NOTE: This guide specification covers the requirements for vertical lift metal doors of the stacking type.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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NOTE: On the drawings, show:

1. Location and size of door openings.
2. Type and details of door frames.
3. Design wind loads required for the building.
4. Wire and conduit from power source to operators and controls for electrically-operated doors.
5. Electrical power characteristics and location of motors and control station.
6. Counterweight tower location relative to door.

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## PART 1 GENERAL

### 1.1 REFERENCES

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NOTE: Issue (date) of references included in  
project specifications need not be more current than  
provided by the latest guide specification. Use of  
SpecsIntact automated reference checking is  
recommended for projects based on older guide  
specifications.  
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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

#### AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 335 (1989) Structural Steel Buildings  
Allowable Stress Design and Plastic Design

#### ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M (2002) Zinc (Hot-Dip Galvanized) Coatings  
on Iron and Steel Products

ASTM A 36/A 36M (2003a) Carbon Structural Steel

ASTM A 653/A 653M (2003) Steel Sheet, Zinc-Coated  
(Galvanized) or Zinc-Iron Alloy-Coated  
(Galvannealed) by the Hot-Dip Process

ASTM B 209 (2002a) Aluminum and Aluminum-Alloy Sheet  
and Plate

ASTM B 209M (2002a) Aluminum and Aluminum-Alloy Sheet  
and Plate (Metric)

ASTM B 221 (2002) Aluminum and Aluminum-Alloy  
Extruded Bars, Rods, Wire, Profiles, and  
Tubes

ASTM B 221M (2002) Aluminum and Aluminum-Alloy  
Extruded Bars, Rods, Wire, Profiles, and  
Tubes (Metric)

#### NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MFM (1988) Metal Finishes Manual

#### NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1 (2000) Industrial Control and Systems:  
General Requirements

NEMA ICS 2 (2000) Industrial Controls and Systems:  
Controllers, Contactors, 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	(2002) National Electrical Code
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1.2 SUBMITTALS

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NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

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 projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.

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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.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Doors; G, [\_\_\_\_\_]

Show types, sizes, locations, metal gages, hardware provisions, installation details, and other details of construction. [For electrically operated doors, include supporting brackets for motors, location, type, and ratings of motors, and safety devices.]

#### SD-03 Product Data

Doors; G, [\_\_\_\_\_]

[ Motors; G, [\_\_\_\_\_]]

[ Controls; G, [\_\_\_\_\_]]

[ For electrically operated doors, submit manufacturer's wiring diagrams for motors and controls.]

#### SD-08 Manufacturer's Instructions

Doors

#### SD-10 Operation and Maintenance Data

Doors, Data Package 2; G, [\_\_\_\_\_]

Submit in accordance with Section 01781 OPERATION AND MAINTENANCE DATA.[ Include wiring diagrams.]

### 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. Storage shall permit easy access for inspection and handling. Remove damaged items that cannot be restored to like-new condition and provide new items.

## PART 2 PRODUCTS

### 2.1 MATERIALS

#### 2.1.1 Steel Sheet

ASTM A 653/A 653M.

#### 2.1.2 Steel Shapes

ASTM A 36/A 36M.

#### 2.1.3 Aluminum Extrusions

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

#### 2.1.4 Aluminum Sheets and Strips

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

### 2.1.5 Glass

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

## 2.2 DOORS

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**NOTE: The normal design wind load for vertical lift  
metal doors is one kPa 20 psf. If conditions  
require greater design loads, use appropriate loads.**  
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Doors shall consist of multiple sections set one behind the other. Arrange door operation and travel so that sections arrive simultaneously at the full open position. Sections shall stack vertically in a compact group above the head of the opening. Provide doors with counterweights. Doors, components, and methods of installation shall be designed in accordance with AISC 335. Minimum design wind load shall be [one kPa] [20 psf] [as indicated for the building] [[\_\_\_\_\_] kPa psf]. Maximum wind load deflection of the door shall not exceed the door height in mm inches divided by 120 and the door width in mm inches divided by 120. Doors shall be operable during design wind load.

### 2.3 MANUAL OPERATORS

Provide a galvanized, endless chain operating over a sprocket. Extend chain to within 900 mm 3 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. Hoist shall allow for future installation of electric operators. The force required to operate the door shall not exceed 15.75 kilograms 35 pounds.

### 2.4 ELECTRIC OPERATORS

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**NOTE: Specify three-phase motors wherever  
three-phase electrical service is or will be  
available. Locate control stations so operator will  
have complete visibility of the door at all times,  
within building at least 1500 mm 5 feet above floor  
line; one station should be placed about 600 mm 2  
feet from jamb, guide, or track.**  
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Provide operators of the type recommended by the door manufacturer. Operators shall include electric motor, machine-cut reduction gears, steel chain and sprockets, magnetic brake, brackets, pushbutton controls, limit switches, magnetic reversing contactor, a manual operator as specified above for emergency use, and other accessories necessary for operation. The electric operator shall be designed so that the motor may be removed without disturbing the limit switch timing and without affecting the manual operator. The manual operator shall be clutch controlled so that it may be engaged and disengaged from the floor; operation shall not affect limit switch timing. Provide an electrical or mechanical device that disconnects the motor from the operating mechanism when the manual operator is engaged.

#### 2.4.1 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. Motor shall produce a door travel speed of not less than 200 mm two-thirds foot or more than 300 mm one foot per second without exceeding the rated capacity. Motors shall 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.] [Motor enclosures shall be drip-proof type or NEMA totally enclosed non-ventilated (TENV) type.] Install motors in approved locations.

#### 2.4.2 Controls

Each door motor shall have 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. Control equipment shall conform to NEMA ICS 1 and NEMA ICS 2. Control enclosures shall be NEMA ICS 6, Type 12 or Type 4, except that contactor enclosures may be Type 1. Each control switch station shall be of the three-button type; buttons shall be 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" buttons. 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.

#### 2.4.3 Safety Device

Provide a safety device on the bottom edge of electrically operated doors. The device shall immediately stop and reverse the door in its closing travel upon contact with an obstruction in the door opening or upon failure of the device or any component of the control system and cause the door to return to the full open position. The door-closing circuit shall be automatically locked out and the door shall be operable manually until the failure or damage has been corrected. Do not use the safety device as a limit switch.

#### 2.4.4 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.

#### 2.4.5 Electrical Components

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NOTE: Ensure that labor and materials for connecting motors and controls are specified in the electrical section, e.g., "Vertical Lift Metal 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 door manufacturer's wiring diagrams."  
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NFPA 70. The door manufacturer shall furnish manual or automatic control and safety devices, including extra flexible Type SO cable and spring-loaded automatic takeup reel or equivalent device, as required for operation of the doors. Conduit, wiring, and mounting of controls are specified in Section 16402 INTERIOR DISTRIBUTION SYSTEM.

#### [2.4.6 Hazardous Locations

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**NOTE: Delete this paragraph if not applicable. If applicable, identify doors.**  
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Electrical materials, equipment, and devices for installation in hazardous locations, as defined by NFPA 70, shall be specifically approved by Underwriters Laboratories or by another independent testing agency using equivalent standards, for the particular chemical group and the class and division of hazardous location involved.

#### ]2.5 WEATHER SEALS [AND SAFETY DEVICE]

Provide exterior doors with weatherproof joints between sections, a rubber or vinyl adjustable weatherstrip at the top, and a compressible neoprene or rubber weather seal attached to the bottom of the door. [On exterior doors that are electrically operated, the bottom seal shall be a combination compressible weather seal and safety device for stopping [and reversing] door movement.] [Provide interior doors that are electrically operated with a compressible type of safety device for stopping [and reversing] door movement.]

#### 2.6 FINISHES

Concealed ferrous metal surfaces shall be hot-dip galvanized. Exposed ferrous metal surfaces shall be hot-dip galvanized and shop primed.

##### 2.6.1 Galvanized and Shop Primed

Surfaces specified shall have a zinc coating, a phosphate treatment, and a shop prime coat of rust-inhibitive paint. The galvanized coating shall conform to ASTM A 653/A 653M, coating designation Z275 G90, 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. The prime coat shall be a type especially developed for materials treated by phosphates and adapted to application by dipping or spraying. Repair damaged zinc-coated surfaces by the application of 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 to slats before forming in lieu of prime coat specified.

##### 2.6.2 Aluminum

[Surfaces shall receive a clear anodized finish, AA-M10-C22-A41, in accordance with NAAMM MFM.] [Exposed surfaces shall receive a pretreatment and a [white] [ ] baked-on enamel finish as standard with the manufacturer.]

## PART 3 EXECUTION

### 3.1 FABRICATION

#### 3.1.1 Door Sections

Provide vertical and horizontal door section members constructed of structural steel angle or channel shapes. Cover door section exteriors with sheet steel not lighter than 1.8 mm thick 14 gage, bolted, plug welded, or edge welded to frame at not more than 230 mm 9 inches on centers. Provide intermediate horizontal or vertical stiffeners so the maximum unsupported area of sheet is 1.8 square meters 20 square feet. Corners and intersections of frame members shall be welded and ground smooth on exposed surfaces. Welds shall develop the full strength of frame.

##### 3.1.1.1 Insulated Sections

Door sections shall be insulated with fibrous glass or plastic foam to provide a "U" factor of 0.14 or less. Interior of door sections shall be covered with steel sheets not lighter than 0.6 mm thick 24 gage to completely enclose the insulating material.

##### 3.1.1.2 Aluminum Sections

At the Contractor's option, door sections may be constructed of aluminum in lieu of steel. Aluminum sections shall, as a minimum, provide the same structural and thermal properties as steel sections.

#### 3.1.2 Guides and Jamb Plates

Door sections shall run in structural steel guides, securely fastened to the counterweight tower and to the idler tower, which shall be attached to the building construction. The counterweight enclosure shall extend approximately to the same height as the guides. Set back guides and tower faces on walls to provide clear door opening unobstructed by door guides, except when indicated otherwise.

#### 3.1.3 Hardware

Door sections shall be supported by chain or steel cable with a safety factor of five. The sheaves over which the chain or cable passes to the door shall have permanently sealed precision bearings. Cast-iron counterweights shall be stacked on a steel weight rod or in a special container. The counterweight tower shall be enclosed with a removable steel cover not lighter than 1.8 mm thick 14 gage to a height of 2150 mm 7 feet above the floor. Provide doors with a positive locking device and cylinder lock with two keys.

#### 3.1.4 Glazing

Provide glass panels where indicated. Install panels using rubber gaskets as standard with the door manufacturer.

### 3.2 INSTALLATION

NFPA 70. Install doors in accordance with approved detail drawings and manufacturer's instructions. Accurately locate anchors and inserts for guides, brackets, [motors,] [switches,] hardware, and other accessories. Upon completion, doors shall be weathertight and free from warp, twist, or

distortion. Doors shall be lubricated and adjusted to operate freely.

### 3.3 ELECTRICAL WORK

NFPA 70. Conduit, wiring, and mounting of controls are specified in Section 16402 INTERIOR DISTRIBUTION SYSTEMS.

### 3.4 TESTING

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

-- End of Section --