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USACE / NAVFAC / AFCEA UFGS-08331N (February 2004)  
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Preparing Activity: NAVFAC Superseding  
UFGS-08331N (August 2001)

UNIFIED FACILITIES GUIDE SPECIFICATION

References are in agreement with UMRL dated 25 June 2004

Revised throughout - changes not indicated by CHG tags

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## SECTION 08331N

### ROLLING SERVICE [AND FIRE] DOORS 02/04

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NOTE: This guide specification covers the requirements for rolling service doors, rolling fire doors and minimum glazing requirements for antiterrorism force protection (ATFP) in accordance to UFC 4-010-01.

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. Locations and sizes of door openings
2. Side of wall where door is to be located
3. Details of door openings and frames
4. Method, type, and spacing of frame anchors
5. Electrical wiring, conduit, and devices for motor-operated doors; power characteristics; and location of controls

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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.

ASTM INTERNATIONAL (ASTM)

ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 653/A 653M	(2003) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 780	(2001) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2002) National Electrical Code
NFPA 80	(1999) Fire Doors and Fire Windows

UNDERWRITERS LABORATORIES (UL)

UL 506	(2000; Rev thru Feb 2004) Specialty Transformers
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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

Rolling service doors; G

[ Rolling fire doors; G]

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

SD-03 Product Data

Rolling service doors; G

[ Rolling fire doors; G]

[ Motors; G]

[ Controls; G]

[ For electrically operated system, submit wiring diagrams for motor and controls.]

#### SD-08 Manufacturer's Instructions

Rolling service doors

[ Rolling fire doors]

Submit manufacturer's currently recommended installation procedures for doors with the shop drawings.

#### SD-10 Operation and Maintenance Data

Rolling service doors, Data Package 2.

[ Rolling fire doors, Data Package 2.]

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

### 1.3 DELIVERY AND STORAGE

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, and in such a manner as to permit access for inspection and handling. Handle doors carefully to prevent damage. Remove damaged items that cannot be restored to like-new condition and provide new items.

## PART 2 PRODUCTS

### 2.1 ROLLING SERVICE DOORS

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**NOTE: Insert design wind load for the building if greater than 0.96 kilopascals 20 PSF.**

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Shall be spring counterbalanced, rolling type, and shall be designed for use on [exterior] [or] [interior] openings, as indicated. Doors shall be operated [by means of 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]. Doors shall be complete with guides, hardware, fastenings, operating mechanisms, and accessories. Doors shall be surface-mounted type with guides at jambs set back a sufficient distance to provide a clear opening when door is in open position. Doors, hardware, and anchors shall be designed to withstand a wind pressure of [0.96] [\_\_\_\_\_] kilopascals [20] [\_\_\_\_\_] pounds per square foot of door area without damage. [Exterior doors shall be mounted [as indicated] [on interior side of walls].] [Where service doors are indicated to be chain- or crank-operated, the door design and construction shall allow for future installation of electric-power operation.]

## 2.2 FABRICATION

### 2.2.1 Curtains

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NOTE: For security applications, steel slats as heavy as 1.8 mm thick 14 gage may be specified. For severe climates, 38 mm 1 1/2 inch thick insulated slats with a "U" factor of 0.11 are available from some manufacturers.  
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NOTE: When antiterrorism/force protection minimum measures are required, specify minimum frame bites and non-thermal, laminated glass vision panels for exterior rolling service doors and include reference to Section 08800, "Glazing".  
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Shall be formed of interlocking galvanized steel slats of shapes standard with the manufacturer, except that slats for exterior doors shall be flat type. Curtain shall roll up on a barrel supported at head of opening on brackets and be balanced by a torsional spring system in the barrel. [Slats for doors less than 4500 mm 15 feet wide shall be not lighter than 0.8 mm thick 22 gage;] [slats for doors from 4500 mm 15 feet wide to 6400 mm 21 feet wide shall be not lighter than 0.9 mm thick 20 gage;] [slats for doors 6400 mm 21 feet wide and wider shall be not lighter than 1.2 mm thick 18 gage].] [Slats shall be of the gage required for the width indicated and the wind pressure specified above.] [Exterior door glazing shall have a minimum frame bite of 9.5 mm 3/8 inch for structurally glazed window systems and 25 mm 1 inch for vision panels that are not structurally glazed. Provide non-thermal, laminated glass vision panels in doors indicated for glazing. Glazing is specified in Section 08800.] [Slats for exterior doors shall be insulated with not less than 13 mm 1/2 inch thick polyurethane or polyisocyanurate foam insulation. Interior side of insulation shall be covered with interlocking galvanized steel slats not lighter than 0.6 mm thick 24 gage.]

### 2.2.2 Endlocks [and Windlocks]

The ends of each slat or each alternate slat shall have malleable iron or galvanized steel endlocks of manufacturer's stock design. [In addition to endlocks, exterior doors which are more than 4875 mm 16 feet wide or which have a design wind load of more than 0.96 kilopascals 20 pounds per square foot, shall have windlocks or integral slat lugs of manufacturer's standard design at ends of at least every sixth slat. Windlocks or lugs shall prevent curtain from leaving guide because of deflection from wind pressure or other forces.]

### 2.2.3 Bottom Bar

The curtain shall have a steel bottom bar consisting of two angles of equal weight, one on each side, or an equivalent extruded aluminum section, fastened to bottom of curtain. Do not use aluminum on doors more than 4875 mm 16 feet wide. In addition, exterior doors shall have a compressible and replaceable rubber, neoprene, or vinyl weather seal attached to bottom bar. [Attach a combination compressible seal and fail-safe safety device for stopping and reversing the travel of the door to the bottom bar of doors]

that are electric-power operated.]

#### 2.2.4 Guides

Steel structural shapes or formed steel shapes fastened to wall with steel shapes not less than 5 mm 3/16 inch thick. Guides shall be of sufficient depth or shall incorporate a steel locking bar to retain the curtain in place under the wind pressure specified. Provide continuous vinyl or neoprene weather seals on guides at exterior doors. Securely attach guides to adjoining construction with not less than 10 mm 3/8 inch diameter bolts, spaced near each end and not over 750 mm 30 inches apart.

#### 2.2.5 Barrel

Steel pipe or commercial welded steel tubing of proper diameter and thickness for the size of curtain. Deflection shall not exceed one mm per 400 mm 0.03 inch per foot of span. Close ends of barrel with cast-iron plugs, machined to fit the pipe and either pinned or attached with screws in the spring barrel, except that drive end plug may be steel welded in place. Welding shall not be used on the tension end. Install within the barrel an oil-tempered, stress relieved, helical, counterbalancing steel spring, capable of producing sufficient torque to assure easy operation of the door curtain from any position. At least 80 percent of the door weight shall be counterbalanced at any position. Spring-tension shall be adjustable without removing the hood.

#### 2.2.6 Brackets

Fabricate of steel plate or heavy cast iron to support the barrel, curtain, and operator and to form a supporting ring and end closure for the hood. Provide prelubricated, self-aligning ball bearings, shielded or sealed.

#### 2.2.7 Hoods

Steel, not lighter than 0.6 mm thick 24 gage formed to fit contour of end brackets and reinforced with steel rods, or rolled beads at top and bottom edges. [Hoods for openings more than 3650 mm 12 feet in width shall have intermediate supporting brackets.] [Provide a weather baffle at the lintel or inside the hood of each exterior door.]

#### 2.2.8 Locking Device

For each manually operated exterior rolling door provide manufacturer's standard chain- or bar-type locking device on the inside. The locking device shall be of type to receive a padlock with a 8 mm 5/16 inch diameter shackle.

### 2.3 MANUAL OPERATION

#### 2.3.1 Manual Push-Up Operation

Provide lifting handles on both sides of door and counterbalance in a manner to provide easy operation while raising or lowering the curtain by hand. The force required to operate the door shall not exceed 11 kgs 25 pounds. Provide pull-down straps or pole hooks on bottom rail of doors over 2130 mm 7 feet high.



### 2.3.2 Manual Hand-Chain Operation

Provide galvanized, endless chain operating over a sprocket and extending to within 900 mm 3 feet of floor. Obtain reduction by use of roller chain and sprocket drive or suitable gearing. Gears shall be high-grade gray iron, cast from machine-cut patterns. The pull required to operate the door shall not exceed 15 kgs 35 pounds.

### 2.3.3 Manual Crank Operation

Provide a fully enclosed, permanently lubricated, geared power unit mounted 860 mm 34 inches above the floor; a removable crank; and a vertical shaft connecting the unit to the counterbalance drive system. The force required to operate the door shall not exceed 9 kgs 20 pounds. Gears shall be of high-grade gray iron, cast from machine-cut patterns.

## 2.4 ELECTRIC OPERATION

### 2.4.1 Operator Features

Provide operators complete with electric motor, machine-cut reduction gears, steel chain and sprockets, magnetic brake, overload protection, brackets, pushbutton controls, limit switches, magnetic reversing contactor, and other accessories necessary for proper operation. The operator shall be so designed that the motor may be removed without disturbing the limit-switch timing and without affecting the emergency auxiliary operators. Make provision for immediate emergency manual operation of door by chain-gear mechanism in case of electrical failure. The emergency manual operating mechanism shall be so arranged that it may be put into and out of operation from the floor, and its use shall not affect the timing of the limit switches. Provide an electrical or mechanical device which will disconnect the motor from the operating mechanism when the emergency manual operating mechanism is engaged.

### 2.4.2 Motors

Shall conform to NEMA MG 1, high-starting torque, reversible type of sufficient horsepower and torque output to move the door in either direction from any position, and produce a door travel speed of not less than 0.2 two-thirds foot or more than 0.3 meters per second one foot per second, without exceeding the rated capacity. Motors shall be suitable for operation on current of the characteristics indicated and shall operate at not more than 3600 rpm. [Single-phase motors shall not have commutation or more than one starting contact.] [Motor enclosures shall be the drip-proof type or NEMA TENV type.] Install motors in approved locations.

### 2.4.3 Controls

Each door motor shall have an enclosed, across-the-line type, magnetic reversing contactor, thermal-overload protection, solenoid-operated brake, limit switches, and remote control switches at locations indicated. Remote control switches shall be at least 1500 mm 5 feet above the floor line, and all switches shall be located so that the operator will have complete visibility of the door at all times. The control equipment shall conform to NEMA ICS 1 and NEMA ICS 2. Control enclosures shall be NEMA ICS 6, Type 12 or Type 4, for interior locations and Type 4 for exterior locations, except that contactor enclosures may be Type 1. Locate control switches inside the building unless otherwise indicated. Each switch control station shall be of the three-button type, with the buttons marked "OPEN,"

"CLOSE," and "STOP." The "OPEN" and "STOP" buttons shall be of the type requiring only momentary pressure to operate. The "CLOSE" button shall be of the type requiring constant pressure to maintain the closing motion of the door. When 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 then 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 the doors at their fully open and closed positions. Positions of the limit switches shall be readily adjustable.

#### 2.4.4 Safety Device

The bottom bar of power-operated doors shall have a safety device that will 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 its 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 safety device as a limit switch.

#### 2.4.5 Control Transformer

Shall be provided in power circuits as necessary to reduce the voltage on the control circuits to 120 volts or less (preferably 24 volts). The transformer shall conform to UL 506.

#### 2.4.6 Electrical Work

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**NOTE: See that labor and materials for connecting motors and controls are specified in the electrical section, "Rolling 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."**  
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Electrical components and installation shall conform to 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 proper operation of the doors. Conduit, wiring, and mounting of controls is specified in Section 16402 INTERIOR DISTRIBUTION SYSTEM.

#### [2.4.7 Hazardous Locations

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**NOTE: Delete this paragraph if not applicable. Doors to which it is applicable should be identified in the specifications.**  
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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 an independent testing agency using equivalent standards, for the particular chemical group and the class and division of hazardous location involved.

## ]2.5 FINISHES

Slats, steel bottom bars, and hoods shall be hot-dip galvanized and shop primed. Shop prime other parts of coiling doors, except faying surfaces.

### 2.5.1 Primed Finish

Clean surfaces thoroughly, treat to assure maximum paint adherence, and provide a factory dip or spray coat of rust-inhibitive metallic oxide or synthetic resin primer on exposed surfaces.

### 2.5.2 Galvanized and Shop-Primed Finish

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, except that hoods located on interior of the building may be Z180 G60, and ASTM A 123/A 123M for iron and steel products. The weight of coatings for products shall be as designated in Table I of ASTM A 123/A 123M for the thickness of base metal 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 materials and methods conforming to ASTM A 780 and spot prime. At the option of the Contractor, a two-part system including bonderizing, baked-on epoxy primer, and baked-on enamel top coat may be applied to slats before forming, in lieu of prime coat specified.

## 2.6 ROLLING FIRE DOORS

Shall conform to the requirements specified herein and to NFPA 80 for the class indicated. Doors shall bear labels of Underwriters Laboratories, or another independent testing agency which has follow-up service and which uses equivalent standards, indicating the applicable fire rating. The construction details necessary for labeled doors shall take precedence over details indicated or specified for service doors. Fire doors shall be equipped with automatic closing mechanism actuated by fusible links. Doors shall be forced into a closed position at a rate of descent of not more than 0.6 meters 2 feet per second and come to rest without impact. The curtain shall be held against the sill until the release mechanism has been reset. The automatic closing mechanism shall not interfere with normal operation of the door. Fire doors shall be complete with hardware, accessories, and automatic closing device as required by NFPA 80.

## PART 3 EXECUTION

### 3.1 INSTALLATION

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**NOTE: Structural steel door frames should be  
specified in Section 05500, "Metal Fabrications."**  
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Install doors in accordance with approved detail drawings and manufacturer's directions. Locate anchors and inserts for guides, brackets, [motors,] [switches,] hardware, and other accessories accurately. Upon completion, doors shall be weathertight and shall be free from warp, twist, or distortion.

### 3.2 FINAL ADJUSTMENT

Doors shall be lubricated and properly adjusted to operate freely.

-- End of Section --