
USACE / NAVFAC / AFCEA / NASA UFGS-08 39 53 (April 2006)

Preparing Activity: NAVFAC Replacing without change
 UFGS-08315 (August 2004)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UML dated 18 July 2006

Revised throughout - changes not indicated by CHG tags

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04/06

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SECTION 08 39 53

BLAST RESISTANT DOORS (OVAL ARCH MAGAZINES) 04/06

NOTE: This guide specification covers the requirements for blast resistant doors used in the construction of earth covered oval arch magazines.

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.

NOTE: The following information shall be shown on the project drawings:

1. The extent and location of structural steel;
2. Designations of steel members;
3. Yield strength of steel used in design;
4. Locations where galvanized steel will be used;
5. Types of connections (welded and bolted);
6. Locations where high-strength bolts and slip critical connections are required and the loads and stresses required if design is provided by Contractor.

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.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

- | | |
|----------|--|
| AISC 303 | (2005) Code of Standard Practice for Steel Buildings and Bridges |
| AISC 335 | (1989) Structural Steel Buildings Allowable Stress Design and Plastic Design |
| AISC 350 | (1999) Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings |

AMERICAN WELDING SOCIETY (AWS)

- | | |
|----------------|--|
| AWS D1.1/D1.1M | (2006) Structural Welding Code - Steel |
|----------------|--|

ASTM INTERNATIONAL (ASTM)

- | | |
|-------------------|--|
| ASTM A 123/A 123M | (2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products |
| ASTM A 153/A 153M | (2005) Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A 307 | (2004) Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength |
| ASTM A 325 | (2004b) Structural Bolts, Steel, Heat |

| | |
|-----------------|---|
| | Treated, 120/105 ksi Minimum Tensile Strength |
| ASTM A 36/A 36M | (2005) Carbon Structural Steel |
| ASTM A 563 | (2004a) Carbon and Alloy Steel Nuts |
| ASTM A 780 | (2001) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings |
| ASTM F 436 | (2004) Hardened Steel Washers |
| ASTM F 844 | (2004) Washers, Steel, Plain (Flat), Unhardened for General Use |

1.2 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.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Blast Resistant Doors[; G][; G, [____]]

Trolley Track[; G][; G, [____]]

Trolleys[; G][; G, [____]]

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the building construction.

SD-03 Product Data

Trolleys[; G][; G, [____]]

SD-05 Design Data

Manual Operator[; G][; G, [____]]

Submit calculations showing that manual operator has achieved by mechanical advantage, a required downward force to open the doors of not more than 18 pounds.

SD-10 Operation and Maintenance Data

Blast Resistant Doors[; G][; G, [____]]

1.3 QUALIFICATIONS

1.4 DELIVERY, STORAGE, AND PROTECTION

Protection from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Steel

ASTM A 36/A 36M.

2.1.2 Bolts, Nuts, and Washers

2.1.2.1 Bolts

NOTE: Do not galvanize ASTM A 490 bolts. When
galvanizing ASTM A 325 bolts limit hardness of bolts
to Rockwell C-32.

The bolt heads and the nuts of the supplied fasteners must be marked with the manufacturer's identification mark, the strength grade and type specified by ASTM specifications.

- a. Anchor Bolts: ASTM A 307, Grade A.

b. High Strength Bolts: ASTM A 325, Type 1 or 2.

2.1.2.2 Nuts

ASTM A 563, Grade A, heavy hex style, except nuts under 1.5 inches may be provided in hex style.

2.1.2.3 Washers

ASTM F 844 washers for ASTM A 307 bolts, and ASTM F 436 washers for ASTM A 325 bolts.

2.1.3 Welding Electrodes and Rods

AWS D1.1/D1.1M.

2.2 TROLLEYS

Shall consist of cast steel or forged steel components and be designed to operate from the track beam section furnished under this contract.

Trolley wheels shall be made from high alloy forged steel. The wheel tread shall be accurately machined to assure concentricity of axle and tread and hardened to 425-480 Brinell. Wheel treads shall be unpainted.

Wheel axles shall be precision machined from high alloy, heat treated steel.

Minimum Rated Load Capacity of the trolley shall be 3000 lbs.

2.3 MANUAL OPERATOR

Provide a cast steel or forged steel, galvanized, pull door travel chain operating over a sprocket. Extend chain loop to within 3 feet of the floor. Provide chain cleat and pin for securing pull door travel chain. Provide mechanical advantage by means of roller chain and sprocket drive and/or gearing. The downward force required to operate the door shall not exceed 18 pounds.

2.4 TROLLEY TRACK

Provide as indicated on drawings.

2.5 FABRICATION

2.5.1 Blast Resistant Doors

Fabricate doors in accordance with the applicable provisions of AISC 335 or AISC 350. Workmanship shall be equal to standard commercial practice in modern metal shops. Fabricate and assemble in the shop to the greatest extent possible.

2.5.1.1 Welding of Steelwork

In accordance with AWS D1.1/D1.1M. For the doors, welding might cause serious residual stresses, therefore, Contractor shall submit for approval by the Contracting Officer a detailed sequence of the welding, amplifying the requirements given by the AWS specifications.

2.5.2 Door Support System

Provide track clamps, threaded suspension rods and support brackets as shown on the drawings, capable of supporting 150% of the design door loads.

Trolley, trolley track, and blast door shall be designed together as a system to operate properly within the vertical and horizontal space provided. This system shall be designed to provide a minimum 1/4 inch vertical and horizontal adjustment in either direction to meet the tolerances required for proper door operation.

2.5.3 Miscellaneous Accessories

2.5.3.1 Weatherstripping

Weatherstripping seals shall be 2 inch wide rubber impregnated canvas belting at head and jambs of doorway. The material shall have a minimum thickness of 3/16 inch and shall be attached to structure with a continuous 1/8" x 1-1/4" metal strip and 1/4" x 3/4" metal screws at 8" o/c.

2.5.3.2 Locking Bars, Restraining Bracket, Chain Guide Holder and Handle

Provide as indicated on drawings.

2.6 FABRICATION FINISHES

2.6.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: [ASTM A 123/A 123M](#) or [ASTM A 153/A 153M](#).

2.6.2 Painting

2.6.2.1 Preparation, Priming and Painting

In accordance with Section [09 90 00](#) PAINTS AND COATINGS.

PART 3 EXECUTION

3.1 ERECTION

3.1.1 Procedure

Erect in accordance with the [AISC 335](#) or [AISC 350](#). Use erecting equipment suitable for the work and in first class condition. Where parts cannot be assembled or fitted properly as a result of errors in fabrication or of deformation due to handling or transportation, report such condition immediately to the Contracting Officer and obtain approval of the method of correction; make the correction in his presence. The straightening of plates and angles or other shapes shall be done by the methods approved by the Contracting Officer. If heating of metal is approved for straightening, it shall not be to a higher temperature than that producing a dark "cherry red" color. After heating, the metal shall be cooled as slowly as possible. There shall be no evidence of fracture on the surface of the metal after straightening. Drain steelwork properly; fill pockets exposed to the weather with an approved waterproof material.

3.1.2 Connections

Provide anchor bolts and other connections between the steel and concrete and properly locate and build into connecting work. Design connections for which details are not indicated in accordance with AISC 335 or AISC 350.

3.1.3 High-Strength Bolting

Specification for structural joints using ASTM A 325 bolts, approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation shall govern the furnishing and installation of high-strength bolting, with the following modifications. Alternate fasteners, specified in paragraph 2(d) will not be permitted.

3.1.4 Erection Tolerances

In accordance with the AISC 303.

3.1.5 Temporary Welds and Backing Strips

Temporary Welds and Backing Strips shall be removed.

3.2 FABRICATION FINISHES

3.2.1 Galvanizing

Galvanize items designated on the drawings to be galvanized.

3.2.1.1 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to ASTM A 780 or by the application of stick or thick paste material specifically designed for repair of galvanizing, as approved by the Contracting Officer. Clean areas to be repaired and remove the slag from the welds. Heat surfaces in which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread the molten material uniformly over surfaces to be coated and wipe the excess material off.

3.2.2 Painting

NOTE: Coordinate color of door and assembly with
Contracting Officer.

The blast resistant door assembly shall be shop painted in accordance with Section 09 90 00 PAINTS AND COATINGS.

3.3 FIELD INSPECTION AND TESTS

3.3.1 Inspection

The manufacturer of the doors shall provide a field inspection engineer to perform the following:

- a. Check installation of embedded items before pouring of concrete (after forms or shoring are in place) to insure that the dimensional tolerances recommended by door manufacturer have been

complied with.

- b. Re-check embedded items to verify the accuracy of dimensions after shoring and forms are removed from concrete.
- c. Supervise any necessary corrective action.
- d. Supervise the job site assembly and installation of the doors and operators.
- e. Inspect final assembly of doors and operators after corrections and adjustments have been made to doors.
- f. Demonstrate to the Contracting Officer that operation of the door assembly is as specified.

3.3.2 Visual Inspection of Welding

Visually inspect welding while the operators are making the welds and again after the work is completed. After the welding is completed, hand or power wire brush welds and thoroughly clean them before the inspector makes the check inspection. Inspect welds with magnifiers under strong, adequate light for surface cracking, porosity, and slab inclusions; excessive roughness, unfilled craters, gas pockets, undercuts, overlaps, size and insufficient throat and concavity. Inspect the preparation of groove welds for adequate throat opening and for snug position of back-up-bars.

3.3.3 Nondestructive Testing

NOTE: The designer shall indicate the location of test welds and types of testing desired. The following information is presented as guidance. Dye penetrant testing detects small surface defects by enhancing the visibility of the flaw. Magnetic particle testing detects surface cracks and near-surface cracks; this test provides more information than the dye penetrant testing, and for approximately the same cost. Ultrasonic and radiographic testing detect surface and internal cracks, delaminations, lack of fusion, and density and thickness variations; these tests offer basically the same information, but their usage is limited by location and type of weld. Generally, fillet welds can only be dye penetrant or magnetic particle tested. Complete penetration welds at butt joints should be radiographically tested; all other complete penetration welds should be ultrasonically tested.

AWS D1.1/D1.1M. Test locations shall be [as indicated] [selected by the Contracting Officer]. If more than [20] [_____] percent of welds made by a welder contain defects identified by testing, then all welds made by that welder shall be tested by radiographic or ultrasonic testing, as approved by the Contracting Officer. When all welds made by an individual welder are required to be tested, magnetic particle testing shall be used only in areas inaccessible to either radiographic or ultrasonic testing. Retest defective areas after repair.

- a. Testing frequency: Provide the following types and number of tests:

| <u>Test Type</u> | <u>Number of Tests</u> |
|-------------------|------------------------|
| Radiographic | [_____] |
| Ultrasonic | [_____] |
| Magnetic Particle | [_____] |
| Dye Penetrant | [_____] |

NOTE: Suggestions for improvement of this specification will be welcomed using the Navy "Change Request Forms" subdirectory located in SPECSINTACT in Jobs or Masters under "Forms/Documents" directory or DD Form 1426. Suggestions should be forwarded to:

Commander
Naval Facilities Engineering Command
Engineering Innovation and Criteria Office, Code EICO
1510 Gilbert Street
Norfolk, VA 23511-2699

FAX: (757) 322-4416 or
Email: cgs@efdlant.navfac.navy.mil

-- End of Section --