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USACE / NAVFAC / AFCEC | **UFGS-08 39 55.00 20 (November 2024)**
Change 1 - 05/26

Preparing Activity: NAVFAC | **New**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2026

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NAVY STANDARD EARTH-COVERED MAGAZINE DOORS

11/24, CHG 1: 05/26

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SECTION 08 39 55.00 20

NAVY STANDARD EARTH-COVERED MAGAZINE DOORS
11/24, CHG 1: 05/26

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NOTE: This guide specification covers the requirements for Earth Covered Navy Magazine Doors, security, operators, and controls. The intent of this specification is to augment standardized doors or custom designed doors for all magazines such that components, controls, and systems are interchangeable between doors. There are Navy standard magazine doors which have been completely designed and detailed in standard drawings, and this specification augments and supports those completed designs. The door construction, headwall, and locking system must be in accordance with the design drawings and may not be altered in any way. As such, this specification is not a performance specification; it is an affirmation of the door design, and includes all peripherals required for a complete door system, including execution and testing.

Adhere to UFC 1-300-02 Unified Facilities Guide **Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.**

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR)**.**
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NOTE: Painting of magazine doors must be

specifically mentioned in Section 09 97 13.27 HIGH PERFORMANCE COATING FOR STEEL STRUCTURES, along with a reference to the drawings and this Section.

In order for this specification to be properly coordinated, the following information must be included in the Navy Standard Magazine Door Design Drawings or in other completed door designs:

1. Size and arrangement of doors, including all details at head, sill, and jambs.

2. All material requirements for all components of the magazine door.

3. Location and type of seals, weather stripping, flashing, operators, and end of travel bumpers with limit switches.

4. Location, spacing, size, type of top guides and bottom rails, and trench covers, including drainage and plow-type trench cover lifting system (plow system).

5. Design wind, seismic, blast, and other loads utilized for the design of the doors.

6. Electrical (power, low voltage, security) and grounding requirements, including device ratings.

7. Access for installation, maintenance, and re-placement of door components such as motors, drive.

8. Special Inspections List.

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PART 1 GENERAL

1.1 REFERENCES

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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 Reference Identifier (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.
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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 CONCRETE INSTITUTE (ACI)

ACI 301	(2020) Specifications for Structural Concrete
ACI 318	(2019; R 2022) Building Code Requirements for Structural Concrete (ACI 318-19) and Commentary (ACI 318R-19)

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 360	(2016) Specification for Structural Steel Buildings
ANSI/AISC 303	(2022) Code of Standard Practice for Structural Steel Buildings and Bridges

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-189	(2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

AMERICAN WELDING SOCIETY (AWS)

AWS A5.4/A5.4M	(2012; R 2022) Specification for Stainless Steel Electrodes for Shielded Metal Arc Welding
AWS D1.1/D1.1M	(2025) Structural Welding Code - Steel
AWS D1.3/D1.3M	(2025) Structural Welding Code - Sheet Steel
AWS D1.6/D1.6M	(2017) Structural Welding Code — Stainless Steel
AWS D1.8/D1.8M	(2016) Structural Welding Code—Seismic Supplement

ASTM INTERNATIONAL (ASTM)

ASTM A1	(2000; R 2016) Standard Specification for Carbon Steel Tee Rails
ASTM A240/A240M	(2025a) Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
ASTM A500/A500M	(2023) Standard Specification for Cold-Formed Welded and Seamless Carbon

	Steel Structural Tubing in Rounds and Shapes
ASTM A572/A572M	(2025) Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM A992/A992M	(2022) Standard Specification for Structural Steel Shapes
ASTM F1554	(2020) Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
ASTM F3125/F3125M	(2019) Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 1	(2022) Standard for Industrial Control and Systems: General Requirements
NEMA ICS 2	(2000; R 2020) Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA ICS 6	(1993; R 2016) Industrial Control and Systems: Enclosures
NEMA MG 00001	(2024) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2026; TIA 26-1; ERTA 26-1; TIA 26-2; TIA 26-3; TIA 26-4; TIA 26-5; TIA 26-6; TIA 26-7; ERTA 26-2; ERTA 26-3) National Electrical Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-101-01	(2020; with Change 4, 2024) Architecture
UFC 3-301-01	(2023; with Change 6, 2026) Structural Engineering
UFC 4-010-06	(2023) Cybersecurity of Facility-Related Control Systems
UFC 4-420-01	(2025) Ammunition and Explosives Storage Magazines

UL SOLUTIONS (UL)

UL 489	(2025) UL Standard for Safety Molded-Case

Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures

UL 506 (2017; Reprint Jan 2022) UL Standard for Safety Specialty Transformers

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification with a code of up to three characters 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 and Air Force projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturer's Qualifications; G, [_____]

Installer's Qualifications; G, [_____]

Acceptance Testing Procedure; G, [_____]

Field Testing Instructions; G, [_____]

Coating Submittal Package; G, [_____]

Sequence of Welding; G, [_____]

Manufacturer's Installation Instructions; G, [_____]

Installation Plan; G, [_____]

Quality Control Plan; G, [_____]

SD-02 Shop Drawings

Shop Drawings; G, [_____]

Electrical Package; G, [_____]

Trench Package; G, [_____]

Boltworks Locking System; G, [_____]

SD-03 Product Data

Product Data; G, [_____]

SD-05 Design Data

Design Data; G, [_____]

SD-07 Certificates

Welding Procedures and Welder's Qualifications; G, [_____]

NDT Certificates; G, [_____]

SD-10 Operation and Maintenance Data

Training Video; G, [_____]

Door Description Information; G, [_____]

Draft Operations and Maintenance Manual, Data Package 2; G, [_____]

Final Operations and Maintenance Manual, Data Package 2; G, [_____]

SD-11 Closeout Submittals

Weld Inspection Report; G, [_____]

Report of Special Inspections; G, [_____]

Shop and Field Operating Test Reports; G, [_____]

Acceptance Testing Report; G, [_____]

Manufacturer's Warranty; G, [_____]

1.3 DOORS

Doors constructed in accordance with this specification are used in

magazine standard drawings approved by the Department of Defense Explosive Safety Board (DDESB) as a[7-bar][3-bar] earth covered magazine and may be sited as an exposed site magazine from other potential explosion sites storing up to [227,000 kg] [500,000 pounds] [_____] hazard division 1.1 explosives. The design and detailing of the magazine for blast loading is the sole responsibility of the government. The government is the engineer of record for the blast door. Any deviation from these standard drawings, except for foundation modifications, without the written approval from the Department of Defense Explosive Safety Board (DDESB) is not permitted as it may require the magazine to be considered an undefined magazine and may severely restrict the allowable storage capacity.

1.3.1 Door Systems

The general contractor must select a single manufacturer to provide a complete blast door system, including but not limited to the blast door and all associated components, hardware, rail, trench, trench cover assembly, plow-type trench cover lifting system (plow system), and embedded plates, including controls, motors, and installation. Provide blast-resistant magazine door system in accordance with the non-deviational standard drawings for door type[CLWS single bay][CLWS double bay][Box Type G][Box Type H][MSM v2] [_____] and UFC 4-420-01. This door system is designed to resist all wind, seismic, and blast effects, including fragment, ballistic, and forced entry resistance. Door system includes flashing, seals, weather stripping, controls, operators, electrical power, low voltage, security, and grounding as well as access for installation, maintenance, and replacement of all door components including, but not limited to, operators, motors, and drive. The door system size and arrangement of doors, top guides, bottom rails with drainage, and plow system, including details at head, sill, jambs, and door/frame and door/sill interfaces are specifically indicated based upon the performance standards required by the Government. The single manufacturer is responsible for providing all door components and completing the design of items not fully designed in the standard drawings. The entire door system described in the standard drawings must be manufactured and installed by a single manufacturer or the single manufacturer's representative, sanctioned by the manufacturer.

For the Door System: Submit Shop Drawings sealed by the door manufacturer's Registered Professional Engineer, Product Data, and Design Data consisting of catalog cuts, brochures, circulars, specifications, calculations, and product data that show the complete door system including all components. Submit Manufacturer's Installation Instructions and Field Testing Instructions. Submit Door Description Information, bound in manual form consisting of manufacturer's safety precautions, preventive maintenance, and schedules, troubleshooting procedures, special tools, parts list, and spare parts data. All material shown on the shop drawings must be cross referenced to the door designations shown on the standard drawings.

1.3.2 Door System Components

The door design is structurally complete and is non-deviational, including the headwall and locking system. Materials, dimensions, strengths, and connections included in the standard drawings must be strictly adhered to. Stronger material grades will not be permitted as they may result in increased reactions and altered performance under blast loading.

Door seals are critical to door system performance. All seals and

weather-stripping must be positively contacted when the door is closed, and all seals and weatherstripping must be inspectable and replaceable with the door in place.

1.3.3 Cybersecurity

Design all control systems (including systems separate from a utility monitoring and control system) in accordance with UFC 4-010-06 and as required by Section 25 05 11[_____] CYBERSECURITY FOR FACILITY-RELATED CONTROL SYSTEMS WITH C-I-A DETERMINATION [_____]. Implement cybersecurity requirements to mitigate vulnerabilities to all facility-related control and security systems.

1.4 QUALITY CONTROL

The blast door manufacturer is solely responsible for manufacturing, shipping, installing, and erecting the blast door system and must submit a Quality Control Plan which details quality control procedures to be undertaken at each phase of this work. The Quality Control Plan will be an item of discussion at the preconstruction meeting.

1.4.1 Welding

Welders, welding operators, and weld inspectors must be qualified in accordance with AWS D1.1/D1.1M except that welders performing arc welding of steel sheet and strip must be qualified in accordance with AWS D1.3/D1.3M.

1.4.2 Quality Control Plan

Develop and submit for approval a blast door system fabrication and installation quality control plan as specified herein. The plan must include the following:

a. Indicate the contractor's understanding and explanation of the QC process.

b. Include Special inspector qualifications and responsibilities.

c. Include shop QC manager (or in-house inspector) qualifications and responsibilities.

d. A list of challenging issues (available material challenges, shipping challenges, and schedule challenges).

e. Special procedures and processes.

f. Include a discussion of SI record keeping and required bi-weekly submittals and any other submittals to the contractor's QC manager.

g. Show coordination between SI inspector, in-house inspector, Shop QC manager, KTR QC manager.

h. Provide quality control reports to the Contracting Officer and Quality Manager.

i. Inspection and approval of all embedded items prior to placement of concrete.

Upon completion of the Quality Plan and a minimum of 2 weeks prior to beginning fabrication or construction activities, a preconstruction meeting must be held to review the Magazine Door Quality Plan. The meeting must include the DOR, Contractor's Quality Manager, Special Inspector, Fabrication Shop Quality Manager, in-house inspector, Contractor Superintendent, the Government Construction Manager, and a government representative familiar with Blast Doors, or their designated representative(s).

1.4.3 Manufacturer's Qualifications

The manufacturer providing the complete door system, must be regularly engaged in the fabrication, erection, and service of large, horizontal rolling, blast resistant, steel doors of the type, complexity, and size required for this project. The manufacturer must have at least 10 years of demonstrated experience fabricating, erecting, and servicing similar horizontal rolling, blast resistant steel doors weighing a minimum of 13,600 kg 30,000 pounds. Similar doors must have comparable function and design including size, configuration, type of use, elements, safety features, controls, and other key engineering elements as the door being specified. It is acceptable to show that a series of similar doors collectively meet all comparable elements to the door being specified, although not necessarily individually. The manufacturer must submit written evidence on a minimum of five examples of similar past doors listing the name, location, contact information of owners, installation dates, overall sizes, features, and other relevant information for experience and qualifications evaluation for approval by the Contracting Officer. Only manufacturers who can submit this evidence of actual installations where the products have proven practical and durable, and require a minimal amount of maintenance, will be qualified under this specification.

1.4.4 Installer's Qualifications

The manufacturer is responsible for the installation of the entire blast door system, including all components, and achieve final approval and acceptance by the Navy. A manufacturer's representative, skilled and experienced in the erection of horizontal rolling, blast resistant, steel doors of the type specified may be utilized if supervised by the manufacturer of the door system in accordance with approved shop drawings. For each installer, submit written evidence of similar past door installations listing the name, locations, contact information of owners, installation dates, overall sizes, features, and other relevant information for experience and qualifications evaluation.

1.4.5 Welding Procedures and Welder's Qualifications

Welders, welding operators, and weld inspectors must be qualified in accordance with AWS D1.1/D1.1M and AWS D1.6/D1.6M except that welders performing arc welding of steel sheet and strip must be qualified in accordance with AWS D1.3/D1.3M. Provide copies of all Welder's Certifications for welders both in the shop and in the field.

[Welding procedures which are considered pre-qualified as specified in AWS D1.1/D1.1M and AWS D1.6/D1.6M as applicable will be accepted without further qualification. Submit for approval a listing or an annotated drawing to indicate the joints not pre-qualified. Procedure qualification is mandatory for these joints.] [No pre-qualified welding procedures are allowed. Qualify the welding procedures and welders by tests prescribed

in the applicable code or specification not withstanding the fact the code or specification may allow pre-qualified procedures.]

1.4.6 Manufacturer's Warranty

Furnish manufacturer's written warranty covering the blast door assembly for 5 years after acceptance by the Government. Warranty must provide for repair and replacement of the blast door assembly, individual hardware, mechanical, electrical, and accessory items in the event of malfunction due to defects in design, materials, and workmanship.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials which are not shop installed on the doors in original rolls, packages, containers, boxes, or crates bearing the manufacturer's name, brand, and model number. Store materials and equipment in dry locations with adequate ventilation, free from soil, water, dust, and contaminants, and 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 DOORS

2.1.1 Structural Steel

Construct all structural steel in accordance with AISC 360. Structural steel bars, plates, and shapes must conform to ASTM A572/A572M, ASTM A992/A992M as indicated in the standard drawings, including steel grades. Hollow Structural Steel Sections must conform to ASTM A500/A500M Grade C, as indicated in the standard drawings. Provide stainless steel in accordance with ASTM A240/A240M Type 304 and design in accordance with AWS D1.6/D1.6M for trench covers, trench weldments, and embedments.

2.1.1.1 Bolted Connections

Provide bolted connections as shown in the standard drawings. Provide bolt heads of the supplied fasteners marked with the manufacturer's identification mark, the strength grade, and type specified by ASTM specifications. Provide the following:

Anchor Bolts: ASTM F1554, Grade as specified

High Strength Bolts: ASTM F3125/F3125M, Grade as specified

Provide compatible nuts and washers corresponding to the bolt grades and strengths above.

2.1.1.2 Welded Connections

Provide welds as shown in the standard drawings.

Provide Welding Electrodes and Rods in accordance with AWS D1.1/D1.1M and AWS D1.6/D1.6M.

2.1.2 Concrete

Concrete properties are specified in the standard drawings and must also

comply with[Section 03 30 00 CAST-IN-PLACE CONCRETE][03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE] [_____]. For concrete reinforcement, provide stainless steel expanded metal reinforcement of the type, size and gage as specified in the standard drawings. Refer to the standard drawings for the required concrete weight, mix design, admixtures, placement, and curing.

2.1.3 Wood

Refer to the standard drawings for species, size, and arrangement of wood to be utilized in the door. Provide wood that is kiln dried.

2.1.4 Components

2.1.4.1 Top Door Guide Assembly

Provide the Top Door Guide Assembly to resist the minimum lateral load capacity as shown on the standard drawings and permit magazine and door construction tolerances and temperature changes without binding or disengaging the door from the top door guide. Door roller guide will be welded to the door per manufacturer's calculations and recommendations and include horizontal stainless-steel rollers with sealed bearings which can be removed and replaced with the door remaining in place. Size and weld retention angles and plates per manufacturer's calculations and recommendations to resist forces and to permit construction tolerances and smooth door operation.

2.1.4.2 Door Stop

Provide door stops to resist the impact of the door at each extent of travel. The stop must not scratch or scar the door finish when the door engages the stop. Door silencers must also be provided to cushion the impact of the door so that steel-to-steel contact is not made during closing.

2.1.4.3 Door Seals

Door seals are critical to door system performance. Doors must have the full door perimeter and all door penetrations sealed. Provide as indicated[between door leaves and] on vertical edges, sills, and heads to afford a weathertight installation and form a portion of the Air Barrier in accordance with UFC 3-101-01. All seals must be positively contacted when the door is closed. Seals must be capable of sealing the mating surfaces, resistant to the atmospheric environment, and be inspectable, adjustable, and replaceable with the door in place. One spare set of gasket seals must be provided for each door assembly for which seals are specified.

Provide flexible door seals in all specified locations including on vertical edges, sills, and heads. Seals must be the dimension shown, but not less than 51 mm 2 inch wide, and be a minimum of two-ply cloth-inserted EPDM material with a minimum thickness of 3 mm 1/8 inch and retained continuously for its full length with flat head socket cap and secured with rust-resistant fasteners spaced no more than 152 mm 6 inches on center. Provide weather stripping at bottom of the door to match the lowest height of the jamb weather stripping.

2.1.4.4 Wheel and Motor Drive System

Machine wheels from a single piece of material. Provide steel plate bottom wheels having a minimum tread diameter as required for the actual wheel loading, but not less than 457 mm 18 inches. Construct wheel assemblies to permit removal of the wheel without requiring removal of the door.

Concrete filled doors require wheels offset nominally toward the interior side of the door to be located at the door's center of gravity. Door manufacturer must calculate and verify center of gravity, prior to final fabrication.

2.1.4.4.1 Treads

Machine wheel treads are to be concentric with bearing seats. The maximum clear distance between flanges cannot exceed the width of the rail by more than 3 mm 1/8 inch at the tread nor more than 6 mm 1/4 inch at the edge of the flange. Machine internal bearing seats accurately for a press fit. Heat treat wheels to obtain a rim hardness of 320 Brine1l.

2.1.4.4.2 Wheel Bearings

Provide tapered roller or spherical bearings, either internal or cartridge type, arranged so that both horizontal and vertical loads are transferred to the rail only through the bearing. Provide bearings tightly sealed and equipped with high-pressure grease fittings.

2.1.4.4.3 Traction Drive

Provide a traction drive door system where the leading edge (door closing) wheel box contains both a wheel and a chain drive power system. The trailing edge wheel is not powered and only contains an idler wheel.

Provide a door system with a manual system override including motor brake disengagement and 13 mm 0.5 inch standard female socket that is capable of both opening and closing the door system.

2.1.4.4.4 Motor Drive

Design motor drive to move its door at a speed of approximately 4.5 meters 15 feet per minute. Design the operating units to consist of a separate motor and gear reducer, high-speed shaft brake, and necessary roller chains and sprockets. Provide the systems with overload protection for the drive units. Provide NEMA MG 00001, high-starting torque, reversible type motor with sufficient horsepower and torque output to operate its door in both directions from any position at not more than 75 percent of its rated capacity. Select motor to operate on current voltage of the characteristics indicated at not more than 3600 rpm. Provide NEMA totally-enclosed, fan-cooled (TEFC) and design using a minimum service factor of 1.2. Provide calculations and product data.

Provide braking systems to ensure stoppage of the doors under normal, dry rail conditions. Provide either a magnetic, spring-set, solenoid-released brake or hydraulic type braking systems. Provide a hand release to release the brake when it becomes necessary to move the door manually. Provide an automatic reset type hand release so that the brake will be operable during subsequent electrical operation of the door.

2.1.4.5 Rail and Trench System

Provide rail(s) as indicated in the standard drawings per ASTM A1. Provide the plow trench cover system and complete the notionally detailed design shown in the standard drawings. Provide all rail and trench system including all components in the Trench Package.

2.1.4.5.1 Rail Tolerance

In accordance with the design, the blast door and components must meet the following tolerances for trueness and levelness:

All trenches and door guide rail must have a 6 mm 1/4 inch maximum differential tolerance per every 11 meters 37 feet.

2.1.4.6 Plow-type Trench Cover Lifting System (Plow System)

The plow trench cover assembly is notionally detailed in the standard drawings. The system to be provided by the manufacturer may vary based upon the door manufacturer's approved design. Dimensions noted with an asterisk (*) must be coordinated with the door manufacturer designing and providing the plow system to provide a door trench cover roller with a smooth transition between closed and open positions.

All plates are to be 6 mm 1/4 inch thick plate minimum unless noted otherwise and weld all joints with a minimum 5 mm 3/16 inch fillet unless noted otherwise in the details.

2.2 FABRICATION

Fabricate doors in accordance with the applicable provisions of AISC 360. Workmanship must be equal to standard commercial practice in modern metal shops. Fabricate and assemble in the shop to the greatest extent possible.

2.2.1 Frames and Framing

Provide welded or bolted construction of doors as shown in the standard drawings. Provide continuous vertical members throughout the height of the door, unless noted otherwise in the standard drawings. Provide frames and framing members true to dimensions and square in all directions; no bowed leaves, warped, or out of line in the vertical or horizontal plane of the door opening by more than 1 mm in 2 meters 1/8 inch in 20 feet. Do not deviate from the standard drawings for any reason, including to resist operational loads and packaging to withstand shipping loads. Grind smooth any exposed welds and prepare, prime, and coat steel as specified in paragraph FINISHES.

2.2.2 Weldments, Embedments, and Trench Covers

Provide ASTM A240/A240M, Type 304 Stainless Steel for door systems including door jamb, door head and locking pilaster.

2.2.3 Shop Assembly

Welding is a critical component in the success of constructing these doors, including meeting door construction tolerances. Welding must be in accordance with AWS D1.1/D1.1M except that arc welding of steel sheet and strip must be in accordance with AWS D1.3/D1.3M. For the doors, welding might cause significant residual stresses; therefore, the contractor must

submit for approval by the Contracting Officer a detailed Sequence of Welding, augmenting the requirements given by the AWS specifications.[Stainless steel must be welded using electrodes conforming to AWS A5.4/A5.4M.] Fabricated steel must be well-formed to shape and size, with sharp lines and angles. Intermediate and corner joints must be coped or mitered. Exposed welds must be dressed smooth.[The stiles[and top] of built-up structural steel doors must be closed using channel shapes or plates as shown in the standard drawings.] Weld all steel in accordance with the standard drawings.

2.2.4 Door Tolerance

In accordance with the design, the blast door and components must meet the following tolerances for trueness and levelness:

Blast door cannot exceed a total maximum flatness tolerance of 7 mm 1/4 inch either vertically or horizontally.

2.2.5 Quality Assurance Demonstration

The door manufacturer must commence a shop demonstration of each door in the presence of the Contracting Officer or their designee, consisting of a successful cycle of opening and closing the door by controls, opening and closing of trench plates by door plows, locking and unlocking door, and alignment of door in security pilaster. The demonstration must be a minimum of half the length of the door travel. Demonstration must also include manual operation of the blast door in both directions.

2.3 OPERATION

Each door is individually operated. For each door provide a separate, traction-drive operating unit driving one of the bottom wheels. On each door provide a motor-mounted, springset, solenoid-released motor brake. Provide doors that are operated from pilaster mounted controls with visibility of the door's leading edge.

2.3.1 Controls

Provide control equipment conforming to NEMA ICS 1 and NEMA ICS 2. Provide[mushroom][guarded] head type push buttons, mounted in heavy-duty, oiltight enclosures conforming to NEMA ICS 6, Type 4, except that enclosure for the VFD with disconnect switch requires Type[12 for interior application][4 for exterior application].[Provide watertight enclosures for exterior push buttons conforming to NEMA ICS 6, Type 4.]

When the Internal Locking Device (ILD) Boltworks Locking System is locked, the Variable Frequency Drive (VFD) is not powered. When unlocked, the VFD is powered. Provide constant pressure push buttons for each individually operated door. Door movement will be stopped upon removal of pressure from the button. Provide push buttons mounted on the exterior face of locking pilaster next to the ILD locking boltworks. Provide the open control button on top of the color green and provide a closer button below the open button of the color red.

2.3.1.1 Safety Interlocks

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NOTE: When mechanical rooms are included in the design, include the below section for safety

interlocks to prevent the adjacent blast door from interfering with mechanical room access [and][or] door.

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When mechanical rooms are included in the design, door controller must be provided for the blast door adjacent to the associated mechanical room with safety interlock feature when sensing mechanical room is open. Door control feature must include a door contact/relay interlocking with blast door control system and mechanical room door so that once the mechanical room door is in 'open mode' or 'unlocked', the control system of the adjacent blast door will be disabled from moving the blast door.

2.3.2 Variable Frequency Drive(s)

For each door, provide a Variable Frequency Drive (VFD) in NEMA ICS 1, Type[4][12] enclosures equipped with access door-controlled, UL 489 Molded Case Circuit Breaker (MCCB) with a through-the-door disconnect switch. The control system includes but is not limited to a VFD equipped with overload and undervoltage protection, relays and timing devices as required, control circuit transformers, and a numbered terminal strip. Provide a control circuit transformer capable of reducing the voltage in the control circuits to 120 volts or less and conforms to UL 506. Provide each VFD to move its door at a speed of approximately 4.5 meters 15 feet per minute. The VFD in each door must automatically transition to crawl speed at each confirmed limit of door movement (full open and full close).

Provide each operating unit with a separate motor and gear reduction unit, highspeed shaft brake, and necessary roller chains and sprockets. Provide the systems with overload protection for the drive units and a means for emergency tractor towing operation.

2.3.2.1 Gear Reduction Unit(s)

Provide gear reduction units that allow a reversal of effort through the gears without damage to the units.

2.3.3 Operations and Maintenance Manual

Submit in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA. Include wiring and control diagrams. Door manufacturer must submit a complete Draft Operations and Maintenance Manual, Data Package 2 to the Contracting Officer for approval and must also submit a Final Operations and Maintenance Manual, Data Package 2 for record.

2.4 LIGHTNING PROTECTION SYSTEM

The Lightning Protection System (LPS) consists of a complete grounding system which electrically bonds all steel doors, frames, and components to the magazine's reinforcing cage in order to maintain equipotential. Provide a grounding reel at top of the door with a grounding path in the door to all components. Provide local bonding with a dedicated path tied to the facility grounding systems to maintain equipotential. All structural and miscellaneous items embedded in the concrete must be electrically bonded to the reinforcing cage by wire ties.

2.5 ELECTRICAL

Provide conduit, wire, flexible cables, boxes, devices, and accessories[,

and install trolley duct,] under Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. If permanent electrical power is not available when door installation is complete, provide temporary power in accordance with distribution system requirements in Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM, for testing and adjusting the doors.

Submit the door manufacturer's Electrical Package including complete schematic wiring diagram, field wiring diagram, and a complete physical location drawing showing the location of controls with the runs of conduit, size of conduit, number and size of wires in each conduit, location of junction boxes, and full details of control mountings.

2.5.1 Electrical Work

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NOTE: Insert the following into Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.
"EARTH COVERED MAGAZINE DOORS: Provide field wiring for doors under this section in accordance with door manufacturer's written instructions, drawings and diagrams, and NFPA 70 and NEMA ICS 1. Provide conduit, wiring, boxes, cables, devices, and accessories under this section. If permanent electrical power is not available when door installation is complete, provide temporary power for testing and adjusting doors for proper operation. Provide draped or festooned cable system under this section with extra-flexible Type SD cable."

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It is the door manufacturer's responsibility to provide the proper electrical equipment and controls built in accordance with the latest NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6 standards. Provide all equipment and controls, and circuits that conform to NFPA 70. Provide automatic control devices necessary for motor operation of the door, including push button stations, limit switches, variable frequency drive with UL 489 MCCB motor circuit protection, control circuit transformers, relays, timing devices, warning devices, and draped or festooned cable system with extra flexible Type SD cable.

2.5.2 Intrusion Detection System (IDS)

Coordinate with the Contracting Officer for the size and locations of balanced magnetic switches and motion sensors, and routing of all IDS conduit. Balanced magnetic switches, motion sensors, and conductors will be installed and connected to the Intrusion Detection System (IDS) by the Government. Pathway, conduit, and junction boxes will be provided by the contractor.

Coordinate with the Contracting Officer for the locations, routing of conduit, and connection of the Internal Locking Device (ILD) Boltworks Locking System which must be installed and connected to the Intrusion Detection System (IDS) by the Government. Pathway, conduit, and junction boxes will be provided by the contractor.

2.6 FINISHES

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NOTE: The coating system specified in Section 09 97 13.27 HIGH PERFORMANCE COATING FOR STEEL STRUCTURES is very robust and should always be followed.

The Navy Standard Magazine Door drawings require the following:

All coating and installation of coatings must comply with Section 09 97 13.27.

Field Coatings: SSPC QP1 + QS1
Color: Light Gray

Surface Preparation:
Remove slag from all welding surfaces prior to cleaning in accordance with NACE SP0178. Solvent clean surface to be coated prior to abrasive blasting in accordance with SSPC SP1. Prior to fully assembling or fabricating door, clean and primer surfaces that will become inaccessible after the door is assembled. The door must not be galvanized. Dry abrasive blast to near white finish in accordance with SSPC SP10/NACE No. 2. Blast profile must be 1-3 mils tooth height.

Paint Systems:
Total coating dry film thickness (DFT): 12 mils

Zinc Rich Primer Coat:
Abrasion resistant inorganic zinc silicate primer (3-5 mils). SSPC Paint 20, Type IC, Level 1 with at least 85 percent zinc in dry film.

Intermediate Coat:
High solids epoxy coating (3-5 mils). MPI No. 108.

Top Coat:
High solids polyurethane coating (3-5 mils). MPI No. 72.

Insert the following into Section 09 97 13.27 paragraph, SURFACES TO BE COATED:

Section 08 39 55.00 20 NAVY STANDARD EARTH-COVERED MAGAZINE DOORS references Section 09 97 13.27.

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Clean, prepare, and coat all exposed and non-exposed ferrous metal surfaces as part of the Section 09 97 13.27 HIGH PERFORMANCE COATING FOR STEEL STRUCTURES work, including all requirements, submittals, certifications, testing, and inspections required by Section 09 97 13.27. Do not coat finished bearing surfaces. Alternative coating systems or products will not be considered. Prepare surface and follow all temperature, humidity, and testing requirements listed in Section 09 97 13.27. After installation of the door, prep and touch up surfaces damaged during assembly and installation of the door. Prep and coat unfinished ferrous metal accessories such as bolts and brackets. Provide details and document compliance path in the Coating Submittal Package.

2.7 SPECIAL INSPECTIONS

Special inspection requirements are included in the standard drawings, UFC 3-301-01, and UFC 4-420-01 which must be adhered to, and the successful final results of all Special Inspections will be submitted in the Report of Special Inspections. Systems requiring special inspections include, but are not limited to:

Fabricator Certification and Quality Control Procedures

Fabrication Inspection

Shop Demonstration

ECM Grounding

Grounding System

Individual Bonds

LPS Components

LPS Testing

Door Laps

Embedded and Attached Items (Doors, Frames, and Trenches)

2.8 ACCESSORIES

2.8.1 Hardware

Coordinate with the Contracting Officer for procurement and installation of the Internal Locking Device (ILD) Boltworks Locking System and the distribution of key sets for each magazine door. The ILD Boltworks Locking System must be procured with two unique keys for operation.

Contact the DoD Lock Program for directions on how to procure the ILD Boltworks Locking System and the qualifications for procuring a qualified Boltworks Manufacturer.

DoD Lock Program: https://navfac.navy.mil/go/locks

Email: ILD_Field_Support@navy.mil

ILD Support Hotline: 805-982-5625

DoD Lock Program Technical Support: 800-290-7607 or 805-982-1212

2.8.2 Nameplate

Each door assembly must have a permanently affixed nameplate that displays the manufacturer's name, place, year of manufacture, and applicable peak overpressure, and impulse. Mount nameplate on a nearby interior wall.

PART 3 EXECUTION

3.1 ERECTION

Assemble and install the doors and accessories in accordance with the manufacturer's recommendations and installation manual. Provide all work associated with these door systems under the direct supervision and control of the manufacturer for safety, quality control, and control of product performance and liability. Coordinate the erection of the doors with the work of other trades. Coordinate electrical work, including locations of all panels, equipment, motors, and other components for required clearances for maintenance, access, and routing of power.

3.1.1 Procedure

Erect and install in accordance with the manufacturer's written instructions, AISC 360, and ACI 318 and submit an Installation Plan which is covered in the preconstruction meeting. Use erecting equipment suitable for the work and in proper working 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, obtain approval of the method of correction, and make the correction in their presence. The straightening of plates and angles or other shapes must be done by the methods approved by the Contracting Officer. If heating of metal is approved for straightening, it must not be to a higher temperature than that producing a dark "cherry red" color. After heating, the metal must be cooled as slowly as possible. Evidence of fracture on the surface of the metal after straightening is not allowed. Drain steelwork properly; fill pockets exposed to the weather with an approved waterproof material.

3.1.2 Erection Tolerances

Steel construction must be in accordance with the tolerances in ANSI/AISC 303, unless noted otherwise. Concrete construction must be in accordance with the tolerances in ACI 301, unless noted otherwise.

3.1.3 Temporary Welds and Backing Strips

Temporary Welds and Backing Strips must be removed.

3.2 ELECTRICAL WORK

Provide all conduit, wiring, and mounting of controls in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and NFPA 70. Provide and install all[208v 3-phase][480v 3-phase] [_____] supply power to all components such as main, auxiliary, controllers, panels, motors, and other devices which require low voltage supply power. Provide and install all conduit for the control level power. Provide and install all wiring for control level power in accordance with the approved submittals.

3.3 TESTS, INSPECTIONS, AND VERIFICATIONS

Submit Shop and Field Operating Test Reports that include values for opening and closing forces and times, forces required to operate latches, and a description of all operating tests performed.

3.3.1 Inspection

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

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

b. Recheck 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

Furnish the services of AWS-certified welding inspectors for fabrication and erection inspection and testing and verification inspections in accordance with AWS D1.1/D1.1M and AWS D1.6/D1.6M. Perform visual inspections on 100 percent of all shop and field welds with a Certified Welding Inspector. Document this inspection in the Weld Inspection Report.

Inspect for proper preparation, size, gaging location, identification marking, and operation and current characteristics of welding sets in use and acceptability of all welds.

3.3.3 Nondestructive Testing

Perform nondestructive testing (NDT) in accordance with AWS D1.1/D1.1M[and AWS D1.6/D1.6M][and AWS D1.8/D1.8M]. Perform ultrasonic testing in accordance with Table[6.2][6.3] of AWS D1.1/D1.1M[and Table 8.2 of AWS D1.6/D1.6M]. Test 50 percent of all welds, with sampling representative of all weld types and locations for the entire door system, for the duration of the fabrication schedule and both shop and field welds. All personnel performing NDT are required to be certified in accordance with ANSI/ASNT CP-189 in the method of testing being performed. Submit NDT Certificates showing compliance with ANSI/ASNT CP-189 for all NDT technicians. If more than 10 percent of welds made by a welder contain defects identified by testing, then all groove welds made by that welder are required to be tested by ultrasonic testing, and all fillet welds made by that welder are required to be inspected by magnetic particle testing (MT) or dye penetrant testing (PT). When groove welds made by an individual welder are required to be tested, MT or PT may be used only in areas inaccessible to ultrasonic testing. Retest all repaired areas. Submit Weld Inspection Report.

Any weld repairs required must be in accordance with AWS D1.1/D1.1M.

3.4 FINAL CLEANUP, PROTECTION, LUBRICATION, AND ADJUSTMENT

3.4.1 Cleanup

After erection is complete, and before repair of protective coatings, thoroughly clean both the interior and exterior of the door and all abraded surfaces, field welds, and field bolts.

3.4.2 Protective Coatings

Complete all protective coating systems in accordance with the paragraph FINISHES including repair of all damage to the protective coating system in accordance with the requirements of Section 09 97 13.27 HIGH PERFORMANCE COATING FOR STEEL STRUCTURES. Prepare surface and apply coatings following all temperature, humidity, and testing requirements listed in Section 09 97 13.27.

3.4.3 Lubrication and Adjustment

Upon completion of installation, including work by other trades, lubricate, adjust, and perform preliminary door tests to verify operation in accordance with manufacturer's product data. Final adjustments will be made by the manufacturer. Adjust and retest the doors until the entire installation is fully operational and acceptable.

3.5 ACCEPTANCE TESTING PROCEDURE AND REPORT

Submit an Acceptance Testing Procedure for approval. After Government approval, and after installation is complete, field test each door for operation, clearance, fit, seating, and sealing by operating the door and hardware through a minimum of 10 operating cycles (unlock, full open, full close, and lock is one cycle) within the manufacturer's written time interval between cycles. Test the entire door system including every component and door hardware, and confirm maximum operational forces specified are not exceeded. Provide personnel and equipment required to perform field testing. Perform all field tests in the presence of the Contracting Officer. After testing is successfully completed, prepare the Acceptance Testing Report and submit to the Contracting Officer.

3.6 PERSONNEL TRAINING

Provide a 2-hour on-site training session for the Government's door operating personnel and maintenance. Attendees may include base personnel such as facility users, fire department, and others. In the training, outline door safety, normal operation, emergency operation, troubleshooting, maintenance, and repair guidelines.[Record this on-site training and provide a Training Video presented in an organized and coherent fashion such that the Government may use the video as the sole training program for future user operators. It is acceptable to utilize stock training video content in this video provided the door operation, safety, and controls are identical to the door system provided.]

-- End of Section --