JOINT BASE LEWIS McCHORD

DESIGN STANDARDS

DIVISION 05 - METALS SECTION 05 50 13

MISCELLANEOUS METAL FABRICATIONS

# 07/18

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the

extent referenced. The publications are referred to within the text by the

basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF45 2003; Reaffirmed 2009) Designation System

for Aluminum Finishes

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303 (2010) Code of Standard Practice for Steel

Buildings and Bridges

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.3 (2006) Operations - Safety Requirements

for Powder Actuated Fastening Systems

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2012; Errata 2011) Structural Welding

Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1 (2010) Square and Hex Bolts and Screws

(Inch Series)

ASME B18.2.2 (2010) Standard for Square and Hex Nuts

ASME B18.21.1 (2009) Washers: Helical Spring-Lock, Tooth

Lock, and Plain Washers (Inch Series)

ASME B18.6.2 (1998; R 2010) Slotted Head Cap Screws,

Square Head Set Screws, and Slotted

Headless Set Screws: Inch Series

ASME B18.6.3 (2010) Machine Screws, Tapping Screws, and

Machine Drive Screws (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2012) Standard Specification for Zinc

(Hot-Dip Galvanized) Coatings on Iron and

Steel Products

ASTM A153/A153M (2009) Standard Specification for Zinc

Coating (Hot-Dip) on Iron and Steel

Hardware

ASTM A307 (2010) Standard Specification for Carbon

Steel Bolts and Studs, 60 000 PSI Tensile

Strength

ASTM A36/A36M (2008) Standard Specification for Carbon

Structural Steel

ASTM A385/A385M (2011) Standard Practice for Providing

High-Quality Zinc Coatings (Hot-Dip)

ASTM A47/A47M (1999; R 2009) Standard Specification for

Ferritic Malleable Iron Castings

ASTM A475 (2003; R 2009e1) Standard Specification

for Zinc-Coated Steel Wire Strand

ASTM A500/A500M (2010a) Standard Specification for

Cold-Formed Welded and Seamless Carbon

Steel Structural Tubing in Rounds and

Shapes

ASTM A53/A53M (2012) Standard Specification for Pipe,

Steel, Black and Hot-Dipped, Zinc-Coated,

Welded and Seamless

ASTM A653/A653M (2011) Standard Specification for Steel

Sheet, Zinc-Coated (Galvanized) or

Zinc-Iron Alloy-Coated (Galvannealed) by

the Hot-Dip Process

ASTM A780/A780M (2009) Standard Practice for Repair of

Damaged and Uncoated Areas of Hot-Dip

Galvanized Coatings

ASTM A786/A786M (2005; R 2009) Standard Specification for

Hot-Rolled Carbon, Low-Alloy,

High-Strength Low-Alloy, and Alloy Steel

Floor Plates

ASTM A924/A924M (2010a) Standard Specification for General

Requirements for Steel Sheet,

Metallic-Coated by the Hot-Dip Process

ASTM B108/B108M (2012; E 2012) Standard Specification for

Aluminum-Alloy Permanent Mold Castings

ASTM B209 (2010) Standard Specification for Aluminum

and Aluminum-Alloy Sheet and Plate

ASTM B221 (2012) Standard Specification for Aluminum

and Aluminum-Alloy Extruded Bars, Rods,

Wire, Profiles, and Tubes

ASTM B26/B26M (2012) Standard Specification for

Aluminum-Alloy Sand Castings

ASTM C1513 (2012) Standard Specification for Steel

Tapping Screws for Cold-Formed Steel

Framing Connections

ASTM D1187/D1187M (1997; E 2011; R 2011) Asphalt-Base

Emulsions for Use as Protective Coatings

for Metal

MASTER PAINTERS INSTITUTE (MPI)

MPI 79 (Oct 2009) Alkyd Anti-Corrosive Metal

Primer

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 3 (1982; E 2004) Power Tool Cleaning

SSPC SP 6/NACE No.3 (2007) Commercial Blast Cleaning

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.502 Fall Protection Systems Criteria and

Practices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Access doors and panels, installation drawings; G

Cover plates and frames, installation drawings; G

Roof hatch; G

Fall protection anchors; G

Structural Steel Door Frames; G

Submit fabrication drawings showing layout(s), connections to

structural system, and anchoring details as specified in AISC 303.

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

Access doors and panels

Cover plates and frames

Roof hatch

Fall protection anchors

SD-07 Certificates

Materials

Provide certificates for steel members to receive galvanized finish indicating chemical composition of steel.

1.3 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.4 DELIVERY, STORAGE, AND PROTECTION

Protect 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 Carbon Steel

ASTM A36/A36M.

2.1.2 Structural Tubing

ASTM A500/A500M.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Fittings for Steel Pipe

Standard malleable iron fittings ASTM A47/A47M.

2.1.5 Floor Plates, Patterned

Floor plate ASTM A786/A786M. Steel plate shall not be less than 14 gage.

2.1.6 Steel Deck

Steel deck shall be as indicated, and shall be galvanized.

2.1.7 Anchor Bolts

ASTM A307. Where exposed, shall be of the same material, color, and finish as the metal to which applied.

2.1.7.1 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.7.2 Toggle Bolts

ASME B18.2.1.

2.1.7.3 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 or ASTM A307.

2.1.7.4 Powder Actuated Fasteners

Follow safety provisions of ASSE/SAFE A10.3.

2.1.7.5 Screws

ASME B18.2.1, ASME B18.6.2, ASME B18.6.3 and ASTM C1513.

2.1.7.6 Washers

Provide plain washers to conform to ASME B18.21.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.1.

2.1.8 Aluminum Alloy Products

Conform to ASTM B209 for sheet plate, ASTM B221 for extrusions and

ASTM B26/B26M or ASTM B108/B108M for castings, as applicable. Provide aluminum extrusions at least 1/8 inch thick and aluminum plate or sheet at least 0.050 inch thick.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: ASTM A123/A123M, ASTM A153/A153M,

ASTM A653/A653M or ASTM A924/A924M, G90, as applicable.

2.2.2 Galvanize

Anchor bolts, grating fasteners, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to ASTM A780/A780M or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting

Officer. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.2.4 Shop Cleaning and Painting

2.2.4.1 Surface Preparation

Blast clean surfaces in accordance with SSPC SP 6/NACE No.3. Surfaces that will be exposed in spaces above ceiling or in attic spaces, crawl spaces, furred spaces, and chases may be cleaned in accordance with SSPC SP 3 in lieu of being blast cleaned. Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete shall be free of dirt and grease. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints, but coat with rust preventative applied in the shop.

2.2.4.2 Pretreatment, Priming and Painting

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions. On surfaces concealed in the finished construction or not accessible for finish painting, apply an additional prime coat to a minimum dry film thickness of 1.0 mil. Tint additional prime coat with a small amount of tinting pigment.

2.2.5 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.2.6 Aluminum Surfaces

2.2.6.1 Surface Condition

Before finishes are applied, remove roll marks, scratches, rolled-in scratches, kinks, stains, pits, orange peel, die marks, structural streaks, and other defects which will affect uniform appearance of finished surfaces.

2.2.6.2 Aluminum Finishes

Unexposed sheet, plate and extrusions may have mill finish as fabricated.

Sandblast castings' finish, medium, AA DAF45. Unless otherwise specified, provide all other aluminum items with a standard mill finish. Provide a coating thickness not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF45. Provide a polished satin finish on items to be anodized.

2.3 ACCESS DOORS AND PANELS

Provide flush type access doors and panels unless otherwise indicated.

Fabricate frames for access doors of steel not lighter than 14 gage with welded joints and anchorage for securing into construction. Provide access doors with a minimum of 14 by 20 inches and of not lighter than 14 gage steel, with stiffened edges and welded attachments. Provide access doors hinged to frame and with a flush-face, turn-screw-operated latch. Provide exposed metal surfaces with a shop applied prime coat.

2.4 COVER PLATES AND FRAMES

Fabricate cover plates of 1/4 inch thick rolled steel weighing not more than 100 pounds per plate with a diamond raised pattern nonslip top surface.

Plate shall be galvanized. Butt joint straight runs. Allow for expansion on straight runs over 15 feet. Provide flush drop handles for removal formed from 1/4 inch round stock. Provide holes and openings with 1/2 inch clearance for pipes and equipment. Remove sharp edges and burrs from cover plates and exposed edges of frames. Weld all connections and grind topsurface smooth. Weld bar stops every six inches. Provide 1/8 inch clearance at edges and between cover plates.

2.5 ROOF HATCH

Provide zinc-coated steel sheets not less than 14 gage, with 3 inch beaded flange, welded and ground at corner. Provide a minimum clear opening of 30 by 36 inches. Construction and accessories as follows:

a. Insulate cover and curb with one inch thick rigid fiberboard insulation covered and protected by zinc-coated steel liner not less than 26 gage with 12 inches high curb, formed with 3 inch mounting flange with holes provided for securing to the roof deck. Equip the curb with an integral metal cap flashing of the same gage and metal as the curb, full welded and ground at corners for weather tightness.

b. Provide hatch completely assembled with pintle hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles on inside and outside, and neoprene draft seal. Provide fasteners for padlocking on the inside. Equip the cover with an automatic hold-open arm complete with grip handle to permit one-hand release. Cover action shall be smooth through its entire range with an operating pressure of approximately 30 pounds.

2.6 GUARD POSTS (BOLLARDS/PIPE GUARDS)

Provide galvanized standard weight steel pipe as specified in ASTM A53/A53M. Anchor posts in concrete as indicated and fill solidly with concrete with minimum compressive strength of 2500 psi.

2.7 MISCELLANEOUS PLATES AND SHAPES

Provide for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings and frames.

Provide angles and plates, ASTM A36/A36M, for embedment as indicated.

Galvanize embedded items exposed to the elements according to

ASTM A123/A123M.

2.8 STRUCTURAL STEEL DOOR FRAMES

Provide frames of rolled shapes as indicated. Miter and weld heads to jambs. Provide frames for swinging doors with 5/8 by 1 1/2 inch solid bar stops secured to the frame by welding or by 1/4 inch diameter countersunk machine screws spaced not more than 12 inches on centers. Secure frames to concrete with zinc-coated metal anchors spaced as indicated. Where necessary to engage the threads of machine screws for fastening hardware, tap frames as necessary for the installation of hardware and other work. Provide strike openings to receive door locking hardware. Countersink rivets and screw heads where exposed in the finished work. Grind welds smooth.

2.9 GUY CABLES

Guy cables shall be prestretched, galvanized wire rope of the sizes indicated. Wire rope shall conform to ASTM A475, high strength grade with Class A coating. Guys shall have a factory attached clevis top-end fitting; a factory attached open-bridge strand socket bottom-end fitting; and be complete with oval eye, threaded anchor rods. Fittings and accessories shall be hot-dip galvanized.

2.10 ENTRY CANOPIES

Entry canopies shall be fabricated as indicated and the entire assembly, except metal decking, shall be hot dipped galvanized in accordance with

ASTM A385/A385M, minimum coating weight of 2 ounces per square foot. Metal deck shall be G90 galvanized in accordance with ASTM A653/A653M. Attachment plates connecting to building structure shall also be hot-dipped galvanized to a minimum coating weight of 2 ounces per square foot. The galvanized finish shall have a uniform, shiny appearance. Coordinate galvanizing process with the chemical composition of the steel as needed to provide specified appearance. Canopy surfaces will not be painted.

2.11 FALL PROTECTION ANCHORS/GUY WIRE ANCHORS

Fall protection and guy wire anchors shall be prefabricated units consisting of a 12 inch high, minimum 2 inch diameter, schedule 80 steel pipe stanchion with a closed top and fixed steel bar anchor loop, with a steel base plate as required to attach to structure. Anchors shall be attached to structure in accordance with manufacturer's instructions.

Anchor shall capable of supporting a minimum of 5,000 pounds in accordance with the requirements of 29 CFR 1926.502. Galvanized finish.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners shall be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Form joints exposed to the weather shall be formed to exclude water. Items listed below require additional procedures.

3.2 WORKMANSHIP

Provide miscellaneous metalwork that is well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections of work in place and ground smooth. Provide a smooth finish on exposed surfaces of work in place and unless otherwise approved, flush exposed riveting. Mill joints where tight fits are required. Corner joints shall be coped or mitered, well formed, and in true alignment. Accurately set work to established lines and elevations and securely fastened in place. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening miscellaneous metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 BUILT-IN WORK

Form for anchorage metal work built-in with concrete or masonry, or provide with suitable anchoring devices as indicated or as required. Furnish metal work in ample time for securing in place as the work progresses.

3.5 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.6 FINISHES

3.6.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

3.6.2 Field Preparation

Remove rust preventive coating just prior to field erection, using a remover approved by the rust preventive manufacturer. Surfaces, when assembled, shall be free of rust, grease, dirt and other foreign matter.

3.6.3 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than 5 degrees F above the dew point of the surrounding air, or when surface temperature is below

45 degrees F or over 95 degrees F, unless approved by the Contracting

Officer.

3.7 ACCESS PANELS

Install a removable access panel not less than 12 by 12 inches directly below each valve, flow indicator, damper, or air splitter that is located above the ceiling, other than an acoustical ceiling, and that would otherwise not be accessible.

3.8 COVER PLATES AND FRAMES

Install the tops of cover plates and frames flush with floor.

3.9 INSTALLATION OF GUARD POSTS (BOLLARDS/PIPE GUARDS)

Set pipe guards vertically in concrete piers. Construct piers of, and the hollow cores of the pipe filled with, concrete having a compressive strength of 3000 psi.

3.10 STRUCTURAL STEEL DOOR FRAMES

Secure door frames to concrete walls at head and jambs with expansion bolts as indicated. Install frames to wrap edges of previously formed concrete openings as indicated. Weld corners of frames and grind smooth. Make any necessary reinforcements and drill and tap the frames as required for hardware.

3.11 ENTRY CANOPIES

Fabricate entry canopies in accordance with the requirements of AISC 303,

Section 10, Architecturally Exposed Structural Steel (AESS). Attachment plates connected to the building structure shall be installed prior to installation of exterior building envelope. Envelope materials shall be flashed and sealed around the plate penetration prior to installation of the canopies. Repair damage to galvanized finish to maintain appearance and protection of substrate metal.

-- End of Section --