

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1      GENERAL**

**1.01      REFERENCES**

A.    The following is a list of standards which may be referenced in this section:

1.    The Aluminum Association, Inc. (AA): The Aluminum Design Manual.
2.    American Galvanizers Association (AGA):
  - a.    Inspection of Hot-Dip Galvanized Steel Products.
  - b.    Quality Assurance Manual.
3.    American Iron and Steel Institute (AISI): Stainless Steel Types.
4.    American Ladder Institute (ALI): A14.3, Ladders - Fixed - Safety Requirements.
5.    American National Standards Institute (ANSI).
6.    American Society of Safety Engineers (ASSE): A10.11, Safety Requirements for Personnel and Debris Nets.
7.    American Welding Society (AWS):
  - a.    D1.1/D1.1M, Structural Welding Code - Steel.
  - b.    D1.2/D1.2M, Structural Welding Code - Aluminum.
  - c.    D1.6/D1.6M, Structural Welding Code - Stainless Steel.
8.    ASTM International (ASTM):
  - a.    A36/A36M, Standard Specification for Carbon Structural Steel.
  - b.    A48/A48M, Specification for Gray Iron Castings.
  - c.    A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - d.    A108, Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
  - e.    A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - f.    A143/A143M, Standard for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - g.    A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - h.    A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
  - i.    A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.

- j. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- k. A276, Standard Specification for Stainless Steel Bars and Shapes.
- l. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- m. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- n. A325, Standard Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
- o. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
- p. A384/A384M, Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
- q. A385/A385M, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
- r. A489, Standard Specification for Carbon Steel Lifting Eyes.
- s. A500/A500M, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- t. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- u. A563, Standard Specification for Carbon and Alloy Steel Nuts.
- v. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- w. A780/A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- x. A786/A786M, Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
- y. A793, Standard Specification for Rolled Floor Plate, Stainless Steel.
- z. A967, Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.
- aa. A992/A992M, Standard Specification for Structural Steel Shapes.
- bb. A1085, Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS).
- cc. B209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- dd. B308/B308M, Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- ee. B429/B429M, Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

- ff. B632/B632M, Standard Specification for Aluminum-Alloy Rolled Tread Plate.
- gg. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- hh. D1056, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
- ii. F436, Standard Specification for Hardened Steel Washers.
- jj. F468, Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
- kk. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
- ll. F594, Standard Specification for Stainless Steel Nuts.
- mm. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
- nn. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- 9. Occupational Safety and Health Administration (OSHA):
  - a. 29 CFR 1910.27, Fixed Ladders.
  - b. 29 CFR 1926.105, Safety Nets.
  - c. 29 CFR 1926.502, Fall Protection Systems Criteria and Practices.
- 10. Specialty Steel Industry of North America (SSINA):
  - a. Specifications for Stainless Steel.
  - b. Design Guidelines for the Selection and Use of Stainless Steel.
  - c. Stainless Steel Fabrication.
  - d. Stainless Steel Fasteners.

## 1.02 DEFINITIONS

- A. Anchor Bolt: Cast-in-place anchor; concrete or masonry.
- B. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.
- C. Exterior Area: Location not protected from weather by building or other enclosed structure.
- D. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.
- E. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.

- F. Submerged: Location at or below top of wall of open water-holding structure, such as basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

### 1.03 SUBMITTALS

#### A. Action Submittals:

- 1. Shop Drawings: Metal fabrications, including welding and fastener information.
- 2. Samples: Color samples of abrasive stair nosings.

#### B. Informational Submittals:

- 1. Pre-engineered Ladders: Letter of certification that ladder meets OSHA 29 CFR 1910.27 requirements.
- 2. Passivation method for stainless steel members.
- 3. Galvanized coating applicator qualifications.
- 4. Hot-Dip Galvanizing: Certificate of compliance signed by galvanizer, with description of material processed and ASTM standard used for coating.

### 1.04 QUALITY ASSURANCE

#### A. Qualifications:

- 1. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Insofar as practical, factory assemble specified items. Package assemblies, which have to be shipped unassembled to protect materials from damage and tag to facilitate identification and field assembly.
- B. Package stainless steel items to provide protection from carbon impregnation.
- C. Protect painted coatings and hot-dip galvanized finishes from damage as a result of metal banding and rough handling. Use padded slings and straps.
- D. Store fabricated items in dry area, not in direct contact with ground.

## 1.06 SPECIAL GUARANTEE

- A. Manufacturer's extended guarantee or warranty, with Government named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at option of Contracting Officer, removal and replacement of sidewalk doors and floor hatches found defective during a period of 5 years after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in General Conditions.

## 1.07 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following extra materials:

| Item                            | Quantity                                                                              |
|---------------------------------|---------------------------------------------------------------------------------------|
| Polychloroprene Gasket          | Two for each location requiring polychloroprene gaskets.                              |
| Polychloroprene Gasket Adhesive | One (manufacturer's recommended) for each location requiring polychloroprene gaskets. |

- B. Delivery: In accordance with Section 01 67 00, Product Requirements.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. For hot-dip galvanized steel that is exposed to view and does not receive paint, limit the combined phosphorus and silicon content to 0.04 percent. For steels that require a minimum of 0.15 percent silicon (such as plates over 1.5 inches thick for ASTM A36/A36M steel), limit maximum silicon content to 0.21 percent and phosphorous content to 0.03 percent.
- B. Unless otherwise indicated, meet the following requirements:

| Item                             | ASTM Reference                                                        |
|----------------------------------|-----------------------------------------------------------------------|
| Steel Wide Flange Shapes         | A992/992M                                                             |
| Other Steel Shapes and Plates    | A36/A36M or A572/A572M, Grade 50 or A992/A992M for other steel shapes |
| Steel Pipe                       | A500, Grade B                                                         |
| Hollow Structural Sections (HSS) | A500/A500M, Grade C                                                   |

| Item                                                 | ASTM Reference                                               |
|------------------------------------------------------|--------------------------------------------------------------|
| Aluminum:                                            |                                                              |
| Aluminum Plates                                      | B209, Alloy 6061-T6                                          |
| Aluminum Structural Shapes                           | B308/B308M, Alloy 6061-T6                                    |
| Stainless Steel:                                     |                                                              |
| Bars and Angles                                      | A276, AISI Type 316 (Type 316L for welded connections)       |
| Shapes                                               | A276, AISI Type 304 (Type 304L for welded connections)       |
| Steel Plate, Sheet, and Strip                        | A240/A240M, AISI Type 316 (Type 316L for welded connections) |
| Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs | F593, AISI Type 316, Group 2, Condition SH                   |
| Nuts                                                 | F594, AISI Type 316, Condition CW                            |
| Steel Bolts and Nuts:                                |                                                              |
| Carbon Steel                                         | A307 bolts, with A563 nuts                                   |
| High-Strength                                        | A325, Type 1 bolts, with A563 nuts                           |
| Anchor Bolts and Rods                                | F1554, Grade 36 with weldability Supplement S1               |
| Eyebolts                                             | A489                                                         |
| Threaded Rods                                        | A36/A36M                                                     |
| Flat Washers (Unhardened)                            | F844                                                         |
| Flat and Beveled Washers (Hardened)                  | F436                                                         |
| Thrust Ties for Steel Pipe:                          |                                                              |
| Threaded Rods                                        | A193/A193M, Grade B7                                         |
| Nuts                                                 | A194/A194M, Grade 2H                                         |
| Plate                                                | A283/A283M, Grade D                                          |
| Welded Anchor Studs                                  | A108, Grades C-1010 through C-1020                           |
| Aluminum Bolts and Nuts                              | F468, Alloy 2024-T4                                          |
| Cast Iron                                            | A48/A48M, Class 35                                           |

- C. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, zinc-plated steel, and aluminum material types as indicated in Fastener Schedule at end of this section.

## 2.02 ANCHOR BOLTS AND ANCHOR BOLT SLEEVES

### A. Cast-in-Place Anchor Bolts:

- 1. Headed type, unless otherwise shown on the Drawings.
- 2. Material type and protective coating as shown in Fastener Schedule at end of this section.

### B. Anchor Bolt Sleeves:

- 1. Plastic:
  - a. Single unit construction with corrugated sleeve.
  - b. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.
  - c. Material: High-density polyethylene.
- 2. Fabricated Steel: ASTM A36/A36M.

## 2.03 POST-INSTALLED CONCRETE AND MASONRY ANCHORS

- A. See Section 05 05 19, Post-Installed Anchors.

## 2.04 PIPE SLEEVES

- A. As specified in Section 40 27 01, Process Piping Specialties.

## 2.05 EMBEDDED STEEL SUPPORT FRAMES FOR FLOOR PLATE AND GRATING

- A. Steel angle support frames to be embedded in concrete shall be stainless steel, ASTM A276, AISI Type 316, unless indicated otherwise.
- B. Welded anchors for stainless steel support frames shall also be stainless steel.

## 2.06 ABRASIVE NOSING FOR STAIRS

- A. Unless otherwise shown on the Drawings, furnish flush type abrasive nosings on stairs.
- B. Nosing Components:
  - 1. Manufacturers and Products:
    - a. Wooster Products, Inc., Wooster, OH; Spectra Type WP3C.
    - b. Or equal.

2. Physical Characteristics:
  - a. Homogeneous epoxy abrasive, with minimum 50 percent aluminum oxide content, formed and cured upon an extruded aluminum base.
  - b. Epoxy abrasive shall extend over and form curved front edge of nosing.
  - c. Base of Nosing: Extruded aluminum alloy, 6063-T5, heat-treated.
  - d. Anchoring System: Double-set anchors consisting of two rows of integrally extruded anchors.
  - e. Size: 3 inches wide by 1/4 inch to 3/8 inch thick by length as shown.
  - f. Color: Selected by Contracting Officer from manufacturer's standard color range.
3. Functional Characteristics: None.
4. Performance Characteristics: None.

## 2.07 FLOOR PLATE

### A. Material:

1. Aluminum: ASTM B632/B632M, Alloy 6061-T6.

### B. Minimum Thickness:

1. Steel: 1/4 inch, unless shown otherwise on the Drawings.
2. Aluminum: 3/8 inch, unless shown otherwise on the Drawings.

### C. Surface: Raised-lug pattern or diamond tread, unless shown otherwise on the Drawings.

## 2.08 SIDEWALK DOORS

### A. Manufacturers and Products:

1. Bilco Co., New Haven, CT; J Series.
2. Or equal.

### B. Physical Characteristics:

1. Access Door Leaf(s): 1/4-inch aluminum diamond pattern plate. Provide stainless steel safety chain and attachments for end of double-leaf door assembly when open.
2. Channel Frame: 1/4-inch thick extruded aluminum trough frame with continuous anchor flange around perimeter. Weld 1-1/2-inch diameter drain coupling, and drain pipe, to frame trough at front right corner, unless indicated otherwise on the Drawings.

3. Safety Grate: Aluminum grating with 300 psf live load capacity, 5-inch by 5-inch grate openings, permanent hinging system that locks grate in 90-degree position, and opening arm with vinyl grip handle and locking device.
4. Door Hardware:
  - a. Hinges: Heavy-duty brass or stainless steel with stainless steel pins through-bolted to cover plate with tamper-proof stainless steel bolts flush with top of cover and to outside leg of channel frame with stainless steel bolts and locknuts.
  - b. Lifting Mechanism: Stainless steel compression lift springs enclosed in telescoping vertical housing or stainless steel torsion lift springs.
  - c. Snap Lock:
    - 1) Stainless steel snap lock mounted on bottom of door leaf with removable topside key wrench and inside fixed lever handle.
    - 2) Threaded plug for flush outside surface with key wrench removed.
5. Aluminum: Mill finished with protective coating applied to surfaces to be in contact with concrete, as specified in Section 09 90 00, Painting and Coating.

C. Functional Characteristics:

1. Door Hardware:
  - a. Hold-Open Arm:
    - 1) Locks automatically in open position.
    - 2) Disengages with slight pull on vinyl grip with one hand.
    - 3) Door can be easily closed with one hand by pulling forward and down on vinyl grip.

D. Performance Characteristics:

1. Load Capacity: 300 psf with maximum deflection of 1/150th of span. Provide H-20 wheel loading capacity where indicated on the Drawings.
2. Safety Grate: Aluminum grating with 300 psf live load capacity.

## 2.09 SIDE ACCESS WALL HATCH (QUICK OPENING)

A. Manufacturers and Products:

1. Chase Associates, Edgecomb, Maine; Model CM-1.
2. Or equal.

B. Physical Characteristics:

1. All stainless steel components, Type 316Lq.
2. ASME flanged and dished cover against a liquid-tight, replaceable EPDM gasket.
3. OSHA approved lockout/tagout feature to prevent accidental openings or closings.

C. Functional Characteristics:

1. Handwheel release operates only when the tank is empty and provides access in seconds without unbolting or use of tools.
2. Open into the vessel.

D. Performance Characteristics:

1. Conforms to:
  - a. 36 psi pressure rated (minimum).
  - b. Welding Procedures-ASME Code Sec IX, WPS CA-FC 8/8, FCAW.
  - c. AWWA D100-96 Section 7.1 Shell Manholes.
  - d. OSHA "Permit-Required Confined Space" entry rules Part 1910.146.

2.10 FALL ARREST ANCHORS

A. Manufacturers and Products:

1. Thaler Metal Industries, Buffalo, NY; FARA Wall Anchor.
2. Or equal.

B. Physical Characteristics:

1. Components and Accessories:
  - a. Forged combination eye and base assembly with headed anchor bolt, backer plate, lock washer, and nut.
  - b. Suitable for embedment in concrete wall or slab.
  - c. Material: Hot-dip galvanized steel in accordance with ASTM A123/A123M.

C. Functional Characteristics: None.

D. Performance Characteristics:

1. Conforms to OSHA CFR Part 1926.502.
2. Minimum Breaking Strength: 5,000 pounds.

## 2.11 FABRICATED UNITS

- A. Weir and Baffle Plates: Fabricate plates and associated framing of stainless steel, AISI Type 316 unless indicated otherwise.
- B. Stop Gates and Guide Frames: Aluminum plate with aluminum channel or angle sections as stiffeners.
  - 1. Guides:
    - a. Manufacturer:
      - 1) Washington Aluminum Co., Baltimore, MD.
      - 2) Or equal.
    - b. Physical Characteristics:
      - 1) AISI Type 316 Stainless Steel.
      - 2) Extruded aluminum type.
    - c. Functional Characteristics: None.
    - d. Performance Characteristics : None.
  - 2. Rests, and Fasteners: AISI Type 316 stainless steel.
  - 3. Identification Plate:
    - a. 16-gauge aluminum or stainless steel securely mounted on each gate.
    - b. Text: 1-inch die-stamped word “WATERSIDE” and corresponding gate number as shown in Gate Schedule.
    - c. Mount plate on side opposite gate stiffeners.

## 2.12 ACCESSORIES

- A. Antiseizing Lubricant for Stainless Steel Threaded Connections:
  - 1. Manufacturers and Products:
    - a. Bostik, Middleton, MA; Neverseez.
    - b. Or equal.
  - 2. Physical Characteristics: None.
  - 3. Functional Characteristics: None.
  - 4. Performance Characteristics:
    - a. Suitable for potable water supply.
    - b. Resists washout.
- B. Polychloroprene Gasket:
  - 1. Manufacturers and Products:
    - a. Monmouth Rubber and Plastics Corporation, Long Branch, NJ; Durafoam DK1111LD.
    - b. Or equal.
  - 2. Physical Characteristics:
    - a. Thickness: Minimum 1/4 inch.
    - b. Furnish without skin coat.

3. Functional Characteristics: None.
4. Performance Characteristics: ASTM D1056, 2C1, soft, closed-cell polychloroprene gasket material, suitable for exposure to sewage and sewage gases, unless otherwise shown on the Drawings.

## 2.13 FABRICATION

### A. General:

1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
3. Conceal fastenings where practical; where exposed, flush countersink.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
6. Fit and assemble in largest practical sections for delivery to Site.

### B. Materials:

1. Use steel shapes, unless otherwise noted.
2. Steel to be hot-dip galvanized: Limit silicon content to less than 0.04 percent or to between 0.15 percent and 0.25 percent.
3. Fabricate aluminum in accordance with AA Specifications for Aluminum Structures—Allowable Stress Design.

### C. Welding:

1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.
2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.
3. Steel: Meet fabrication requirements of AWS D1.1/D1.1M, Section 5.
4. Aluminum: Meet requirements of AWS D1.2/D1.2M.
5. Stainless Steel: Meet requirements of AWS D1.6/D1.6M.
6. Welded Anchor Studs: Prepare surface to be welded and weld with stud welding gun in accordance with AWS D1.1/D1.1M, Section 7, and manufacturer's instructions.
7. Complete welding before applying finish.

### D. Painting:

1. Shop prime with rust-inhibitive primer as specified in Section 09 90 00, Painting and Coating, unless otherwise indicated.
2. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as

specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.

3. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.

E. Galvanizing:

1. Fabricate steel to be galvanized in accordance with ASTM A143/A143M, ASTM A384/A384M, and ASTM A385/A385M. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.
2. Provide venting and drain holes for tubular members and fabricated assemblies in accordance with ASTM A385/A385M.
3. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.
4. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
5. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123/A123M.
6. Hot-dip galvanize bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop assemble bolts and nuts.
7. Galvanized steel sheets in accordance with ASTM A653/A653M.
8. Galvanize components of bolted assemblies separately before assembly. Galvanizing of tapped holes is not required.

F. Electrolytic Protection: Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.

G. Watertight Seal: Where required or shown, furnish polychloroprene gasket of a type that is satisfactory for use in contact with sewage. Cover full bearing surfaces.

H. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.

I. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

## 2.14 SOURCE QUALITY CONTROL

- A. Visually inspect all fabrication welds and correct deficiencies.
  - 1. Steel: AWS D1.1/D1.1M, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
  - 2. Aluminum: AWS D1.2/D1.2M.
  - 3. Stainless Steel: AWS D1.6/D1.6M.
- B. Hot-Dip Galvanizing:
  - 1. An independent testing agency, will be retained by Contracting Officer, to inspect and test hot-dip galvanized fabricated items in accordance with ASTM A123/A123M and ASTM A153/A153M.
  - 2. Visually inspect and test for thickness and adhesion of zinc coating for minimum of three test samples from each lot in accordance with ASTM A123/A123M and ASTM A153/A153M.
  - 3. Reject and retest nonconforming articles in accordance with ASTM A123/A123M and ASTM A153/A153M.

## PART 3 EXECUTION

### 3.01 INSTALLATION OF METAL FABRICATIONS

- A. General:
  - 1. Install metal fabrications plumb and level, accurately fitted, free from distortion or defects.
  - 2. Install rigid, substantial, and neat in appearance.
  - 3. Install manufactured products in accordance with manufacturer's recommendations.
  - 4. Obtain Contracting Officer approval prior to field cutting steel members or making adjustments not scheduled.
- B. Aluminum:
  - 1. Do not remove mill markings from concealed surfaces.
  - 2. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.
  - 3. Fabrication, mechanical connections, and welded construction shall be in accordance with the AA Aluminum Design Manual.

C. Pipe Sleeves:

1. Provide where pipes pass through concrete or masonry.
2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
3. Provide center flange for water stoppage on sleeves in exterior or water-bearing walls.
4. Provide rubber caulking sealant or a modular mechanical unit to form watertight seal in annular space between pipes and sleeves.

3.02 CAST-IN-PLACE ANCHOR BOLTS

- A. Locate and hold anchor bolts in place with templates at time concrete is placed.
- B. Use anchor bolt sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.
- C. Minimum Bolt Size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

3.03 ABRASIVE NOSINGS

- A. Provide abrasive nosings on concrete steps not being supplied or coated with another type of nosing or nonskid material.

3.04 ACCESS COVERS

- A. Install access covers, including sidewalk doors, floor hatches, and hinged manhole covers in accordance with manufacturer's instructions.
- B. Accurately position prior to placing concrete, such that covers are flush with floor surface.
- C. Protect from damage resulting from concrete placement. Thoroughly clean exposed surfaces of concrete spillage to obtain a clean, uniform appearance.
- D. Route drain pipe to exterior face of concrete or as shown on the Drawings.
- E. Position cover so that hinge is on side opposite ladder.

3.05 ELECTROLYTIC PROTECTION

- A. Aluminum and Galvanized Steel:
  1. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as

specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.

2. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.
3. Allow coating to dry before installation of the material.
4. Protect coated surfaces during installation.
5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

B. Titanium: Where titanium equipment is in contact with concrete or dissimilar metal, provide full-face polychloroprene insulation gasket, 3/32-inch minimum thickness and 70-durometer hardness.

C. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.
2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.
3. Remove contamination using cleaning and passivation methods in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

### 3.06 PAINTING

A. Painted Galvanized Surfaces: Prepare as specified in Section 09 90 00, Painting and Coating.

B. Repair of Damaged Hot-Dip Galvanized Coating:

1. Conform to ASTM A780/A780M.
2. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780/A780M.
3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780/A780M.
4. Use magnetic gauge to determine thickness is equal to or greater than base galvanized coating.

C. Field Painting of Shop Primed Surfaces: Prepare surfaces and field finish in accordance with Section 09 90 00, Painting and Coating.

### 3.07 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

#### A. Contracting Officer-Furnished Quality Assurance:

1. In accordance with IBC Chapter 17 requirements, is provided in the Statement of Special Inspections Plan in Supplement located at end of Section 01 45 33, Special Inspection, Observation, and Testing.
2. Contractor responsibilities and related information on special inspection, observation, and testing are included in Section 01 45 33, Special Inspection, Observation, and Testing.

#### B. Contractor-Furnished Quality Control:

1. Inspection and testing required in Section 01 40 00, Quality Requirements.
2. Manufacturer's Certificate of Compliance per Section 01 67 00, Product Requirements, for test results, or calculations, or drawings that ensure material and equipment design and design criteria meet requirements of Section 01 67 00, Product Requirements, and Section 01 88 15, Anchorage and Bracing.

### 3.08 FASTENER SCHEDULE

- A. Unless indicated otherwise on the Drawings, provide fasteners as shown on the Area Classification Table.
- B. Antiseizing Lubricant: Use on stainless steel threads.

**END OF SECTION**

