

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies stainless steel nosings for concrete stairs and stainless steel stair hand railings as well as fabrication of the ossuary cap and pipe.

**1.2 RELATED WORK**

- A. Concrete Stairs: Section 03 30 00, CAST-IN-PLACE CONCRETE.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS AND PRODUCT DATA.
- B. Shop Drawings:
  - 1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
  - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
  - 3. Provide templates and rough-in measurements as required.
- C. Manufacturer's Certificates:
  - 1. Stainless Steel finish as specified.
  - 2. Live load designs as specified.
- D. Design Calculations for specified live loads including dead loads.
- E. Furnish setting drawings and instructions for installation of anchors to be installed into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

**1.4 QUALITY ASSURANCE**

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

**1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
  - B18.6.1-81(R1997).....Wood Screws
  - B18.2.2-87(R2005).....Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
  - A36/A36M-08.....Structural Steel
  - A47-99(R2004).....Malleable Iron Castings
  - A48-03(R2008).....Gray Iron Castings
  - A53-07.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
  - A123-08.....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - A269-08.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service
  - A307-07.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
  - A653/A653M-08.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
  - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
  - C663.....Adhesion or Cohesive Strength of Flame-Sprayed Coatings
  - C1107-08.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  - E140.....Hardness Conversion Tables for Metals
  - E384.....Microhardness of Materials
  - F436-09.....Hardened Steel Washers
  - F468-06.....Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
  - F593-02(2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs
  - F1667-05.....Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
  - D1.1-04.....Structural Welding Code Steel
  - D1.2-03.....Structural Welding Code Aluminum
  - D1.3-98.....Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
  - AMP 500-505-1988.....Metal Finishes Manual

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F. Structural Steel Painting Council (SSPC):

- SP 1-05.....No. 1, Solvent Cleaning
- SP 2-05.....No. 2, Hand Tool Cleaning
- SP 3-05.....No. 3, Power Tool Cleaning

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

A. Stainless Steel:

- 1. ASTM A167 Standard specification for stainless and heat-resisting Chromium-Nickel,
- 2. TYPE 304 Stainless Steel.

**2.2 HARDWARE**

A. Rough Hardware:

- 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
- 2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal is used.

B. Fasteners:

- 1. Bolts with Nuts:
  - a. All mechanical fasteners and hardware used in the assembly of stainless steel shall be manufacturer from stainless steel

**2.3 FABRICATION GENERAL**

A. Material

- 1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
- 2. Use material free of defects which could affect the appearance or service ability of the finished product.

B. Size:

- 1. Size and thickness of members as shown.

C. Connections

- 1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
- 2. Field riveting will not be approved.
- 3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
- 4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.

5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable member's machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.

E. Workmanship

1. General:
  - a. Fabricate items to design shown.
  - b. Furnish members in longest lengths commercially available within the limits shown and specified.
  - c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
  - d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
  - e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
  - f. Prepare members for the installation and fitting of hardware.
  - g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.

- h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.
- 2. Welding:
  - a. Weld in accordance with AWS standards as listed in article Applicable Publications.
- 3. Joining:
  - a. Miter or butt members at corners.
  - b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
- 4. Anchors:
  - a. Provide as indicated.
- 5. Cutting and Fitting:
  - a. Accurately cut, machine and fit joints, corners, copes, and miters.
  - b. Fit removable members to be easily removed.
  - c. Design and construct field connections in the most practical place for appearance and ease of installation.
  - d. Fit pieces together as required.
  - e. Fabricate connections for ease of assembly and disassembly without use of special tools.
  - f. Joints firm when assembled.
  - g. Conceal joining, fitting and welding on exposed work as far as practical.
  - h. Do not show rivets and screws prominently on the exposed face.
  - i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the assembly of item and eliminate the need to use other than common tools.

#### **2.4 SUSTAINABLE - STAINLESS STEEL**

- A. Maintain a high percentage of both post-consumer and post-industrial recycled content
- B. Recycled Content% 75 to 85%

#### **2.5 HANDRAIL**

- A. Stainless Steel:
  - 1. ASTM A269 Standard specification for seamless and welded stainless steel
  - 2. All pipe material 1 1/2" OD 304 Stainless Steel Tubing.
  - 3. Finish No. 4 Satin
  - 4. Welds: Ornamental Quality

5. All field joints to be with mechanical splices and concealed fasteners
6. All dimensions to be field verified prior to fabrication
7. Wall thickness 0.065
8. 3" diameter stainless steel snap-on cover flange
9. Installed handrail shall withstand a lateral load applied to the top rail of no less than 350 pounds without railing deflection or weakening.

## **2.6 STAIR NOSING**

### **A. Design Requirements**

1. Basis of Design: SlipNOT Metal Safety Flooring or an approved equal
2. Product Information
  - a. Thickness: 1/4"
  - b. Width: 4 inches
  - c. Length: see drawings as indicated
  - d. Material: 304 Stainless Steel
  - e. Grade: 1 (Fine)with stainless steel grip plate. Grip plate to incorporate anti-slip stainless steel surface covering 100% of substrate, random hatch matrix with surface hardness between 55-63 (Rockwell "C" scale), surface bond strength minimum 4,000psi.
  - f. Coefficient of Friction: Coefficient of friction greater than or equal to 0.8, listed a slip resistant by Underwriters Laboratories

## **2.7 OSSUARY CAP AND RECEIVING FLANGE**

### **A. Stainless Steel:**

1. ASTM A269 Standard specification for seamless and welded stainless steel
2. All material shall be 304 Stainless Steel.
3. Finish: Brushed (Submittal required for approval)
4. Welds: Ornamental Quality
5. All joints and connections shall be as shown on drawings.
6. All dimensions to be field verified prior to fabrication
7. Minimum wall thickness at Ossuary Cap shall be 3/8".
8. Minimum wall thickness at Ossuary Cap Receiving Flange shall be 3/16".
9. (3) Three sets of spanner head bolt tools to remove Ossuary Cap shall be provided to the COR by the contractor.

## **2.8 OSSUARY 6" DIAMETER PIPE**

### **A. Stainless Steel:**

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1. ASTM A269 Standard specification for seamless and welded stainless steel
2. All material shall be 304 Stainless Steel.
5. All joints and connections shall be as shown on drawings.
6. All dimensions to be field verified prior to fabrication
7. Minimum wall thickness shall be 1/4".

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete or masonry.
  1. Provide temporary bracing for such items until concrete or masonry is set.
  2. Place in accordance with setting drawings and instructions.
  3. Build strap anchors, into masonry as work progresses.
- C. Set frames of gratings, covers, corner guards, trap doors and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
- D. Field weld in accordance with AWS.
  1. Design and finish as specified for shop welding.
  2. Use continuous weld unless specified otherwise.
- E. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- F. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- G. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.
- H. Coordinate installation as per manufacturer's recommendations and guidelines.

#### **3.2 STAIR NOSING**

- A. Install slip-resistant metal fabrications at locations on the drawings and in accordance with manufacturer's instructions
- B. Install slip-resistant metal fabrications level, square, rigid, with flush installation.

- C. Fasten slip-resistant metal fabrications to support steel as indicated on drawings and as per manufacturer's recommendations.
- D. Repair damaged factory-applied finishes as directed by manufacturer.
- E. Replace defective or damaged slip-resistant metal fabrications as directed by manufacturer.

**3.3 CLEAN AND ADJUSTING**

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.
- C. As installation is completed, was thoroughly using clean water and soap; rinse with clean water. Do not use acid solution, steel wool or other harsh abrasives

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