



**SPECIAL PROVISIONS  
FOR  
METAL FABRICATIONS**

**Woodbury County  
IM-NHS-029-6(257)147--03-97**

**Effective Date  
March 18, 2014**

**THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**120147.01 DESCRIPTION.**

**A. Summary.**

Shop fabricated steel and aluminum items, including:

- Stairs and Ships Ladders.
- Handrails and Railings.
- Gratings.
- Structural Metals
- Stair Treads and Nosings.

**B. Reference Standards.**

1. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc..
2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association.
3. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
4. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes
5. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
6. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
7. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.

8. ASTM B 308 - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
9. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
10. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
11. ASTM F594 - Standard Specification for Stainless Steel Nuts
12. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.
13. AWS D1.1 - Structural Welding Code - Steel; American Welding Society.
14. AWS D1.2 - Structural Welding Code - Aluminum; American Welding Society.
15. AWS D1.6 - Structural Welding Code - Stainless Steel; American Welding Society

## **120147.02 MATERIALS.**

### **A. Steel Materials.**

1. Stainless Steel Shapes: ASTM A276, type 304L unless noted otherwise
2. Stainless Steel Plates, Welded studs, bars, etc: ASTM A240, type 304L unless noted otherwise
3. Stainless Steel Pipe: ASTM A312, type 304L unless noted otherwise
4. Stainless Steel Bolts, Nuts, and Washers: ASTM F593, F594, type 316
5. Stainless Steel Welding Materials: AWS D1.6

### **B. Aluminum Materials.**

1. Plate: Alloy 6061-T6, Mill Finish, Heat Treatable.
2. Structural Shapes: Alloy 6061-T6, ASTM B 308.
  - a. Angle Shapes designated on the drawings as "Depth x Width x Leg Thickness" shall conform to the section properties of Part VI of the Aluminum Design Manual, Table 16 - "Angles - Equal Legs" and Table 18 - "Angles - Unequal Legs".
  - b. Channel Shapes designated on the drawings as "CS Depth x WT" shall conform to the section properties of Part VI of the Aluminum Design Manual, Table 5 - "Aluminum Association Standard Channels".
  - c. Channel Shapes designated on the drawings as "C Depth x WT" shall conform to the section properties of Part VI of the Aluminum Design Manual, Table 9 - "Channels - American Standard".
3. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
4. Round Pipe: Alloy 6061-T6, ASTM B429.  
Round pipe members shall conform to the section properties of Part VI of the Aluminum Design Manual, Table 26 - "Pipe".
5. Aluminum-Alloy Bars: ASTM B211 (ASTM B211M), 6061 alloy, T6 temper.

6. Bolts, Nuts, and Washers: 316 Stainless steel.
7. Welding Materials: AWS D1.2; type required for materials being welded.

### C. Gratings.

#### 1. General.

- a. Grating finish, depth and thickness of bearing bars, and span direction shall be as designated on the drawings.
- b. Bearing bars shall be spaced at 1 3/16 inches on center and cross bars shall be spaced at 4 inches on center. Cross bars shall be flush at top with bearing bars.
- c. All grating edges shall be banded with bar equal in thickness and depth to the bearing bars. Provide openings shown. Openings not shown but required for piping and other items passing through may be field cut and banded. Touch up all welds with applicable finish.
- d. Unless noted otherwise, all grating shall be removable and not welded to supports, provide stainless steel saddle clips and stainless steel bolts as required for attachment. Limit weight of each section to no more than 50 pounds. Provide joints at center of openings where possible to permit removal of grating around items passing through.

#### 2. Aluminum Grating.

- a. Material: ASTM B 221, Alloy 6061-T6.
- b. Construction Type: Swage-locked rectangular grating conforming to NAAMM Standards.
- c. Surface: As designated on the drawings.

### D. Stair Treads and Nosings.

1. Provide aluminum prefabricated standard grating stair treads with corrugated angle nosing.
2. Individual stair treads and their connections to stringers shall be designed to support a 300 pound concentrated load placed in a position which would cause maximum stress.

### E. Fabrication.

1. Verify all existing dimensions, materials, and conditions are as shown on the drawings prior to any fabrication.
2. Fabricate in accordance with reviewed shop drawings and reference standards.
3. Fit and shop assemble items in largest practical sections, for delivery to site.
4. Fabricate items with joints tightly fitted and secured.
5. Continuously seal joined members by intermittent welds and plastic filler.
6. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
7. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
8. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
9. Weld seat angles over slide gate guides to the guides.

10. Seat angles for grating, supports, or floor plates, clips for precast panels and brackets for piping shall be stainless steel unless otherwise specified.
11. Make joints and intersections of metal tightly fitting and securely fastened.
12. Make work square, plumb, straight, and true.
13. All butt welds shall be full penetration, unless noted otherwise.
14. Drill or punch holes required for attachment of work of other trades and for bolted connections. Burned holes will not be accepted.
15. Punch holes 1/16 inch larger than nominal size of bolts, unless otherwise specified.
16. For thick metal, subpunch and ream drill holes.
17. Connections not detailed or noted on the drawings shall be designed by the fabricator and approved by the Engineer.
18. Provide other miscellaneous steel metal work including embedded and non-embedded steel metal work, hangers and inserts as specified on drawings.

#### **F. Fabricated Items.**

1. Handrails and Railings:
  - a. Aluminum-Alloy Drawn Seamless Tubes: ASTM B 210 (ASTM B 210M), 6061-T6.
  - b. Unless otherwise noted or detailed provide the following:
    - 1) Standard platform and standard stair railings shall be constructed of 1 1/2 inch nominal diameter standard pipe with posts spaced not more than 4 feet on center. Posts shall be schedule 80 pipe, and remainder of railing shall be schedule 40 pipe.
    - 2) All railings shall consist of a top handrail and an intermediate rail approximately halfway between the top handrail and the lower surface.
      - a) The vertical height of a standard platform railing shall be 42 inches from the upper surface of the top handrail to the platform level.
      - b) The vertical surface of a standard stair railing shall be 34 inches from the upper surface of the top handrail to the surface of the tread in line with the face of riser at the forward edge of the tread.
  - c. All handrail, intermediate rail and post connections and spacings not detailed or noted on the drawings shall be designed by the fabricator and approved by the Engineer. The anchoring or posts shall be of such construction that the completed structure shall be capable of withstanding a minimum load of 200 pounds applied in any direction at any point on the top of the handrail.
  - d. Unless noted otherwise, at all standard platform railing locations a continuous standard toeboard shall be provided.
    - 1) A standard toeboard shall be 1/4 inch plate by 4 inches in vertical height from its top edge to the level of the floor, platform, runway or ramp.
    - 2) Standard toeboards shall be securely fastened in place with not more than 1/4 inch clearance above the floor level.

#### **G. Finishes.**

1. **General.**
  - a. Perform all fabrication including cutting, drilling punching, threading, and tapping prior to finishing.
  - b. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

- c. Do not paint aluminum or galvanized steel work.
- 2. Aluminum.**
- a. Interior and Exterior Aluminum Railing Surfaces: Class I natural anodized.
  - b. Comply with AA DAF-45 for aluminum finishes required.
  - c. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

**H. Fabrication Tolerances.**

1. Squareness: 1/8 inch maximum difference in diagonal measurements.
2. Maximum Offset Between Faces: 1/16 inch.
3. Maximum Misalignment of Adjacent Members: 1/16 inch.
4. Maximum Bow: 1/8 inch in 48 inches.
5. Maximum Deviation From Plane: 1/16 inch in 48 inches.

**120147.03 CONSTRUCTION.**

**A. Submittals.**

1. Shop Drawings:
  - a. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  - b. Include erection drawings, elevations, and details where applicable.
  - c. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
2. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
3. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

**B. Quality Assurance.**

1. Do not use salvaged, reprocessed, or scrap materials.
2. Qualifications: Prepare Shop Drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Iowa.
3. Codes and Standards:
  - a. Comply with pertinent codes and regulations during installation of miscellaneous metal fabrications.
  - b. Comply with recommendations of "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" of American Institute of Steel Construction.
  - c. Comply with recommendations of "Code of welding in Building Construction" of American Welding Society.
  - d. Complete shop and field welding conforming to AISC M011.

**C. Examination.**

Verify that field conditions are acceptable and are ready to receive work.

**D. Preparation.**

Clean and strip primed steel items to bare metal where site welding is required.

**E. Installation.**

1. Install items plumb and level, accurately fitted, free from distortion or defects.
2. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
3. Accurately place metal work to be embedded in concrete; hold in correct position while placing concrete.
4. Set seat angles for grating and supports for floor plates flush with floor. Maintain grating and floor plates flush with floor.
5. Field weld components indicated on drawings.
6. Perform field welding in accordance with AWS requirements.
7. Obtain approval prior to site cutting or making adjustments not scheduled.
8. After erection, prime welds, abrasions, and surfaces not shop primed.
9. After installation, clean and touch-up surfaces of shop primed metals.
10. Coordinate installation schedule with other trades to ensure orderly and timely progress of work.

**F. Tolerances.**

1. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
2. Maximum Offset From True Alignment: 1/4 inch.
3. Maximum Out-of-Position: 1/4 inch.

**G. Cleaning.**

Thoroughly clean surfaces of metal work in contact with or embedded in concrete.

**H. Galvanic Protection.**

Protect dissimilar metals from galvanic corrosion, Install pressure tape, coating or isolator between dissimilar metals to avoid direct contact.

**120147.04 METHOD OF MEASUREMENT.**

Incidental to Siphon Structures

**120147.05 BASIS OF PAYMENT.**

Incidental to Siphon Structures and will not be paid for separately.