

SECTION 05 50 00

METAL FABRICATIONS

PART 1: GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

1.02 SUMMARY

- A. Section includes: All labor, material necessary to complete all items of miscellaneous metal as listed on the schedule in Part 2 and shown on the Drawings.
1. The design, fabrication, transportation to the project site, and associated operations required to complete miscellaneous metals, including all the various metal items manufactured to more or less standard details in sizes conforming to specific requirements of the project.
- B. Related work specified in other sections:
1. Installation of loose lintels and other items embedded in concrete masonry - Section 03 30 00 and 04 20 00.

1.03 REFERENCE STANDARDS

- A. The following specifications and standards are incorporated by reference. Materials and operations shall comply with requirements of the specified issue of published reference. Where provisions of these Project Specifications are at variance with those reference specifications, the maximum criteria or requirements shall govern.
1. ASTM A36-03a, "Carbon Structural Steel"
 2. ASTM A53-02, "Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless"
 3. ASTM A123-02, "Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products"
 4. ASTM A307-02, "Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength"
 5. ASTM A325-02, "Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength"
 6. ASTM A500-03, "Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes"
 7. ASTM A563-00, "Carbon and Alloy Steel Nuts"
 8. ASTM A666-00, "Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar"
 9. ASTM A992-02, "Steel for Structural Shapes for Use in Building Framing"
 10. ASTM F1554-99, "Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength"
 11. AWS D1.1-2002, "Structural Steel Welding Code"

1.04 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
 - 1. Shop drawings required for all items. Show all work to be fabricated with all construction details shown in appropriate scale, methods of attachment to other materials, finished dimensions, shop welds and grinding of welds, field assembly joints, etc. Indicate welded connections, including net weld lengths, using standard AWS welding symbols.
 - 2. Calculations: Accompany shop drawings with a complete structural design and analysis prepared and certified by a Professional Engineer (P.E.) licensed in the State in which the project is located. The design and analysis shall show all design loads, reactions, forces or stresses, and structural characteristics of members and connections for the items listed in section 2.01.B. Include a certified letter stating that shop drawings as submitted conform to the requirements on the design calculations.
 - 3. Coordinate work with other suppliers and subcontractors; obtain their approved shop drawing where necessary, or obtain any necessary additional detail information regarding mounting conditions or other aspects of related work.

1.05 PRODUCT PROTECTION

- A. Package, handle, deliver and store at the job site in a manner that will avoid damage or deformation. Damaged material will be rejected.
- B. Furnish items to be built into concrete, masonry, carpentry, etc. as the work progresses.

1.06 JOB CONDITIONS

- A. Verify dimensions in field, as required, for pre-cut or prefabricated items.
- B. Examine job conditions and adjoining construction which may affect the acceptability of the work.

PART 2: PRODUCTS

2.01 DESIGN

- A. All materials shall be free from defects impairing strength, durability, appearance, and shall be of the best commercial quality for the purposes indicated. Structural properties shall be such to withstand safely all strains and stresses to which they will be normally subjected.
- B. Metal railings, stairs, catwalks, ladders, and other items specified in this section shall be designed to resist self-weight and the more stringent of:
 - 1. Superimposed Dead and Live Loads indicated on the Contract Documents, and
 - 2. Loads set forth by the governing Building Code.
- C. The maximum Live Load deflection shall be $L/360$. Deflection determined based on structural section(s) alone.

2.02 MATERIALS

- A. Structural Steel: ASTM A36 or A992.
- B. Fastenings: Bolts, welds, rivets or other fastenings as required.

- C. Anchor Bolts, Nuts: ASTM F1554, Grade 36.
- D. Steel Pipe: ASTM A53, Grade B.
- E. Steel Tubing: ASTM A500 Grade B.
- F. Shop Paint Primer: Manufacturer's standard rust inhibiting primer.
- G. Galvanizing: ASTM A123.
- H. Expansion and Adhesive Anchors.
 - 1. Wedge Anchors: Hilti "Kwik Bolt II" or Ramset/Redhead "Trubolt" or equal.
 - 2. Heavy Duty Sleeve Anchors: Hilti "HSL" or equal.
 - 3. Adhesive Anchors: Hilti "HVA" or "HIT", Ramset/Redhead "EPCON" or equal.
- I. Galvanizing Repair Compound: Galvilite as manufactured by ZRC Worldwide.

2.03 GENERAL REQUIREMENTS FOR FABRICATION

- A. Weld permanent connections wherever possible; use continuous welds where exposed and grind smooth, straighten members after welding.
- B. Perform welding in accordance with AWS D1.1.
- C. Perform shop cutting, drilling, fitting and assembly wherever possible. Take field measurements before fabrication when required.
- D. Provide all supporting members, fasteners, framing, hangers, bracing, brackets, straps, bolts, angles, etc. required to set, connect the work rigidly and properly to other construction.
- E. Install welded end caps at all handrail terminations.

2.04 SHOP COATS PROTECTIVE TREATMENT

- A. Clean free of all mill scale, rust and foreign matter by wire brushing, scraping, sandblasting or flame cleaning. Remove grease, oil with solvent. Dust, dirt: Remove with air blast or brush.
- B. Apply one shop coat of specified primer to all ferrous metal products, except galvanized. Provide primer for field touch up. Be responsible for quality and adhesion of shop prime finish.
- C. Hot-dip galvanize all ferrous metal items exposed to weather in the finish work and shop prime with primer recommended for use on galvanized metal.

2.05 SCHEDULE OF MISCELLANEOUS METAL ITEMS

- A. Items listed in this Section are intended only as a guide, but do not relieve responsibility for verifying quantities and inclusion of all similar items. Thoroughly examine all Drawings for items of miscellaneous metal fabrications.
 - 1. Steel pan stairs and landings.
 - 2. Steel handrails and guardrails.
 - 3. Stair nosings.
 - 4. Ships ladders.
 - 5. Loose and fixed masonry lintels, as scheduled.

6. Overhead bracing for masonry walls.
7. Trench drains.
8. Other miscellaneous metal items shown on Drawings.

PART 3: EXECUTION

3.01 INSTALLATION GENERAL REQUIREMENTS

- A. Anchor to concrete and masonry with expansion or adhesive anchors where built-in anchorage is not provided; do not fasten to wood plugs set in masonry.
- B. Vertical members set into concrete or masonry: As shown.
- C. Bolts, screws, etc., for field connections: Same material, finish as base material.

3.02 FIELD SPLICES, WELDS

- A. Perform field welding in accordance with AWS D1.1.
- B. Welders shall be certified by AWS.
- C. Continuously weld field splices and grind smooth where exposed to view.
- D. Fill exposed splice joints with body filler and sand smooth.
- E. Touch-up joints, welds with specified primer.
- F. Touch-up damaged hot dipped galvanizing with Galvanizing Repair Compound per manufacturer's requirements.

3.03 FIELD QUALITY CONTROL

- A. Structural Testing and Special Inspection
 1. Comply with the requirements of Section 05 10 00 – Structural Steel Framing
 2. The Owner will employ a Special Inspector for the following:
 - a. Visual inspect 100% of all fillet welds, for size, length, and quality, per AWS D1.1. Qualifications: Technical II.

3.04 DEMONSTRATION

- A. Instruct the Owner on the proper procedures for cleaning and regular maintenance for stainless steel provided for use in swimming pool environments. Refer to Section 01 79 00 demonstration and training.

END OF SECTION 05 50 00