

SECTION 05500

MISCELLANEOUS METALS

PART 1 GENERAL

1.01 SECTION INCLUDED:

- A. This section covers furnishing and installing miscellaneous metal items. Included are all materials and parts necessary to complete each item, even though such work is not definitely shown or specified.
- B. Carefully examine drawings and other sections of specifications for extent of miscellaneous metal work required. All metal work not included under other sections of the specifications shall be furnished and installed under this section.

1.02 MEASUREMENT AND PAYMENT

- A. No direct measurement or payment will be made for the work to be done or the equipment to be furnished under this item, but shall be considered subsidiary to the particular items of work for which unit prices are required in the proposal.

1.03 REFERENCES

- A. American Society of Testing and Materials:
- B. ANSI/ASTM B209 – Standard Specification for Aluminum-Alloy Sheet and Plate.
- C. ANSI/ASTM B221 –Standard Specification for Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.
- D. ANSI/ASTM B308 – Standard Specification for Aluminum-Alloy Structural Shapes, Rolled or Extruded.
- E. ANSI/ASTM A36 – Standard Specification for Structural Steel.
- F. ANSI/ASTM A193 – Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service.
- G. ANSI/ASTM A 307 – Standard Specification for Carbon Steel Externally Treaded Standard Fasteners.
- H. American Welding Society: D1.1 – Structural Welding Code – Steel.

- I. Aluminum Association: Specifications for Aluminum Structures; Qualifications Standard for Structural Welding of Aluminum.

1.04 SUBMITTALS

- A. General. Do not begin fabrication until after submittals have been reviewed by the Engineer.
- B. Shop Drawings. Submit six (6) sets of shop drawings on all fabricated and cast items. Indicate thickness, type, grade, class of metal and finish. Show construction details, mark numbers, reinforcement, anchorage and interface relation with adjacent construction. Indicate method for protection of aluminum at contact points with concrete or steel.
- C. Manufacturer's Product Data. Submit manufacturer's technical information on the expansion bolts proposed for use by the Contractor. The data shall contain sufficient information to evaluate conformance to specifications and shall include pullout and shear test reports from a certified independent testing laboratory.
- D. Field Measurements

Prior to fabrication, take necessary field measurements of previously installed construction so that work will fit properly. Members that do not fit properly must be replaced unless approval for their modifications have been obtained from the Engineer.

- E. Qualification of Welders

Welding of miscellaneous metal items must be performed by certified welders. Welders must be qualified by procedures of the American Welding Society, Structural Welding Code, Steel and Aluminum Association, Qualifications Standard for Structural Welding of Aluminum, using procedures, materials and equipment of the type required for the work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Aluminum

1. Aluminum Shapes.

- a. Rolled Shapes. Conform to ANSI/ASTM B308 aluminum alloy 6061.

- b. Extruded Shapes. Conform to ANSI/ASTM B221 aluminum alloy 6063.
 2. Aluminum Plates. Conform to ANSI/ASTM B209 aluminum alloy 6061.
 3. Finishes of Aluminum Members. Aluminum members shall have mill finish.
 4. Aluminum surfaces that will be in contact with concrete or steel shall be given a heavy coat of alkali resistant bituminous paint, or other coating recommended by the manufacturer that will provide equivalent protection. The coating shall not be visible in the completed installation.
- B. Structural Steel Shape, Plates and Bars

ANSI/ASTM A36.
- C. Stainless Steel

Where indicated on the drawings as "stainless steel", "SS" use stainless steel conforming AISI 31b for non-welded items and AISI Type 316L for welded items. All stainless steel shall have a minimum yield strength of 45,000 psi.
- D. Abrasive Cast Aluminum Nosings
 1. Provide abrasive cast aluminum nosings for all concrete stairs.
 2. Unless otherwise indicated, nosings must be not less than 3 inches from front to back, not less than 5/16 inch thick and shall have a hatched abrasive surface.
 3. Nosings shall be stopped 3 inches short of each end of threads. Set nosings at the proper height to finish flush with adjacent concrete surfaces.
 4. Set nosings level and straight. Anchor nosings to concrete from underside with clip anchors. Place one clip near each end and stagger clips between at approximately 13 inches apart. Upon completion, clean cement from the surface of nosings. Verify that nosings are firmly anchored in place.
- E. Carbon Steel Anchor Bolts

Shall conform to ASTM A307. Provide anchor bolts for all equipment and machinery when anchor bolts are furnished by the manufacturer. Anchor size, length, projection, etc., shall conform to the requirements of the equipment and machinery manufacturer. All anchor bolts shall be hot-dip galvanized. Use templates to accurately position the anchor bolts in the forms.

F. Stainless Steel Bolts

Shall be AISI Type 316 conforming to ASTM A193. Use stainless steel bolts where indicated on the drawings as "stainless steel" or "SS".

G. Expansion Bolts

1. All expansion bolts shall be stainless steel.
2. All expansion bolts shall have a 4:1 safety factor with a minimum working capacity as follows:

Bolt Size	7/8"	3/4"	1/2"	3/8"
Minimum Sheet Strength	5250#	4250#	1650#	625#
Minimum Pullout Strength	5250#	4250#	1300#	1030#
Minimum Embankment	7"	4"	3-1/2"	3-1/2"

3. Provide manufacturer's technical literature and test reports from an accredited independent testing laboratory showing certified bolt capacities for expansion bolts proposed for use on this project.

H. Galvanized Repair Coating

Carboline Carbo Zinc No. 11; Galv-Weld Products; Galv-Weld Alloy; Koppers, Organic Zinc Coating; or equal.

I. Standard Products

Details and specifications of items for which equivalent standard products are available are considered as respective guides for such items. Standard products will be acceptable subject to approval, provided they vary only in minor details from requirements of drawings and specifications.

J. Fabrication

1. Where practical, fit and assemble items in the shop and deliver to the site ready for installation.

2. Shop connections shall be welded or riveted. Do not use screws or bolts where their use can be avoided; where used, countersink heads, screw up tight and nick threads to prevent loosening. Finish welds and rivets flush and smooth on surfaces that will be exposed after installation. Cope or miter corners.
3. Welding.
 - a. Welding of steel items shall conform to the requirements of the American Welding Society Structural Welding Code – Steel.
 - b. Welding of aluminum shall conform to the requirements of the American Welding Society of the welding of aluminum and the Aluminum Associations Specifications for Aluminum Structures.
 - c. Any welding not governed by the above shall be performed in accordance with best modern practice for strength and durability.
 - d. All welds exposed to view in completed work shall be ground down flush and finished smooth. Weld continuously along the entire line of contact.
4. Provide anchors where necessary to fasten miscellaneous metal items securely in place.
5. Carefully form metal work to shape and size, with sharp lines and angles and true curves.
6. Drilling and punching must produce clean true lines.
7. Where tight joints are required, mill to a close fit.
8. Thickness of metals and details shall be of ample strength and thickness.
9. Form joints exposed to weather to exclude water.
10. Provide holes and connections for work of other trades.
11. Galvanizing. Hot-dip galvanize all miscellaneous carbon steel items after fabrication, unless otherwise specified. Items completely embedded in concrete shall not be galvanized. Galvanize in accordance with ASTM A123, A120, A153, A163, A386, or A525, as applicable.

PART 3 EXECUTION

3.01 CONSTRUCTION METHODS

A. Conditions of Surfaces

Prior to installation, inspect surfaces to which miscellaneous metal items will be attached. If the condition of such a surface will adversely affect installation, do not proceed with installation until corrective measures have been taken. Verify that aluminum surfaces that will be in contact with concrete or steel are coated as specified.

B. Installation

1. Accurately set work to established lines and elevations and securely fasten in accordance with approved shop drawings and provisions of this section.
2. All work shall be free from finish scratches, nicks, gouges, dents, concrete splatter, paint or any other foreign matter. Damaged material must be replaced without additional cost to the Owner.

C. Touch Up

1. Touch-up surfaces damaged by welding, cutting, abrasion or from other causes as follows:
 - a. Painted Surfaces. In accordance with Section 09905, Cleaning and Painting Exposed Piping, Valves and Related Items
 - b. Galvanized Surfaces. Apply two coats of galvanizing repair coating.

END OF SECTION