

SECTION 05500 – METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

- A. Metal fabrications include items made from iron and steel and aluminum plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
- B. Extent of metal fabrications is indicated on drawings and schedules.
- C. Types of work in this section include metal fabrications for:
  - 1. Rough hardware.
  - 2. Miscellaneous framing and supports.
- D. Related Work Described Elsewhere:
  - 1. Section 06100 – ROUGH CARPENTRY

1.02 QUALITY ASSURANCE

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.03 SUBMITTALS

- A. General: Submit under provisions of Section 01330 – SUBMITTAL PROCEDURES.
- B. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
- D. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.
- E. Samples: Submit 2 sets of representative samples of railing materials and finished products as may be requested by Architect.

~~1.04 WARRANTY~~

- ~~A. Manufacturer's Warranty (Aluminum Decorative Screens): Submit written warranty (2 copies) before Substantial Completion signed by screen manufacturer/fabricator agreeing to repair or replace defective materials or components that fail in materials or workmanship during the warranty period.~~

- ~~1. The warranty shall include extrusions, decorative cut screen plate, trim, fasteners and all other accessories.~~
  - ~~2. This warranty shall cover all on-site labor to repair or replace all defective parts for the entire warranty period.~~
  - ~~3. Warranty Period: 10 years after the Substantial Completion date.~~
- ~~B. Finish Paint Warranty (Aluminum Decorative Screens): Provide paint manufacturer's warranty for coating system under Hawaiian weather conditions, provide following as a guide for expected warranty:~~
- ~~1. TGIC polyester paint finish shall be free from material defects and shall be warranted for 5 years from the date of Substantial Completion.~~
  - ~~2. Warranty shall cover paint finish system against peeling, chipping, cracking or color change in excess of 5 NBS units when tested according to ASTM D 2244 during the term of this warranty.~~
  - ~~3. In the event that the above paint system fails under normal wind and weathering conditions within the warranty period, the manufacturer/supplier shall replace or repair as necessary any panels whose factory color finish that fails.~~

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Asbestos Prohibition: No asbestos containing materials or equipment shall be used in this section. The Contractor shall ensure that all materials and equipment incorporated in the project are asbestos-free.
- B. Ferrous Metals:
1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
  2. Structural Steel Plates, Channels, Angles and Bars: ASTM A 36/A 36M.
  3. Welding Rods and Bare Electrodes: Select according to AWS specification for the metal alloy to be welded.
- C. Aluminum: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with strength and durability properties for each aluminum form required not less than that of alloy and temper designated below.
1. Aluminum Plate: ASTM B 209, Alloy 5052-H32.
  2. Extruded Bars and Shapes: ASTM B 221, Alloy 6063-T5/T52
- D. Fasteners:
1. Any fasteners in wet or exposed areas of the wall shall be series 300, non-magnetic stainless steel. All other fasteners shall be hot-dipped galvanized unless otherwise noted.

- a. Use types, gages, and lengths to suit unit installation conditions.
- b. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
2. Exposed Fasteners: Where indicated or required provide flat-head fasteners with exposed heads finished to match exposed aluminum components.
  - a. Provide fasteners with tamper-resistant heads.
3. Screws: ANSI B18.2.1, ANSI B18.6.2, and ANSI B18.6.3.
4. Plain Washers: Round, carbon steel, ANSI B18.22.1, except where specified of stainless steel.
5. Threaded Concrete and Masonry Anchors:
  - a. Material and Finish: Bi-Metal, 300 Series Stainless Steel head and shank fused to harden steel tapping threads and point with corrosion resistant coating with not less than 800 hours of salt-spray resistance according to ASTM B 117.
  - b. Basis of Design: Elco Industries, Inc.; Aggre-Gator; Hex Washer Head with Silver Stalgard finish.
  - c. Not Acceptable: Self-drilling fasteners, screw in plugs, and powder actuated fasteners are not permitted in concrete
6. Toggle Bolts: ANSI B18.2.1 as required.
7. Lock Washers: Helical spring type carbon steel, ANSI B18.21.1.
8. Self-drilling fasteners shall be Drill-Flex as manufactured by DeWalt. or Kwik-Flex as manufactured by Hilti, Inc. No substitutions accepted. Self-drilling fasteners used in wet areas shall include Dewalt Stal-Guard SUB finish or Hilti's Kwik-Cote finish respectively.
9. Self-piercing fasteners shall be TruGrip Metal-to-Wood fasteners as manufactured by ITW Buildex. or approved equal. Self-piercing fasteners used in wet areas shall include ITW Buildex's Climseal finish.
- E. Miscellaneous Steel Backing Plates: Provide adequate steel backing plates as required by architectural and mechanical drawings for the attachment of items such as fixtures, toilets, sinks, railings, equipment, and other items. Securely fasten all plates in precise position to supporting members.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187

## 2.02 FABRICATION, GENERAL

- A. Workmanship: Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.
- B. Fabricate metal fabrications to design, dimensions and details shown. Provide members in sizes and profiles indicated, with supporting members and brackets

- of size and spacing shown, but not less than required to comply with requirements indicated for structural performance and delegated structural analysis
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
  - D. Welded Connections: Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings. Perform welded connections prior to finishing.
  - E. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flathead (countersunk) screws or bolts.
  - F. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
  - G. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
  - H. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:
    - 1. ASTM A 153 for galvanizing iron and steel hardware.
    - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8-inch thick and heavier, and for assembled steel products.
    - 3. Coating thickness shall be not less than G90 designation.
  - I. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
  - J. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
    - 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning".
    - 2. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

### 2.03 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting metal fabrications.
- B. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

**2.04 MISCELLANEOUS FRAMING AND SUPPORTS**

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework reinforcement, and other members as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars, for supports, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Galvanize all miscellaneous frames and supports.

**PART 3 - EXECUTION**

**3.01 PREPARATION**

- A. Examine the areas and conditions under which metal fabrications will be installed and correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected and approved by the Architect.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- C. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

**3.02 INSTALLATION , GENERAL**

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, and other connectors as required.
- B. All welding shall be done by skilled mechanics qualified or licensed in accordance with local building regulations and shall conform to the recommended practices of the American Welding Society. All welds or damage to structural steel coating must be prepared and touched up with zinc-rich primer as described herein.
- C. Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings.

- D. Do not weld or abrade surfaces of components that have been coated or finished after fabrication and are intended for field connection by mechanical or other means without further cutting or fitting
- E. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
- F. Fit exposed connections accurately together to form tight hairline joints.
- G. Align screen units so that variations from level for horizontal members, parallel for aligned members shall not exceed 1/8-inch in 12-feet.
- H. Repair finishes damaged by cutting, welding, soldering, and grinding operations required for fitting and jointing. Restore finishes so there is no evidence of corrective work. Return items which cannot be refinished in field to shop, make required alterations and refinish entire unit, or provide new units
- I. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

### 3.03 CONNECTIONS

- A. Nonwelded Connections: Use manufacturer's standard mechanical joints for permanently connecting components. Use wood blocks and padding to prevent damage to screen and awning members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of the screen and awning.
- B. Welded Connections: Use welding method which is appropriate for metal and finish indicated and that develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces smooth, flush, and blended to match adjoining surfaces complying with NOMMA Joint Finishes; "Finish #1 – No Evidence of Welded Joint". Weld all around at connections, including at fittings. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.

### 3.04 ADJUST AND CLEAN

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION