

## SECTION 05 01 00 -- METALS

### PART 1 - GENERAL

- A. This section applies to all miscellaneous and ornamental metals that receive exterior exposure, such as handrails, guardrails, bollards, exterior metal stairs, gratings, ladders, trellises, and exposed structural elements such as shelf angles, and similar items.
- B. Exposed Fasteners: Avoid exposed fasteners in locations accessible to the public. Where it is necessary to use fasteners, use tamper-proof type.
- C. Thermal Movement: Avoid long, continuous runs of handrail, angles, or other items subject to thermal cycling. Divide long runs into a series of shorter sections, each no longer than 40-50 feet.
- D. Structural Attachment: Attach metal items directly to supporting structural elements such as blocking, concrete slabs, structural steel, footings, or brackets extending to the building structure (If possible, avoid thermal or moisture-barrier breaks in envelope insulation; review with Brown Project Manager). Do not make primary attachments to brick or stone veneer, metal studs, curtainwall, or other secondary elements unless calculations show that these elements are capable of withstanding the load and transmitting it to primary structural elements. Do not attach handrails through gypsum or other friable material; provide rigid steel collars against which to tighten the fasteners.
- E. Cap Watertight: Use watertight welds to fully seal the ends of all hollow objects, such as tubes and pipes, so that they cannot collect water or condensation, or become a conduit for water or condensation. If the geometry of the piece does not permit fully sealing the ends, use a different geometry that does not create internal spaces where water can collect.
- F. Grouting: Grout all baseplates solid after installation. Pack the grout tight to ensure that no voids remain. Do not leave plastic or metal shims exposed in the finished work. Use non-metallic, non-shrink grout.
- G. Areaway Gratings: Security, removal, drainage, leaf protection shall be reviewed and approved with Brown Project Manager. Exterior gratings should be avoided when possible because of multiple maintenance issues.
- H. Expansion Joints: Both interior and exterior shall be reviewed and approved with Brown Project Manager. Note special concern regarding design and maintenance requirements, particularly for floor applications that have finish materials spanning concrete slabs.

### 1.1 Corrosion Resistance:

- A. All metals with exterior exposure must be properly primed and painted, or hot dip galvanized (field paint on galvanized metal is not allowed), stainless steel, aluminum, brass, or other corrosion-resistant materials. Miscellaneous electrical items such as conduits and brackets must also be corrosion-resistant or plastic, if permitted by code. Zinc-electroplated metal is not acceptable.
- B. Steel elements exposed the interior of masonry wall cavities must also be made of corrosion-resistant or galvanized metals, or shielded from the wall cavity with self-adhered waterproofing membrane.
- C. Metal items embedded in masonry, stone, or concrete may only be brass or stainless steel. Aluminum, galvanized steel, or coated steel is not acceptable for embedment. All fasteners used in stone, masonry, or concrete must also be stainless steel or, in the case of expansion anchors, brass. Do not cast pipe sleeves into exterior concrete unless they are stainless steel. Otherwise, use a galvanized base plate with stainless steel fasteners extending into the concrete.
- D. For high-humidity environments where condensation is expected, such as enclosed swimming pools where chloride ion is present, follow more stringent guidelines appropriate for highly corrosive environments. Ordinary 304 stainless can be corroded by chloride ion in chemically pure condensate water. The guidelines of this section do not apply to high-humidity or corrosive environments.
- E. Galvanized metal is not to be painted unless approved by Brown Project Manager. If approved, galvanized metal intended for painting, must be prepared properly to receive paint; see related Painting sections.

### 1.2 Acceptable Materials:

- A. Galvanized Steel: ASTM A123. Galvanize all assemblies after fabrication to the greatest extent practical. Avoid the need to make field welds, which destroy the zinc coating. Instead, used bolts or concealed fasteners to join sections in the field. Where field welding is unavoidable, grind all welds smooth and touch up with zinc-rich paint per ASTM A 780.
- B. Stainless Steel: ASTM A 276, Type 304 or higher (i.e. Type 316).
- C. Aluminum Extrusions: ASTM B221, alloy 6063-T6.

END OF SECTION