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Date: [Datum]

File: Reinforcing Steel

SECTION THRU RAIL

SECTION THRU RAIL (Showing Elliptical Tube Option)

SECTION THRU RAIL (Showing Rectangular Tube Option)

ELLIPICAL TUBE WITH RAIL POST & ANCHORAGE DETAILS

ELEVATION

RECTANGULAR TUBE WITH RAIL POST & ANCHORAGE DETAILS

SECTION THRU POST

SECTION THRU RAIL

SECTION THRU POST

SECTION THRU RAIL

Unless directed otherwise by the Engineer, the fabricator may use the rectangular tube in lieu of the elliptical tube for the rail member.

Increase 2" for structures with overpass.

6 1/8" when vertical reinforcing has closer clear space over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.

See "Material Notes" for anchor bolt information.

For longitudinal slabs, be may be adjusted generally 3" plus or minus to tie reinforcing.
**Construction Notes:**

This rail may be slipformed if approved by the Engineer when anchoring bolts are used. At the Contractor’s option, anchor bolts may be used with the parapet. See Cast-in-Place Anchor Bolt Details.

**Slipforming parapet is not allowed if anchor bolts are used with parapet wall.**

Any rail is slipformed, apply an heavy epoxy heavy “D” behind line of traffic side of rail to concrete deck just prior to slip forming. Provide a ½” DIA heavy epoxy heavy “D” in a bottom seal of rail. An additional DIA ½” or ¾” hole must be provided in sufficient capacity if any of the DIA’s do not meet the required rail load. Repair damage from sealing as directed. Rail parapet must be sealed until otherwise approved. Steel posts must be square to the top of parapet. Use Type VIII epoxy mortar under base plates if gaps larger than ½” exist.

**Cap on ends of tubular steel sections at parapet.** Rail member sections must have at least two posts but not more than four. Round or chamfer all exposed edges of steel components by grinding prior to painting. Chamfer all exposed concrete corners.

**Material Notes:**

Galvanize all metal components of steel rail system. Apply additional coatings when shown elsewhere on the plans. When plans require point to point galvanizing, follow the requirements for painting galvanized steel in Item 649, “Galvanizing and Epoxy field painting”. Item 646, “Field Coating and Painting Grease”. Steel members and anchor bolts must receive galvanization prior to installation and only fields after installation unless directed otherwise by Engineer. Anchor bolts may be DIA 1/2” ASTM A325 or A490 bolts with heavy nuts, one hardened steel washer (ASTM F436) and one 1/2” DIA (1/2” DIA) steel washer each. Nuts must conform to ASTM A563 requirements. Embed fully threaded rods into parapet wall with a Type VI. Class C-5, or Type III anchor. Minimum anchor steel embedment depth is 12”. Anchor bolt embedment depth must be able to accommodate long term strength demands of a single anchor. Parapet section must meet the manufacturer’s published literature showing the proposed anchor adhesive’s ability to develop this load to the Engineer required approach. Use anchor installation, include holes, drilling, and clean out, must be in accordance with Item 450, “Reinforcement.”

**Material Notes:**

Provide Class V (HVR) or similar reinforcing steel if laps are epoxy coated or galvanized. Provide Grade 60 reinforcing steel. Provide Grade 60 reinforcing steel if laps are epoxy coated or galvanized. Provide Class VIII epoxy mortar under post base plates if gaps larger than ½” exist.

**Epoxy Coats:**

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**General Notes:**

- This rail has been evaluated and approved to be of equal strength to railing with like geometry, which have been crash tested to meet MASH TL-4 criteria. This rail can be used for speeds of 30 mph and greater when a T.I.D. rated guard fence is installed. When a T.I.D. rated guard fence transition is used, this rail can be used for speeds of 45 mph and less.

Do not use this rail on bridges with expansion joints providing more than 5” movement. See Cast-in-Place Anchor Bolt Details.

**Rail anchorage details shown on this standard may require modifications for select structure types.** See appropriate details elsewhere in the plans. Do not change design or material of reinforcing steel shown elsewhere on the plans. Rail anchorage details shown on this standard may require modifications or used for select structure types. See appropriate details elsewhere in the plans.

Subject erosion drawings showing panel lengths, rail post spacing, and anchor bolt setting to the Engineer for approval.

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