

**KANSAS DEPARTMENT OF TRANSPORTATION  
SPECIAL PROVISION TO THE  
STANDARD SPECIFICATIONS, 2015 EDITION**

**SECTION 721**

**HANDRAIL FOR BRIDGES AND OTHER USES**

**721.1 DESCRIPTION**

Fabricate and erect the metal handrails according to the Contract Documents.

**BID ITEMS**

Bridge Handrail (\*) (\*\*)

Handrail (\*) (\*\*)

\* Type

\*\* Size

**UNITS**

Linear Foot

Linear Foot

**721.2 MATERIALS**

Provide materials that comply with **DIVISION 1600**.

**721.3 CONSTRUCTION REQUIREMENTS**

**a. General.** Fabricate the metal handrails according to **SECTION 744**.

Before ordering or fabricating the materials, submit shop drawings to the State Bridge Office for approval (**SECTION 105**).

Store handrail materials above ground on platforms or skids, with spacer blocks to keep the members separated. Protect the stored materials from contaminants and moisture.

Before placing concrete, protect the portion of the anchor bolts above the finished concrete line with wrappings or coatings of a release material. Use a template to verify the correct spacing and alignment of the anchor bolts. Remove the wrappings or coatings before erecting the handrails.

Before erecting the handrail posts, true the concrete surfaces where the posts will rest. Grind the concrete surfaces for proper seating, when required.

Erect the handrail by groups of posts corresponding to the length of each rail piece. Fully support handrail by posts at the time it is placed. The maximum deviation allowed from the correct alignment is  $\frac{1}{8}$  inch. Abrupt breaks in alignment must be corrected. Drifting of holes during assembly is permitted only to bring the parts into position. Do not enlarge the holes or distort the metal. Use beveled washers on beveled surfaces to give full bearing to both the head and nut. After the handrail is erected, align it and tighten the nuts on the anchor bolts.

**b. Steel Handrail.** Erect the handrail to line and grade using surveying instruments. Shim the handrail posts as required. For shims  $\frac{1}{8}$  inch or greater, use either steel or sheet lead shims. Only use 1 shim per post.

**c. Coatings for Steel Handrail.**

(1) Non-Galvanized Surfaces. Surface prep, shop and field paint in accordance with **SECTION 714**.

(2) Paint over Hot-Dipped Galvanized Surfaces. Galvanize railing and related hardware in accordance with ASTM A 123 or ASTM A 153, as appropriate.

Determine the age of the zinc corrosion products, smooth and clean surfaces, check for the presence of and if necessary remove chromate conversion coatings or wet storage stain, and finally prepare and dry surfaces to be painted in accordance with ASTM D 6386. Always pretreat galvanized surfaces (D 6386, sections 5.4.3 thru 5.4.5), regardless of age, to prevent the immediate formation of oxides and to enhance paint adhesion.

The galvanizer and paint manufacturer must work together prior to galvanizing so that the galvanizing process and the post galvanizing surface prep are fully compatible with the selected paint system. Apply paint in accordance with the manufacturer's recommendations. The time between any surface's preparation and paint application must not exceed 8 hours.

Refer to the Contract Documents for paint color.

(3) Powder Coating over Hot-Dipped Galvanized Surfaces. Galvanize railing and related hardware in accordance with ASTM A 123 or ASTM A 153, as appropriate.

Determine the age of the zinc corrosion products, smooth and clean surfaces, check for the presence of and if necessary remove chromate conversion coatings or wet storage stain, and finally prepare surfaces to be powder coated in accordance with ASTM D 7803. Always pretreat galvanized surfaces (D 7803, section 5.1.3.2), regardless of age, to prevent the immediate formation of oxides and to enhance powder coating adhesion. Notify the powder coater and manufacturer of this pretreatment.

After the requirements of the previous paragraph are satisfied, thermally treat railing and related hardware just prior to powder coating to reduce pinholing and blistering. Treat in accordance with ASTM D 7803, Section 6.

The galvanizer, powder coating manufacturer and powder coater must work together prior to galvanizing so that the galvanizing process and the post galvanizing surface prep are fully compatible with the selected powder coating formulation. Apply the powder coating in accordance with the manufacturer's recommendations.

Refer to the contract documents for powder coating color.

**d. Aluminum Handrail.** Erect the handrail to line and grade using surveying instruments. Shim the handrail posts between the post and concrete surfaces, or between the post and base plate, as required. Use aluminum shims. If the shims are in contact with another metal or the concrete surfaces, coat the shims with caulking compound, or paint the shims with paint specifically used on aluminum, or use a synthetic rubber gasket.

#### **721.4 MEASUREMENT AND PAYMENT**

The Engineer will measure handrail from the center of end post to center of end post by the linear foot.

Payment for the "Bridge Handrail" or "Handrail" at the contract unit prices is full compensation for the specified work.

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