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5.26 SUPPLY BOX BEAM GUARDRAIL AND POSTS5.26.1 GENERAL

The Work consists of supplying standard box beam or median box beam guardrail and posts for use as hazard avoidance barriers.

5.26.2 STANDARDS OF REFERENCE

All material supplied shall refer to the following standards, specifications or publications:

Society of Automotive Engineers:

SAE J403 - Sept. 80 - Chemical Composition of SAE Carbon Steels

Canadian Standard Association:

CAN/CSA G40.20-M87 - General Requirements for Rolled or Welded Structural Quality Steel

CAN/CSA G40.21-M87 - Structural Quality Steel

CSA W47.1-1983 - Certification of Companies for Fusion Welding of Steel Structures.

CSA W59-M1984 - Welded Steel Construction (Metal Arc Welding).

CSA G164-M1981 - Hot Dip Galvanizing of Irregularly Shaped Articles.

American Society for Testing and Materials:

ASTM A307-86a - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength

ASTM A325M-86 - High-Strength Bolts for Structural Steel Joints (Metric).

References made to TEB drawings in this Specification refer to drawings found in the manual entitled "Standard Drawings for Highway Construction" which is available from Alberta Transportation.

5.26.3 MATERIALS

The Contractor shall supply all materials necessary to complete the Work. Previously installed material may not be used.

Prior to installing any guardrail, the Contractor shall supply the Consultant with the manufacturer's certification that the material conforms with the specifications.

All materials for standard box beam installations shall be supplied in accordance with drawings TEB 3.27, TEB 3.28, TEB 3.33, TEB 3.34, TEB 3.35, TEB 3.36, TEB 3.37, TEB 3.38, TEB 3.39, TEB 3.40, TEB 3.41, TEB 3.46 and TEB 3.47.

All materials for median box beam installations shall be supplied in accordance with drawings TEB 3.22, TEB 3.23, TEB 3.24, TEB 3.25, TEB 3.26, TEB 3.27A, TEB 3.28A, TEB 3.29 and TEB 3.30.

5.26.3.1 **Steel Box Beam Barriers**5.26.3.1.1 Rails

Rails shall be welded or seamless structural tubing (350 WT grade) and either class C or H conforming to CAN/CSA G40.21M.

The steel shall conform to a minimum standard impact energy requirement of 14 Joules (10.5 ft-lbs) for a half-size test specimen tested at 0° C and shall contain a manganese/carbon ratio, computed based on heat analysis values, of at least 4.5.

The above requirements and the mechanical and chemical properties shall be verified by test results, certified as outlined in CAN/CSA G40.20M, and verified as outlined in the Quality Assurance Section of the Road Authority specification.

5.26.3.1.2 Posts, Ground Plates, Paddles, Brackets, Base Plates and Splice Plates.

Posts shall be American standard beam section. Posts, ground plates, paddles, brackets, and splice plates shall conform to CSA/CAN G40.21M, grade 230G.

5.26.3.1.3 Bolts, Nuts and Washers.

Bolts, Nuts and Washers shall conform to ASTM A307-86A. Self-drilling, self-tapping fasteners shall be #12-24-1.50 indented hex washer head, cadmium plated.

Bolts, nuts and washers used for terminal end anchorage treatment shall conform to ASTM A325M-86.

5.26.3.2 **Production**5.26.3.2.1 General Requirements

Welding shall conform to CSA W59M and W47.1. No transverse welds are permitted on the rail sections.

All components and associated hardware except for self-drilling, self-tapping fasteners shall be hot dip galvanized after fabrication and shall conform to CSA G164M.

All dimensions are subject to manufacturing tolerances unless otherwise indicated. The individual components shall be capable of being assembled to conform to the finished structure as indicated on the drawings.

5.26.3.2.2 Fabrication

Flame-cutting shall not be used to create the rounded ends of the slots for the post paddles. The slots may be fabricated in one of the following ways:

- Two holes each 40 mm in diameter shall be drilled at the two ends of the slot, and the material between may then be removed either by flame-cutting or saw-cutting; or
- The entire slot may be punched.

The distance from the end of the slot to the outside face of the nearest vertical side wall shall be no less than 13 mm, and cuts shall not extend past these rounded ends. Failure to comply with these requirements shall constitute grounds for rejection of the product. All slots are to be fabricated before hot dip galvanizing.

When indicated in the material requirements, an expansion joint shall be provided for at one end of the rails in accordance with drawings TEB 3.30 and TEB 3.40.

5.26.3.2.3 Marking

The name, brand or trademark of the steel producer, the year of production, and the heat number shall be stamped so as to remain legible after galvanizing.

The stamped information shall appear on the underside of each rail.

5.26.4 EQUIPMENT

The Contractor shall supply all equipment necessary to complete the Work.

5.26.5 MEASUREMENT AND PAYMENT

Payment for the supply of box beam guardrail including all required hardware and posts will be included in the unit price bid per metre for "Box Beam Guardrail - Supply and Install" in accordance with Specification 2.19, Guardrail and Guide Posts.