

PART 1 - GENERAL

1.1 DESCRIPTION

- .1 This section specifies the requirements for the supply and installation of guide rails.

1.2 MEASUREMENT FOR PAYMENT

- .1 **Guide Rail:** Measurement for payment for the supply and installation of guide rail shall be the length of guide rail placed within the limits specified or designated by the Departmental Representative measured in linear meters, rounded to one decimal place, measured end to end along the face of the railing and terminal sections. Payment by the meter shall include excavation for new post holes, supply and install all posts, anchors, rail section, angled/buried rail sections, terminal sections, bolts, nuts, washers, spikes, and nails, the backfill of post holes, compaction of backfill, the disposal of waste material, the trimming of posts, the supply and application of wood preservative, the installation of reflectors, the cleaning, pre-treatment and coating of steel rail with cold galvanizing compound where so required, all in accordance with this specification.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Guide rail parts furnished under this section shall be interchangeable with similar parts regardless of their source of manufacture.
 - .1 The rail elements shall consist of a corrugated steel W-beam with corrugations symmetrical about the horizontal axis and such that the edges and centre of the rail element may contact each post.
 - .2 The individual rail elements shall be of the W-beam type consisting of 2.75 mm thick rail of length not less than 4125 mm, having post bolt slots 3810 mm apart centre to centre, unless indicated elsewhere in which case one additional post bolt plot will be placed at mid-span.
 - .3 The rail metal shall be open hearth oxygen furnace or electric furnace steel having an elongation of not less than 12 percent in 50 mm and shall withstand cold bend, without cracking, or 1800 around a mandrel of a diameter equal to 2 ½ times the thickness of the plate.
 - .4 The rail elements shall be hot-dip galvanized before or after fabricating in accordance with ASTM A-525 (Class 2 ½ oz .) or A123.
 - .5 Rail element joints shall be capable of withstanding a tensile load of not less than 360 kN without failure. The rail element shall not deflect more than 140 mm when tested as a simple beam with the traffic face up and with a 8.9 kN load applied at the center of a 3650 mm span through a 76 mm wide flat bearing.

PART 2 - PRODUCTS
(CONT'D)

2.1 MATERIALS
(CONT'D)

- .1 (cont'd)
 - .6 Workmanship shall be equivalent to good commercial practice and all edges, bolt holes and surfaces shall be free of torn metal, burns, sharp edges and protrusions.
 - .7 Rail sections shall be supplied by the Contractor.
 - .8 Two (2) certified copies of mill test reports of each batch from which the rail element is formed, shall be furnished to the Departmental Representative, if required.
- .2 Angled rail sections shall be manufactured to meet the dimensions as shown on drawings. The sections shall be shop fabricated from rail sections conforming to the requirements. No punching, cutting or welding will be permitted in the field.
 - .1 The weld shall be cleaned, pre-treated and coated with cold galvanizing compound as outlined.
 - .2 Where corrugated steel beam is cut with a saw, drilled or welded, the beam shall be thoroughly cleaned with a wire brush to remove scale, ruse, slag residue, weld splatter, etc. and wiped clean. The cleaned surface shall receive at least one (1) application of metal conditioner to de-oxidize, de-grease and phosphatize the metal surface to be treated if the surface is oily. Pre-mixed, ready to apply liquid zinc compound should be applied to the prepared, clean, dry metal surface. The cold galvanizing compound must be of a type that imports cathodic action against corrosion. The cold-galvanizing compound should have a minimum 50 mm overlap of the surrounding undamaged galvanized steel.
 - .3 Both metal conditioner and cold-galvanizing compound must be approved by Underwriters Laboratories Inc. for component coatings-organic and meet or exceed in accordance with the manufacture instructions.
 - .4 The Contractor shall supply the angled sections.
- .3 Rail terminal sections shall be of standard type as shown on the drawings. The metal and galvanizing shall be of the same thickness and quality as is stipulated for the rail sections. The Contractor shall supply the terminal sections.
- .4 All bolts, nuts and washers shall conform to the specifications of ASTM A307 or A325, except the rail splice bolts shall be button headed.
 - .1 Post bolts and splice bolts shall have shoulders of such shape and size that they fit into the bolt slot in the rails and prevent the bolt from turning.
 - .2 Post bolts shall be 16 mm diameter and 200 mm long for use with standard 150 x 150 mm posts.
 - .3 Post bolt washers for the back of posts shall be 45 mm in diameter and 4 mm thick.

PART 2 – PRODUCTS
(CONT'D)

2.1 MATERIALS
(CONT'D)

- .4 (cont'd)
 - .4 Bolts for anchors shall be 16 mm diameter and 350 mm long for use with 150 mm x 150 mm posts and anchors. Washers shall be 45 mm round and 4 mm thick.
 - .5 Splices for anchors shall be 125 mm galvanized spikes.
 - .6 Bolts, nuts, washers and other fittings shall be hot-dip galvanized in accordance with ASTM A-153.
 - .7 The Contractor shall supply the bolts, nuts, washers and spikes.
- .5 Silver signal reflectors and yellow signal reflectors shall be of size 75 mm x 100 mm. The Contractor shall supply both types of signal reflectors.
- .6 Nails for securing signal reflectors shall be supplied by the Contractor and shall consist of 30 mm galvanized flat head nails.
- .7 Timber for posts and anchors shall be sound, well-seasoned structural grade lumber.
 - .1 Posts shall have minimum dimensions of 150 mm x 150 mm x 2000 mm.
 - .2 Anchors shall consist of either one piece of guide rail post cut 450 mm long or two pieces of 38 mm x 140 mm x 450 mm lumber.
 - .3 After cutting to size, posts and anchors shall be pressure treated with wood preservative. The minimum weight of preservative retained per cubic metre of timber shall be 130 kg with empty cells.
 - .4 The Contractor shall supply all the required wood preservative treated posts and anchors.
- .8 Field treatment of wood preservative to be in accordance with CSA 080.

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Galvanize materials shall be loaded, hauled and handled in such a manner that galvanizing will not be damaged. All bare, abraded, and damaged surfaces shall be cleaned, pre-treated if required and coated with cold galvanizing compound as outlined above.
- .2 Guide rail shall be placed to lengths, lines and grades indicated on the drawings. Except where directed otherwise by the Departmental Representative, the guide rail shall be installed in accordance with the requirements of the drawings.

PART 3 – EXECUTION
(CONT'D)

3.1 INSTALLATION
(CONT'D)

- .3 An angled rail section shall be placed on the approaching traffic end of a run of guide rail and terminal section shall be placed at the other end, unless directed otherwise by the Departmental Representative.
- .4 The end post at an angled/buried rail section shall have an anchor secured to the bottom of the post.
- .5 Where a 150 mm x 150 mm x 450 mm timber anchor is used it shall be secured to the post by means of a galvanized nut and 16 mm diameter bolt 3560 mm long together with two (2) 45 mm round, 4 mm thick galvanized washers.
- .6 Where a double 38 mm x 140 mm x 450 mm timber anchor is used it shall be secured to the post by means of four (4) 125 mm galvanized spikes.
- .7 Field boring and cutting to length of anchors will be permitted provided that the hole is treated with two (2) coats of wood preservative before driving the bolts and provided that the cut end is treated with two (2) coats of wood preservative before burying.
- .8 The Contractor shall excavate the holes for the posts such that when placed in the holes the bottom of the posts are at least 1000 mm below the ground surface.
- .9 Posts shall be set plumb and to the established lines and grades and shall be placed at 3810 mm intervals, unless directed otherwise by the Departmental Representative.
- .10 The posts shall be firmly backfilled with selected material, free of large rock, placed in layers of thickness and not greater than 100 mm. Each layer shall be thoroughly compacted before the next layer is placed. Should the backfill be dry then each layer shall be moistened before tamping.
- .11 All backfill shall be compacted to 95% of Standard Proctor Density (ASTM D698-78).
- .12 All excavated waste material shall be disposed of along the sides of fill, or in other locations as directed by Departmental Representative.
- .13 The rails shall be secured to even lines such that the center of the rail is 500 mm above the edge of pavement.
- .14 The Contractor shall bore holes in the posts for the post bolts and treat the holes with two (2) coats of wood preservative before driving the bolts.

PART 3 – EXECUTION
(CONT'D)

3.1 INSTALLATION
(CONT'D)

- .15 Rail elements and terminal sections shall be lapped so that the exposed ends will not face approaching traffic.
- .16 The bolted connections of the rail element to the post shall be capable of withstanding a 22.5 kN pull at right angle to the lines of the railing.
- .17 When the attachment of the rail elements to the posts has been completed, the tops of the posts shall be cut to a point 75 mm above the top of the rail as shown on the drawings. The tops of the posts shall be treated with two (2) coats of wood preservative after cutting.
- .18 Signal reflectors shall be attached to posts at terminal sections, posts at the welded angled sections and to every fourth post in a length. Silver reflectors shall be placed facing oncoming traffic and yellow reflectors shall be placed on the opposite side.
- .19 The Contractor shall drill nail holes in the reflectors, bend the reflectors to the required shape and secure the reflectors with 30 mm galvanized flat head nails as shown on the drawings.