

BRIDGE RAILING, F-SHAPE CONCRETE

****From Guilford AC IM 091-1(33)**

- xx. DESCRIPTION. This work shall consist of furnishing and erecting cast-in-place concrete bridge railing (F-shape concrete) in accordance with the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Sections 501 and 525 of the Standard Specifications, with the exception that the provisions of Subsection 525.03 do not apply.

- xx. MATERIALS. Concrete shall meet the requirements of this Section for High Performance Concrete, Low Shrinkage.

- xx. CLASSIFICATION AND PROPORTIONING. Proportioning of High Performance Concrete, Low Shrinkage shall meet the following requirements:

HPC Class	Req.*** Cem. Mat. (lbs./cy)	Maximum Water- Cem. Mat. Ratio	Max.* Slump (in.)	Air Content (%)	Coarse Aggregate Gradation Table	28-Day** Comp. Strength (psi)	28-Day** Modulus of Rupture (psi)
Low Shrinkage	611	0.44	7	7.0 ± 1.5	704.02B	3500	600

*A maximum slump of 8 inches is allowed after the addition of admixtures.

** The listed 28-day compressive strength or modulus of rupture will serve as the basis of designing or approving the concrete mix.

***See additional (English unit) tables located in Subsection 501.03 for required cementitious materials (use HP Class B).

- xx. SHRINKAGE COMPENSATING ADMIXTURE. A shrinkage compensating admixture shall be added during the initial concrete mixing phase or as recommended by the chemical manufacturer product representative. The shrinkage compensating admixture shall be one of the products listed below. The final dosage rate will be determined by the product representative and the concrete producer. The dosage rate volume is computed into the final water/cementitious ratio.

Manufacturer: Sika Construction Product Division

Product name: Sika Control 40

Tel.: 1-800-933-7452

Website: <http://www.sikaconstruction.com/tds-cpd-SikaControl40-us.pdf>

Manufacturer: The Euclid Chemical Company

Product name: Eucon SRA

Tel.: 1-800-321-7628

Website:

http://www.euclidchemical.com/fileshare/ProductFiles/techdata/eucon_sra.pdf

Manufacturer: BASF (Master Builders)

Product name: Tetraguard AS20

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Tel.: 1-800-628-9900

Website: <http://www.basf-admixtures.com/NR/rdonlyres/84C7EC12-F527-44FD-A8B9-3A007609FF76/0/TETRAGUARD AS20 DS307.pdf>

Manufacturer: Grace Construction Products

Product name: Eclipse Plus

Tel.: 1-877-423-6491

Website:

<http://www.na.graceconstruction.com/concrete/download/EC-13B 2.pdf>

- xx. FABRICATION. Fabrication tolerances for all cast-in-place concrete bridge railing, regardless of the method of construction, shall conform to the following finished tolerances:

Bar Reinforcement Cover	-0, +13 mm (½ inch)
Width (Top)	-0, +6 mm (¼ inch)
Width (Bottom)	-0, +13 mm (½ inch)
Surface Straightness	13 mm in 6 m
(Deviation from theoretical centerline)	(½ inch in 20 feet)
Vertical Alignment	13 mm in 6 m
(Deviation from a line parallel to the theoretical grade line)	(½ inch in 20 feet)

The barrier shape indicated on the Plans shall not be altered.

Precast concrete barrier units shall not be used for permanent concrete bridge railing.

Slip forming of the barrier will not be allowed.

- xx. CURING CONCRETE. The Contractor and all other project personnel shall take particular care when performing any construction or other operations during the railing curing period in order that the bridge deck is not struck, shaken, or vibrated. After the curing period is completed, all parties shall take care to avoid damaging the railing during the remainder of project construction.

After 24 hours the bond between the concrete rail and the forms shall be broken. Weeper hoses shall be installed so that the water can flow across all faces of the concrete rail for the entire required curing period.

If the forms are removed before ten curing days have passed, the concrete shall be cured by means of a white curing compound. Curing compound shall be sprayed on the concrete surface immediately following form removal and hand finishing operations. The compound shall be applied by means of pressure spraying or distributing equipment at the rate directed by the Engineer, but not less than 0.06 gallons per square yard of surface or a dosage rate as specified by the curing compound manufacturer, whichever is greater.

The equipment for applying the compound shall be such that the compound is applied as a fine spray with no surface damage to the concrete. The equipment shall also provide adequate agitation of

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the compound during application, and shall be approved by the Engineer before work is started.

At the request of the Engineer, the Contractor shall devise a demonstration of the equipment and spray coverage over an area of no less than 32 square feet that will not be incorporated into the accepted work. Should the method of applying the compound produce a non-uniform film, or should the spraying equipment fail and duplicate equipment not be immediately available, the application of curing compound shall be discontinued immediately and the curing shall be accomplished by another method acceptable to the Engineer.

The Contractor shall submit a contingency curing plan at the deck pre-pour meeting for review and approval. The Engineer will have 7 days to review the plan. The Contractor shall stockpile sufficient approved coverings for protection of the concrete in the event of rain, non-uniform film application, or breakdown of spray equipment.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Bridge Railing, F-Shape Concrete) to be measured for payment will be the number of cubic meters (cubic yards) of concrete placed in the complete and accepted work, as determined by the prismatic method using dimensions shown on the Plans or as directed by the Engineer. No deductions will be made for the volume of concrete displaced by steel reinforcement, expansion joint material, scuppers, conduits, scoring, chamfers or corners, inset panels of 38 mm (1½ inches) or less in depth, or any pipe less than 200 mm (8 inches) in diameter.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Bridge Railing, F-Shape Concrete) will be paid for at the Contract unit price per cubic meter (cubic yard). Payment will be full compensation for performing the work specified, including designing the mix, satisfactory finishing and curing, and for furnishing all forms, materials, including joint filler and bond breaker, thrie-beam connection plate, labor, tools, admixtures, equipment, including automatic temperature recording units, trial batches, and incidentals necessary to complete the work.

The cost of heating materials and protecting the concrete against cold weather, and any additional cost for cement, will not be paid for separately but will be considered incidental to Special Provision (Bridge Railing, F-Shape Concrete).

The cost of furnishing testing facilities and supplies at the batch plant and the setting of inserts, bench marks, and bridge plaques furnished by the Agency will not be paid for separately but will be considered incidental to Special Provision (Bridge Railing, F-Shape Concrete).

Reinforcing Steel, Terminal Connectors and Water Repellent, Silane used within the pay limits of Special Provision (Bridge Railing, F-Shape Concrete) will be paid for separately under their respective Contract items.

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Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.608 Special Provision (Bridge Railing, F-Shape Concrete)	Cubic Meter (Cubic Yard)