

**ITEM 607.9970--11 M – CONCRETE BARRIER WALL WITH ARCHITECTURAL FINISH AND STEEL POSTS (ON GRADE)**

**DESCRIPTION**

This work shall consist of furnishing and installing concrete barrier walls with architectural finish and steel posts in accordance with the contract documents and as directed by the Engineer.

**MATERIALS**

Concrete shall meet the requirements of Subsection 501-2 with the following additions:

1. Concrete for precast panels shall have a minimum compressive strength of 35 Mpa at 28 days after casting and shall have an air content of  $7\% \pm 2\%$  . Panels shall be designed and constructed in accordance with Section 704-03 of the Standard Specifications.
2. Concrete for precast panels shall conform to the general material and quality requirements for precast concrete items of Section 704-03 of the Standard Specifications, produced in accordance with the current Materials Procedure for precast concrete QC/QA titled “Procedures for Achieving and Maintaining Precast Concrete Manufacturer’s Approved List Status.”
3. Bar reinforcement shall meet the requirements of Subsection 709-01, Grade 420.
4. Wire fabric mesh shall meet the requirements of 709-2.
5. Neoprene pads shall meet the requirements of either Subsection 728-01 or 728-02.

Steel elements and shims shall be as follows:

1. Steel posts shall be ASTM A572M, Grade 345 and shall conform to the requirements of Subsection 715-01.
2. Structural steel for base plates and miscellaneous attachment hardware shall be ASTM A572M, Grade 345 and shall conform to the requirements of Subsection 715-01.
3. Paint for steel posts, base plates and miscellaneous attachment hardware shall conform to Section 572-2. Color shall be as specified in the Contract Documents.
4. Bolts, nuts and washers shall be ASTM A572M, Grade 345 and shall conform to Subsection 715-14. All bolts, nuts and washers shall be galvanized in accordance with Subsection 719-01, Type II.
5. Spacer shims shall be horseshoe shaped and constructed of a multi-polymer plastic suitable for shimming.

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Coloring of the concrete shall be as follows:

1. Pigment admixture for integrally colored concrete shall meet the requirements of ASTM C979. The color(s) of the pigment(s) will be subject to approval by the Engineer and shall closely match the color(s) of the acrylic stain(s). The Contractor shall supply to the Engineer color chips or color samples produced by the pigment manufacturer prior to pouring precast concrete panels and posts.

Acrylic stain for precast concrete panels shall be as follows:

A. General: The color stain shall be:

- a. Standard grade Lithochrome© Tintura™ Stain as manufactured by L.M. Scofield Company, 280 Park Avenue, Rutherford, NJ;
- b. Standard grade H&C Semi Transparent Decorative Stain as manufactured by H & C® Concrete Coatings, 101 W. Prospect Avenue, Cleveland, OH 44115;
- c. Standard grade Seal-Krete® Concrete Colors as manufactured by Convenience Products, 306 Gandy Road, Auburndale, FL 33823;

or an equivalent product approved by the Materials Bureau.

The color stain shall be a 100% acrylic, water repellent stain which provides a uniform tint to the concrete surface, and is resistant to fading or damage due to ultraviolet light, salts and acids caused by automobile emissions.

If an alternate stain product is proposed, the Contractor shall submit to the Engineer, two 100 ml (minimum) samples of the proposed product to the Materials Bureau for testing. The samples shall be of a color acceptable to the Engineer. Accompanying the samples submitted shall be two sets each of the manufacturer's application instructions and product safety data sheets. Samples shall be received by the Materials Bureau at least 60 days prior to the intended use of the product.

- B. Color: The color(s) of the stain(s) used will be as specified on the plans. The Contractor shall supply to the Engineer color chips or color samples produced by the stain manufacturer before any staining work is begun.
- C. Basis of Acceptance: The stain product used will be accepted based on the manufacturer's certificate or label identifying the product supplied as being one of the three products named above or approved equal after the color has been approved by the Engineer.

In the case of an alternate stain product, the product will be accepted based on a written statement from the Materials Bureau describing an alternate stain product which has been tested and approved for use under this specification, plus the manufacturer's certificate or label identifying the product supplied as being the alternate stain product which has been tested and approved by the Materials Bureau, after the color(s) has been approved by the Engineer.

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Fabrication of Precast Concrete Panels:

Precast concrete panels shall conform to the shapes and sizes shown on the Contract Documents. The requirements of Section 704-03 of the Standard Specifications shall apply except as follows:

- A. Panels shall be cast vertically so that architectural finish form liner can be applied on either or both faces of the panel as shown on the Contract Documents.

Alternatively, the Contractor may elect to cast the panels horizontally with a form liner on the bottom of the form using a stamping process to obtain the desired form liner surface on the top.

- B. Exposed concrete surfaces for precast concrete panels shall have an architecturally patterned surface as shown on the contract documents. No form release agents shall be used on surfaces to be coated with acrylic stain. The form liners for the patterns shall:

1. Produce the pattern required by the plans.
2. Be composed of a material(s) that will not bond to the concrete.
3. Be attachable to standard plywood or steel concrete forms, such that no distortion or stray markings occur within the concrete surfaces.

Special care shall be taken after installation to ensure that all form liner surfaces are thoroughly cleaned of all stray material of any nature. No concrete shall be placed prior to the Engineer's inspection and approval of form liner surfaces.

After removal of forms, the Engineer will inspect architecturally patterned concrete surfaces. All such surfaces which do not exhibit the required architectural patterns shall be repaired in a manner satisfactory to the Engineer at no expense to the State. The repair shall match the concrete surface. Concrete repair material, if used, shall meet the requirements of 701-04. Panels which are deemed by the Engineer not be repairable will be rejected.

- C. The dimensions of the concrete panels shall be as shown on the plans with the following permissible tolerances:

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|----------------------|-----------------------|----------------|
| 1. Width: $\pm 5$ mm | 2. Length: $\pm 5$ mm | 3. Height: 5mm |
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Sample Panels:

The Contractor shall construct one 1.83 m x 1.83 m sample panel for approval by the Engineer to demonstrate the construction techniques. If more than one form liner is called for on the plans, each side of the sample panel shall have a different one of the proposed form liners. Materials used in the sample panels including concrete pigment shall be the actual materials to be used in the construction of the final product. If the samples are rejected by the Engineer, the Contractor shall construct additional sample panels as required until the Engineer's approval is granted.

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Repair of Panels:

Repair of panels that contain minor defects caused by manufacture or mishandling may be required if so approved by the Engineer. Minor defects are defined as small holes (less than 25 mm in diameter) or spalls (less than 645 mm<sup>2</sup>) that do not penetrate deeper than the steel reinforcement. Repairs shall be made using a concrete repair material conforming to the requirements of Subsection 701-04 and have a color similar to that of the unit. The repair shall be finished to the correct shape and cured. All repairs must be made to the satisfaction of the Engineer.

Panels having honeycombing, cracks, or spalls larger than those previously defined are not acceptable for repair and will be rejected.

Basis of Acceptance:

The materials for this item will be accepted for shipment based upon the Engineer's mark.

**CONSTRUCTION DETAILS:**

Acrylic stain on precast concrete panels shall be shop applied as follows:

- A. General The concrete surface to be stained shall be clean, dry, fully cured and free from any material which might inhibit the acceptance of color stain. All repairs to the concrete surface shall be performed prior to the application of the stain.
- B. Surface Preparation After the concrete surface has been fully cured, the Contractor shall clean the surface of all dust and soil by water washing or other method approved by the Engineer. Prior to cleaning the concrete surface, the Contractor shall remove loose scale or laitance from the concrete surface by wire brushing or other method approved by the Engineer.
- C. Equipment The stain shall be applied to the concrete surface using airless spray equipment. Roller or brush application will not be permitted.
- D. Application The concrete surface shall be completely dry before application begins. The stain shall be applied in at least two separate coats according to the limitations and provisions of the manufacturer's technical data sheets and product application instructions.

The Contractor shall exercise due care to protect structures and installations adjacent to the work area from overspray. The Engineer will terminate spraying at any time if the Engineer determines that satisfactory results in either spray application or overspray protection are not being met.

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- E. Any coated areas damaged during shipment or installation shall be touched up in the field in accordance with the manufacturer's recommendations and to the satisfaction of the Engineer.

Construction details of Subsection 206-3, Structure Evacuation shall apply.

Holes for post footings for concrete noise barriers installed on grade shall be pre-augered, true and plumb as approved by the Engineer, to the depth and diameter shown on the Contract Documents. Precautions shall be taken to protect the holes from collapse. If a temporary casing is used for the pre-auguring, it shall be removed prior to concrete placement. Holes shall contain no free water at the time of concrete placement. Steel posts shall be centered in the holes, which shall then be filled with Class A concrete in direct contact with the soil, properly consolidated. Posts shall be true and plumb. Post footings shall cure a minimum of five days prior to setting any panels.

Panels shall be assembled as shown on the Contract Documents.

Neoprene Pads shall be placed between panels as shown on the Contract Documents. The neoprene pads shall form a continuous contact area between the adjacent concrete surfaces for the full length of joints.

**METHOD OF MEASUREMENT**

This work will be measured for payment as the number of square meters of Concrete Barrier Wall with Architectural Finish and Steel Posts satisfactory furnished and installed. The number of square meters will be computed as the number of square meters of wall panel surface. Only one face of panel will be measured. No separate measurement will be made for posts.

**BASIS OF PAYMENT**

The unit price bid for Concrete Barrier Wall with Architectural Finish and Steel Posts shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.