

ITEM 555.7295 10 M - ARCHITECTURAL TREATMENT VERTICAL STAINED CONCRETE SURFACES

DESCRIPTION

This work shall consist of architecturally treating and staining the vertical surfaces of integrally colored concrete retaining walls, structures, pilasters, piers or other similar vertical surfaces with designated patterns and textures. All work shall be in accordance with these specifications and in reasonably close conformity to the lines, grades, patterns and textures shown on the plans.

MATERIALS

Form Liner and Rustication Strips. Commercially produced Form Liner and Rustication Strip shall meet the requirements of Section 555-3. The form liners and Rustication Strips shall:

1. Produce the patterns, textures and joints indicated on the plans.
2. Be composed of a material(s) that will not bond to concrete.
3. Be attachable to standard plywood, steel, or concrete forms, such that no distortions, or stray markings occur within the concrete surfaces.
4. Be fabricated with care so that all strips are equal in cross-section so that the ends of the strips can be matched during installation.

Concrete. Concrete shall meet the requirements of Section 501 and 555 of the Standard Specifications except for the following. The class of concrete will be as specified elsewhere in the Contract Documents.

Color Admixture. All concrete which is visible above the finished grade shall be integrally colored using pigment admixture, Federal color as noted on drawings and as approved by the Regional Landscape Architect. The color admixture for integrally colored concrete shall be certified by the manufacturer as meeting the requirements of ASTM 979, Standard Specifications for Pigments for Integrally Colored Concrete and be packaged such that one dose is the proper dosage for one cubic meter of concrete.

Releasing Agents. If the form liner manufacturer requires the use of an agent to facilitate the release of the form liner panel from the concrete, or when its use is specified on the plans, such agent shall appear on the Departments Approved List – Form Coatings for Structural Concrete, be non-staining and evenly spread over the entire liner surface. Formwork shall also be treated as needed.

Concrete Penetrating Stain. To unify minor variations in color, a concrete penetrating stain shall be applied in the field on all surfaces of the integrally colored concrete. The color of the concrete penetrating stain shall match the integrally colored concrete.

The penetrating stain shall be a single component water-based thermoplastic acrylic emulsion which carries its color and water repellent protection into the concrete. The stain shall be delivered in original, sealed plastic pails clearly labeled with the manufacturer's name and batch number of the material.

The penetrating stain shall conform to the following performance requirements:

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PHYSICAL PROPERTIES

<u>CONDITION</u>	<u>RESULTS</u>	<u>TEST METHOD</u>
Dry-through time	25 minutes maximum	ASTM D 1640
Dry-to-recoat time	1 hour maximum	ASTM D 1640
Oil, Wax & Silicone Content	None	
Adhesion to Concrete (Average of 5 Tests)	1375 kPa	ASTM D 4541- Elcometer Test
Weather-Q-Meter Tests (500 Hours)	No Visible Degradation	ASTM G 23-Atlas Carbon Arc
Solids by Weight	57% ± 2%	
Viscosity	70-75 KU	ASTM D 562

The unpigmented, clear, non-volatile portion of the stain shall match the infrared spectrograph on file at the central laboratory. The penetrating concrete stain shall comply with New York State Laws regulating the use of volatile organic compounds and solvents.

Caulking Compounds. When a caulking compound is required to seal any necessary concrete joints in the surface, such caulking compounds shall be color matched to the adjacent concrete and meet the material requirements of U.S. Federal Specification TT-S-00227E (COM-NBS) as a multi component, Class A, Type II sealant with ASTM C 920, Standard Specification for Elastomeric Joint Sealants as a Type M, Grade NS, Class 25 joint sealant for uses NT, A, M, and O.

SUBMITTALS

The Contractor shall submit the following for approval:

1. A separate 1 m x 1 m x 100 mm thick completely finished sample of integrally colored, stained concrete with form liner/rustication joint treatment shall be cast on-site using the methods, materials and finishes stated in this specification and on the plans for the approval of the Engineer and the Regional Landscape Architect. When approved, this sample shall be used as the standard for all Architecturally Treated Stained Concrete work on the project.
2. Form Liner and Rustication Strip samples with manufacturer's specifications shall be submitted to the Regional Landscape Architect for approval.
3. Shop drawings of layouts for vertical stained concrete surfaces on retaining walls, abutment walls, parapets, piers and pier caps, including all dimensions and radii.

CONSTRUCTION DETAILS

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All provisions of Section 555-3 shall apply with the following modifications:

To integrally color the concrete, use a color admixture dosage rate recommended by the manufacturer to achieve the Federal color as noted on drawings. This rate is to remain constant for all batches of concrete produced. Introduce color admixtures into the mixer drum in a manner recommended by the manufacturer. The quantity of concrete being delivered shall be no less than one-third the capacity of the mixer drum. Batch the concrete in full cubic meter increments. Once a portion of the batch has been placed, no additional mixing water shall be added to the remaining batch.

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

Approximately 2 mm of the form liner panel shall overlap on either side of the formwork panel so that when the formwork sections are forced together, the form liners compress at the edges to form a tight joint. Joints between panels shall be sealed, taped or fused to form a watertight seam, according to the manufacturer's instructions. Unless specified on the plans, texturing is not required on surfaces which will be below finished grade. Plastic snap tie cones are to be of the non-leaking type. Metal form ties are not to be placed closer than 38 mm to the interior surface.

Construction joints shall extend to the full depth of the concrete at the locations shown on the plans. When construction joints are needed but are not shown on the plans, the Contractor and the Engineer shall agree on the proper locations of such joints so as not to detract from the appearance of the imprinted pattern and to minimize the possibilities of cracking. Unless otherwise directed by the Engineer, all horizontal and vertical construction joints and contraction joints shall be rusticated with the use of chamfer strips of the size indicated on the plans installed on the formwork.

The rustication strips shall be carefully installed true to line and grade. The rustication strips shall be so installed as to leave a neat regular groove in the concrete at all construction joints, along the vertical and horizontal showing edges of contraction joints and at all exposed corners and edges of the concrete.

When used to form the showing edge of construction joints or at the top edges of pours, the concrete shall be placed even with the top of the strip to provide a formed groove with the same dimensions as that of the strip.

To avoid inclusion of dust and debris beneath chamfer strips located at construction joints, the strips at the bottom of the form shall not be positioned until the joint surface has been washed or blown clean of all debris and accepted by the Engineer.

After formwork removal the Engineer will inspect architecturally patterned concrete surfaces. All such surfaces which do not exhibit the required architectural pattern shall be repaired in a manner satisfactory to the Engineer at no cost to the State. The repair shall match the concrete surface. Concrete repair material, if used, shall meet the requirements of Subsection 701-04, Concrete Repair Material of the Standard Specifications.

Under Subsection 555-3.08, clear (fugitive dye) membrane curing compound shall not be used.

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Surfaces to receive the penetrating stain shall be structurally sound, fully cured, clean, dry and free from dust, curing agents, oil, grease, efflorescence and any other contaminants that could prevent proper adhesion. After the concrete has cured 28 days, power wash at a minimum of 20,000 kPa the surface of the area to receive stain. Sandblasting will not be permitted.

Prior to use, the stain shall be thoroughly mixed using the appropriate mechanical means and shall be remixed during spraying operations as required to maintain uniformity. Penetrating stain shall be applied in strict accordance with the manufacturer's written instructions and precautions.

At the time of stain application, both the concrete and air temperatures must be between 7°C and 32°C. Stain shall not be applied unless weather conditions will permit complete drying of material prior to rain, fog, dew or temperatures beyond the prescribed limits.

The penetrating concrete stain shall be spray applied using conventional or airless spray. The stain shall be applied in two thin coats providing a uniform appearance. The first coat must be applied to become tack free before the second coat is applied. The final coat shall be consistent with the quality and appearance of the approved sample area. The rate of applications shall be in accordance with the manufacturer's recommendations. Area of coverage may vary depending on absorption rates of the various surface materials and textures.

Stain may be brushed or roller applied only at locations where overspray would affect adjacent materials and where not practical for spray application. Adequate protection shall be provided to protect adjacent persons, vehicles and property from overspray during staining operations.

Prior to any staining operations, the Contractor shall be required to complete a test staining program for color acceptance and surface area coverage. This work shall be performed on a portion of the erected structure, location of which to be determined by the Engineer. The Contractor shall apply stain to one complete section of the structure, which, when approved, shall serve as a standard of acceptance for all further work.

The completed stain surfaces shall be consistent with the quality and appearance of the approved sample area. If unevenness in color, lines or the work termination, etc. exist, the Engineer may have all such surfaces resprayed at the Contractor's expense. Respraying, if required, shall be carried to a natural break-off point.

METHOD OF MEASUREMENT

Architectural Treatment Vertical Stained Concrete Surfaces will be measured by the number of square meters of concrete treated to the satisfaction of the Engineer. The quantity will be as computed from payment lines shown on the plans or as established by the Engineer in writing. Measurement will be taken as the vertical plane projection of the treated location. No measurement will be taken of actual concrete surfaces.

BASIS OF PAYMENT

The unit price bid per square meter shall include the cost of the form liners, rustication strips, color admixture, concrete penetrating stain, releasing agent, caulking compound, concrete repair material and all other materials, equipment and labor necessary to complete the work as specified, as well as the cost associated

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with all submittals and samples required. Structural concrete will be paid for separately.