

**DESCRIPTION**

This work shall consist of constructing a simulated rock finish shotcrete wall by hand sculpting and staining. The face of the wall shall be finished to produce a rock-like aesthetic finish to simulate the color and texture of any sample panel provided as information available to bidders, and as described in the contract plans,

Producing a rock-like aesthetic finish will require carving relief into the shotcrete face to the depth required to simulate the required texture. The texture and color shall closely resemble that of the approved visual standard panel .

**MATERIALS**

All the provisions of Section 583-2 shall apply. A qualification test according to Section 583-2.02 shall only apply if reinforcement will be used in the shotcrete. This qualification test panel shall be separate from the Visual Standard Panel and routine Quality Control test panels.

**PVC Connector and Drain Pipes.** Provide schedule 80 PVC connector and drain pipes conforming to the requirements of Section 706-15 PVC Plastic Drain Pipe System.

**Color Stain** – The concrete penetrating stain shall be a single component, water based, thermoplastic acrylic emulsion which carries its color and water repellent protection into the concrete. All Concrete stain shall be of the same batch and lot and shall be delivered to the application site in original sealed containers clearly marked with the manufacturer’s name, brand name, type of material, batch and lot numbers, date of manufacture, and color.

The concrete penetrating stain shall comply with New York State Laws regulating the use of volatile organic compounds and solvents.

**CONSTRUCTION DETAILS**

**Mix Design and Fabrication.** The Contractor shall submit three (3) sets of construction details including shotcrete thickness, welded wire fabric, steel support posts for the welded wire fabric, shotcrete mix design, stain colors, paints and MSDS data sheets at least two weeks prior to the beginning of wall construction. The Contractor must receive notification from the Engineer that the proposed mix design and method of placement are acceptable before shotcrete placement can begin.

**Permanent Shotcrete Facing Tolerances.** Construction tolerances for the permanent shotcrete facing prior to installing the sculptured face are as follows:

- Horizontal Location of Wire Mesh; Rebar; Headed Studs on Bearing Plates, from Plan location;  $\pm 10$  mm.
- Headed studs location on bearing plate, from plan location: 6 mm.
- Spacing between reinforcing bars, from plan dimension:  $\pm 25$  mm.
- Reinforcing lap, from specified dimension:  $-5$  mm.

**ITEM 583.04 03 M - SCULPTED AND STAINED SHOTCRETE FACING**

- Complete thickness of shotcrete, from plan dimension: –5 mm.
- Nail head bearing plate, deviation from parallel to wall face: 10 degrees.

**Qualifications.** The Contractor shall provide a project reference list verifying the successful completion of at least five (5) permanent sculpted shotcrete faced wall projects during the past (2) years totaling at least 7,500 square meters of wall face area. A brief description of each project with the Owner's name, contact person and current phone number shall be included.

Submit as proof to the Deputy Chief Engineer Technical Services (DCETS), written documentation of the finishers and nozzlemen's qualifications. Minimum qualifications include experience on at least three projects in the past three years in similar shotcrete application work. In addition, the nozzlemen must demonstrate the ability to satisfactorily place the concrete. This will be based on either previous ACI certification or satisfactory completion of preconstruction visual standard panels.

The Contractor shall submit a list identifying the lead sculptor, additional sculptors and lead staining artisan that will actually be used for the project having experience installing sculpted shotcrete on at least (5) projects of similar magnitude and difficulty over the past (2) years. The list shall contain a summary of each individual's experience.

**Visual Standard Panel.** The Contractor shall provide a visual standard panel matching the texture and coloring pattern of any sample panel provided as information available to bidders , and as described in the contract plans . The advance submittal of this visual standard panel shall allow enough time for the Contractor to correct any differences between the visual standard panel and the sample panel. The Contractor shall submit one visual standard panel approximately 1 meter × 1 meter to be designated as the project specific visual standard panel a minimum of 5 working days before the beginning of the production sculpturing process. The visual standard panel coloring, sculpting and staining shall reflect the color variations and patterns as described in the contract plans and to match any sample panel provided as information available to bidders. Visual standard panel shall require the approval of the Regional Landscape Architect. A maximum of 3 visual standard panels may be required to be produced to achieve an acceptable panel according to the Regional Landscape Architect. Accompanying the accepted visual standard panel shall be the manufacturer's literature which shall include materials specifications, physical properties, including ASTM test methods utilized, manufacturer's recommended application rates for the various surface textures and porosity, current application instructions, and Material Safety Data Sheets. The Contractor must comply with all safety instructions during all applications.

**Shotcrete Placement.** All the provisions of Section 583-3 shall apply except as modified below.

The final shotcrete wall thickness shall provide a minimum of 50 mm of cover from the deepest sculpted recess over all embedded materials in the wall.

The production of Test Panels according to Section 583-3.03 C shall be required, separate from the above specified Visual Standard Panel.

**Sculpting Process.**

1. Sculpting and carving of the nozzle applied shotcrete shall be carved and shaped so that all crevasses shall be created with a slope so that water cannot be trapped or puddled on the wall face.
2. Sculpting of shotcrete shall be carved in such a way in which finished work shall match an approximate look to that of the visual standard panel.
3. The addition of concrete accelerators may have an adverse effect on the stains adhering or reacting with the cured shotcrete. Concrete accelerators having such an adverse effect, on the specific stains being used, shall not be used.

**Drain Pipes.** After completion of the sculpting process, drain pipes used for weeps shall be cut off flush with the finished shotcrete surface.

**Shotcrete curing.** Shotcrete shall be cured a minimum of seven (7) days prior to staining.

**Shotcrete Staining.**

1. All permanently exposed shotcrete surfaces shall be stained, if necessary, to match the coloring of the sample panel. Prior to staining, all permanently exposed shotcrete surfaces shall be prepared according to the staining manufacturers recommendations.
2. At the time of stain application, both the shotcrete and the air temperature must be between 8°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. Areas not to receive stain shall be masked.
3. Shotcrete staining shall consist of applying a minimum of two separate applications of at least two stain colors to all sculpted shotcrete (architectural surface treatment) such that the sculpted wall face demonstrates individual color variations and character to match that of the visual standard panel. Staining shall only be performed when the entire sculpting is complete and not performed during sculpting construction.

**METHOD OF MEASUREMENT**

Sculpted and stained shotcrete facing will be measured by the square meter surface area of the completed facing measured to the neat lines of the facing as shown in the plans. The quantity of shotcrete facing will be computed to the nearest tenth of a square meter.

**BASIS OF PAYMENT**

The unit price bid per square meter shall include the cost of all labor, equipment, materials—including, but not limited to steel reinforcing, premolded joint filler, polyethylene bond breaker strip, joint sealant, PVC pipe for weep holes, exterior surface finish, visual standard panels, and staining.