

SECTION 2.19 - Pigmented Admixture for Portland Cement

2.19.1. This section describes Pigmented Admixture for coloring Portland cement mixtures.

2.19.2. It shall be certified by the manufacturer that the Pigmented Admixture shall comply with the requirements of ACI 212.3R.89, 4.5.1, as water-reducing admixtures, and that their water-reducing components have been tested for compliance with ASTM C 494 (Specification for Chemical Admixtures for Concrete). It shall be certified by the manufacturer that the Pigmented Admixture shall consist of pure synthetic mineral oxide only, and shall comply with ASTM Designation C 979. It shall also be certified by the manufacturer that the Pigmented Admixture shall be a single-component admixture, complying with both ASTM C 494 and ASTM C 979, not as a combination of two or more additives or admixtures.

The Pigmented Admixture shall produce a color equivalent to the standards on file at the office of the New York City Department of Design and Construction, Division of Infrastructure, 30-30 Thomson Avenue, Long Island City, New York 11101 and the Office of New York City Landmarks Preservation Commission.

2.19.3. (A) The Pigmented Admixture manufacturer shall certify that when used at the recommended dosage, the pigmented admixture has no effect on or increases the compressive strength of the concrete by 5-10% when compared with a control batch of the same mix design and slump but without the Pigmented Admixture. Testing shall be done at 28 days after depositing, and shall be measured in pounds per square inch. The test results shall be an average of at least three (3) cores or cylinders per test.

(B) Calcium Chloride shall not be used in the composition of the admixture nor in the composition of the concrete.

(C) The Pigmented Admixture shall be packaged by the manufacturer in incremental amounts by weight for a single cubic yard of concrete, with the designated dosage clearly marked on each package.

2.19.4. (A) Air entraining agent complying with ASTM Designation C 260 shall be used in combination with the Pigmented Admixture.

(B) No other agents or admixtures shall be used with the Pigmented Admixture in the concrete, unless stated in writing by the manufacturer of the Pigmented Admixture to be of no consequence to the colorfastness of the concrete mixture.

(C) The Pigmented Admixtures shall be mixed and delivered in accordance with ASTM Designation C 94. The quantity of concrete being mixed in a mixer shall be no less than 40% of the capacity of the mixing drum (a minimum of 4 yards in a 10-yard truck). Before placing the Pigmented Admixture in a mixer drum, the drum must be thoroughly cleaned and wetted with approximately 35 gallons of mix water and a portion of the aggregate added. This mixture shall mix for 3-4 minutes while the truck hopper and fins are washed with 5 gallons of water. After adding the remainder of the concrete to the truck, the load shall mix at mixing speed for a minimum of 80 revolutions or 10 minutes.

At the Contractor's option, Pigmented Admixtures may be added at the site, in which case:

The truck shall be charged and mixed at the plant, as previously specified, with the required cement, aggregate and admixtures (excluding pigmented admixtures), but only eighty (80%) percent to ninety (90%) percent of the required water shall be added. The truck shall leave the plant with 0 revolutions on its counter.

Once the truck arrives on site, the remaining water and the Pigmented Admixture shall be added and the load mixed a minimum of 90 revolutions.

Concrete will then be sampled and tested. If the consistency of the mix is not acceptable, additional water may be added not more than twice and mixing resumed for 30 revolutions each time. Once the mix is acceptable, it shall be discharged directly into the forms.

The total number of revolutions allowable after the truck has left the plant shall not exceed 150 and the mix shall be discharged within 90 minutes from when the truck has left the plant in order to achieve the correct workability.

(D) The same type and brand of cement, source of sand and water/cement ratio shall be maintained for each load of concrete used in the entire project.

(E) The slump of the concrete shall remain consistent throughout the project at four inches and should not exceed five inches. If held-back water is added at the job site, the concrete should be mixed at mixing speed for an additional five minutes or 30 revolutions, whichever comes first, after addition of the water as per requirements of **Subsection 2.19A.4.(C)**, above, and before depositing.

(F) Before providing the following sample panel(s), the Contractor shall prepare 6 inch x 6 inch x 4 inch samples of pigmented concrete with color matched curing membrane. As many samples as necessary shall be produced until the color is satisfactory to the Engineer. The Contractor shall then furnish for approval and on site a concrete sample for each color specified using the Pigmented Admixture. The sample shall be at least 4' x 4' x 4" and shall be given the specified surface texture and cured with the methods specified for the concrete installation. The Contractor shall not order the admixture until the samples are approved by the Engineer. Once approved, the samples shall be used for assessing color conformance of pigmented concrete installed..

2.19.5. (A) Water must not be sprinkled or otherwise added to the surface of the slab during finishing. Evaporation retardants may be fog-sprayed provided they are not detrimental to the finished color of the concrete.

(B) Curing Membrane. If the concrete is pigmented as per this **Section 2.19**, the curing membrane shall be of the liquid-membrane forming type and shall be color-matched to the pigmented concrete. Additionally, the curing membrane shall be of a type recommended by the Pigmented Admixture manufacturer and shall conform to both ASTM C 309 and all local, State, and Federal regulations concerning volatile organic compounds (VOC). Plastic sheeting, burlap, paper, or other unspecified material shall not be used as a curing membrane.

2.19.6. Prior to making any field samples and the placing of any colored concrete, the contractor, concrete supplier, engineer-in-charge, and/or city representative shall meet and discuss methods of handling the colored concrete.

SECTION 2.22 - Sealer, Concrete Expansion Joint, Elastic Type

2.22.1. This section describes Elastic Type Concrete Expansion Joint Sealer for sealing expansion and contraction joints in concrete pavements and structures. (For asphaltic joint filler see **Section 2.16.**)

2.22.2. Expansion sealer shall be of the following types:

Type 1 -- Hot poured sealer

Type 2 -- Cold application sealer

2.22.3. (A) Expansion joint sealer shall be a resilient and adhesive material which, when applied to the joints of concrete pavements and structures, will form an effective and continuous seal against infiltration of water through the joints during expansion and contraction.

(B) Type 1 Expansion Joint Sealer shall be suitable for melting in an oil jacketed kettle. When uniformly heated to a safe temperature, it shall melt to such a consistency that it can be readily poured into a horizontal joint one-half (1/2") inch in width. Upon cooling to atmospheric temperature, it shall adhere to the sides of the joint and shall not crack or break or separate from the sides of the joint when exposed to freezing temperatures and extended.

Type 2 Expansion Joint Sealer shall be capable of pouring or extruding at 70^o Fahrenheit into joints one-quarter (1/4") inch in width. It shall be resilient and adhesive to concrete. It shall not flow from the joint or be picked up by vehicle tires at summer temperatures.

(C) Expansion joint sealer shall have at least one (1) year of field service satisfactory to the Engineer.

2.22.4. Type 1 -- Hot Poured Sealer shall comply with the requirement of ASTM Designation D 6690, Type III.

Type 2 -- Cold Application Sealer shall be a one-component, cold-applied, silicone material that cures with atmospheric moisture to form a flexible, low-modulus 100% silicone rubber joint seal which meets or exceeds both Federal Specifications TT-S-001543A Class A (one-part silicone sealants) and TT-S-00230C Class A (one-part silicone sealants), [and listed in the NYS Department of Transportation's Materials and Equipment Approved List for "SILICONE JOINT SEALANTS FOR PAVEMENTS \(705-05\)".](#)

SECTION 4.13 - Sidewalk, Concrete

4.13.1. INTENT. This section describes construction of Concrete Sidewalk.

4.13.2. DESCRIPTION.

(A) Concrete Sidewalk shall be of the width specified and shall be laid on a foundation six (6") inches thick, unless otherwise specified.

(B) Sidewalk shall consist of a single course of concrete four (4") inches thick, except in driveways and corner quadrants where it shall be seven (7") inches thick.

(C) Sidewalk joints shall be either the standard type where both expansion joints and scored dummy joints are tooled with neatly rounded edges and bounded on all sides by a troweled border about one (1") inch in width; or, sidewalk joints shall be of a saw cut type where expansion joints are given a saw cut finish and scored dummy joints are saw cut. When saw cut type joints are not specified the standard type joint shall be used.

(D) Concrete shall be pigmented when specified.

(E) Pigmented concrete shall have a silicon carbide surface treatment when specified.

4.13.3. MATERIALS.

(A) Material for foundation shall consist of Size No. 3 broken stone or gravel complying with the requirements of **Section 2.02**, 100 percent of which passes a 2-1/2" square sieve; or approved broken concrete, 100 percent of which passes a 2-1/2" square sieve, containing not more than five (5) percent material passing a No. 200 mesh sieve, not more than five (5) percent material passing a 1/2" square sieve, not more than fifteen (15) percent passing a 1" square sieve, not more than thirty-five (35) percent passing a 1-1/2" square sieve, and not more than five (5) percent retained on a 2" square sieve; or other approved granular material, 100 percent of which passes a 2-1/2" square sieve, containing not more than five (5) percent material passing a No. 200 mesh sieve and not more than five (5) percent retained on a 2" square sieve, with not more than 30 percent by weight of glass. If used, glass shall conform to the applicable paragraphs of **Sections 4.11.3.(B) and 4.11.3.(E)**.

(B) Concrete shall comply with the requirements of **Section 3.05**, Class B-32, Type IIA, unless otherwise specified. Concrete shall be mixed in compliance with Methods A, B, C, or D of **Section 3.05**, except that hand mixing shall not be permitted unless specifically authorized by the Engineer. Coarse aggregate for one course sidewalk shall comply with the requirements of **Section 2.02**, Type 1, Grade B, Size No. 57, or Type 2, graded as follows:

<u>Sieve Size</u>	<u>General Limits - % Passing</u>
1-1/2"	100
1"	93-100
1/2"	27-58
1/4"	0-8

The water cement ratio (by weight) shall be 0.44. Slump values shall be 1-1/2" minimum to 3-1/2" with a 4" maximum.

An approved air-entraining agent shall be added at the time concrete ingredients are mixed with water, to produce an air content (by volume of concrete) of 6-1/2%, with a tolerance of 1-1/2%.

(C) Pigmenting material shall comply with the requirements of **Section 2.19**.

(D) **Preformed expansion joints shall comply with the following requirements:**

- 1) For Standard Type Sidewalks. The preformed expansion joints shall comply with the requirements of **Section 2.15**, and shall be one-quarter (1/4") inch or one-half (1/2") inch thick, at the Contractor's option. Joint sealer for sealing joints over preformed joint filler shall comply with the requirements of **Section 2.22**, Type 2 - Cold application sealer. Where concrete is designated to be pigmented then the sealant shall match that color.
- 2) For Sidewalks Designated to have Saw Cut Type Joints. The preformed expansion joints shall be an approved non-bituminous premolded joint material in compliance with the requirements of **Section 2.15**, and shall be one-quarter (1/4") inch thick except along the building line where they shall be one-half (1/2") inch thick. Joint sealant for sealing joints over preformed joint filler shall comply with the requirements of **Section 2.22**, Type 2 – Cold application sealer. Color of sealant shall be charcoal to match that used at 120 Broadway in the Borough of Manhattan or shall match that of the adjacent existing sidewalk, as directed.

(E) Reinforcement shall comply with the requirements of **Section 4.14**, as applicable.

(F) Silicon Carbide shall be Silicarbid as manufactured by Anti-Hydro, telephone number (800) 777-1773; Sparkle Grain as manufactured by Pacific Palette Concrete Products, telephone number (831) 457-4566; Carborex WSC as manufactured by Washington Mills, contract Mr. Craig Williams, telephone number (508) 839-6511, ext. 214; or an approved equivalent. Silicon carbide crystals shall have a Moh Scale hardness of at least 9 and a grit size of either 16/30 or 16/36.

4.13.4. METHODS. In order to comply with ADA requirements, the Contractor may be required to break the transverse grade of sidewalks such that there shall be a minimum of five (5') feet width of sidewalk with a transverse slope not exceeding 2% and the remaining sidewalk slope not exceeding 5%. No additional payment will be made for this work which may include, but not be limited to, providing additional form work, finishing, contouring to meet adjacent, and placement operations.

(A) EXCAVATION AND EARTH SUBGRADE

Excavation shall be made to dimensions sufficient to accommodate placement of foundation material and to permit the setting of forms.

Where directed, the Contractor shall sawcut the existing sidewalk along existing score lines and other partial panel or slab locations, as directed by the Engineer, to facilitate replacement of sidewalk while at the same time minimizing the impact on good sidewalk not requiring replacement. All work must be done in a safe and workmanlike manner, to the satisfaction of the Engineer. The sawcut shall be for the full depth of sound concrete or stone sidewalk to the top of the underlying foundation. The sawcut shall be straight with sharp edges. No cutting or encroachment into adjacent panels or slabs will be permitted. All saw cutting shall be done with a water lubricated diamond blade. No separate payment will be made for sawcutting existing sidewalk. The cost of sawcutting sidewalk shall be deemed included in the price bid for the concrete sidewalk item.

The earth subgrade, immediately before foundation material is placed on it, shall be compacted to a minimum of 95 percent of Standard Proctor Maximum Density, smooth, parallel to and at the required depth below the finished sidewalk surface and be dampened with water sufficient only to be absorbed by the subgrade. The subgrade shall not be in a muddy or frozen condition and unsuitable material shall be removed and replaced with acceptable material thoroughly compacted.

(B) FOUNDATION

All existing material within the required six (6") inches of foundation shall be removed in its entirety and replaced with material complying with **Subsection 4.13.3.(A)** hereinabove. The excavated material shall become the property of the Contractor and shall be removed from the site to the Engineer's satisfaction.

Foundation material shall be placed on the prepared subgrade, in a manner to minimize segregation, using equipment and procedures approved by the Engineer. Uncontrolled spreading from piles dumped on the grade resulting in segregation will not be permitted. Foundation material shall then be wetted to the optimum moisture content, based on a laboratory 5 point Proctor density test, and thoroughly compacted using an approved plate compactor into a course not less than six (6") inches thick. Compaction of foundation material shall range between 90% and 95% of the Standard Proctor Maximum Density, as directed by the Engineer, depending upon material used. Unsatisfactory subgrade material shall be removed and replaced with acceptable material thoroughly compacted to a minimum of 95% of Standard Proctor Maximum Density. The top surface of the foundation material shall be parallel to the finished grade and at a distance below the grade equal to the specified thickness of concrete. Additional depth of foundation material for special conditions shall be placed as directed by the Engineer.

(C) FORMS

Forms shall be made of substantial material (preferably steel) with suitable metal dividing plates and of sufficient strength to satisfactorily resist distortion when fastened together and secured in place. Forms and dividing plates shall be of a depth not less than that of the concrete sidewalk, be properly located with tops set to the designated sidewalk surface and be left in place until the concrete has hardened.

(D) REINFORCEMENT

Where sidewalk is specified to be reinforced, the Contractor shall furnish and install a welded wire fabric as per the New York City Department of Transportation's Standard Details of Construction Standard Drawing No. H-1045. The wire fabric reinforcement shall be laid in sheets which are straight and true to form and shall be securely held in position by approved methods so that they will be in their prescribed position after the concrete has been placed.

(E) SLABS

Concrete sidewalk shall be built in approximately twenty (20') feet slabs between expansion joints, as specified, or if in independent slabs, as directed. Expansion joints in sidewalk shall coincide with expansion joints in curb.

Around hydrants and wood poles, sidewalk slabs shall be constructed as independent slabs, separated by expansion joints, as directed.

Dummy scored joints one-eighth (1/8") inch wide shall be provided where directed. For standard finish sidewalks the dummy scored joints shall be not less than one-half (1/2") inch in depth. For sidewalks designated to have a saw cut type joint finish the dummy scored joints shall be saw cut not less than three-quarter (3/4") inch in depth.

(F) EXPANSION JOINTS

Unless otherwise directed by the Engineer and excluding sign and parking meter posts, expansion joints shall be installed at all joints between the sidewalk slabs and curb, street hardware, wood poles, street light and traffic pole foundations, bollard foundations, hydrant foundation slabs, buildings, bridges, etc.

Expansion joints for **tooled joint sidewalks** shall be one-quarter (1/4") inch or one-half (1/2") inch in width, **at the Contractor's option**, and shall be filled with preformed joint filler to within one (1") inch of the sidewalk surface. The top one (1") inch shall be sealed with Type 2 - Cold application sealer poured on an approved bond breaker in accordance with the manufacturer's instructions.

Expansion joints for **saw cut joint sidewalks** shall be one-quarter (1/4") inch wide except along the building line where they shall be one-half (1/2") inch wide, and shall be filled with preformed joint filler to within one (1") inch of the sidewalk surface. The top one (1") inch shall be sealed with Type 2 - Cold application sealer poured on an approved backer rod in accordance with the manufacturer's instructions. **Color of sealant shall be charcoal to match that used at 120 Broadway in the Borough of Manhattan or shall match that of the adjacent existing sidewalk, as directed.**

(G) CONCRETE COURSE

Foundation material shall be thoroughly wetted, to the satisfaction of the Engineer, immediately before concrete is placed. The greater the porosity of the material (i.e. broken concrete), the more water required to prevent water absorption from the concrete. The concrete shall be placed within the forms and thoroughly tamped until the surface is at the finished grade.

Along all joints and around all protrusions into the concrete such as manholes, valve boxes, vaults, etc., and along the inside of the forms, hand operated immersion type vibrators shall be used to thoroughly consolidate the concrete. Vibrators shall not come in contact with forms, shall not be used for moving concrete in the work, and in no case shall any vibrator be operated longer than four (4) seconds in any one location. The Contractor shall be required to furnish a minimum of three (3) hand operated immersion type vibrators to the job site, one of which shall be used as a backup for the other two.

(H) PIGMENTING

Where pigmentation is specified, the concrete sidewalks shall be pigmented with an admixture complying with the requirements of **Section 2.19 and the following:**

Where the color of the concrete is required to simulate the color of dark gray bluestone, the concrete shall be integrally pigmented to produce a gray color equal to Davis Color No. 884-3%; L.M. Scofield "Cool Black No. 4", or an approved equivalent, unless otherwise specified.

Where the color of the concrete is required to simulate the color of light to medium gray granite, the concrete shall be integrally pigmented to produce a gray color equal to Davis Color No. 884-1%; L.M. Scofield "Cool Black No. 1", or an approved equivalent, unless otherwise specified.

Where the sidewalk is designate to have a saw cut joint finish the color of the concrete shall be integrally pigmented a Scofield "Landmarks Grey" K-157-4 color as manufactured by L.M. Scofield, or an approved equivalent.

Prior to Commencement of Work, the Contractor shall submit the name of its proposed sidewalk installer upon which his bid is based, along with their respective work history experience in placing pigmented concrete. The installer shall have documented experience in working with pigmented concrete.

Prior to making any field samples and the placing of any pigmented concrete, the Contractor, its concrete supplier, installer, cement producer, laboratory, the pigmented admixture's representative, and the Engineer shall meet and agree on the specifications and methods of handling the pigmented concrete.

All pigmented concrete at different locations shall be identical, unless otherwise directed. Variations in color/tint/hue will not be acceptable. Therefore, the same brand and type of cement and the same source and type of aggregate shall be used throughout the project.

Prior to the mix design being made, the cement intended for use shall be checked to determine that its lightness/darkness is similar to the cement used in the original approved sample. The Pigmented Admixture shall be added in the standard proportion specified by the manufacturer. No fly ash or other admixtures (including, but not limited to, calcium chloride) shall be used except an air-entraining agent complying with ASTM Designation C 260, when directed by the Engineer.

Prior to commencing the placement of concrete, but after acceptance and approval of the pre-construction field sample, the Contractor shall submit properly labeled and identified samples of materials used in the approved sample, as follows:

Coarse Aggregate	20 pounds
Fine Aggregate	20 pounds
Cement	20 pounds
Pigmented Admixture	1 pint

Joint sealer	2 linear feet
Surface sealer	1 pint
Mix design	1 certified copy
Silicon Carbide Aggregate	20 pounds (when specified)

These samples shall be stored where directed by the Engineer and shall constitute material standards for the project. During construction, one (1) pint of cement from each load of cement delivered to the plant to be used in this specific job shall be retained and, after comparison with retained master sample, dated and stored with other retained samples. Aggregate source shall also be checked periodically, as directed by the Engineer, and compared with retained samples.

(I) SURFACE FINISH

1. Sidewalks with Standard Tooled Joint Finish. Top surfaces of sidewalk shall be finished to true smooth planes by screeding, and finally by wooden floats, then lightly broomed to a uniform texture. Each rectangular slab shall have all edges including, edges along buildings, walls, steps and other structures on abutting properties, neatly rounded with proper tools and be bounded on all sides by a trowelled border about one (1") inch in width. Unless otherwise specified in the contract documents, the concrete surface shall be scored and tooled parallel to and perpendicular to the curb line at intervals of five feet.

The City has established for each Borough an esthetic and/or visual quality standard for concrete sidewalks consisting of a full scale reference installation. Reference standards are located within the Boroughs at:

- Brooklyn: Willoughby St. between Flatbush Avenue and Gold Street, North Side
- Queens: 226th Street from South Conduit Avenue to 148th Avenue
- Manhattan: 125 West End Avenue (in front of ABC Studios), Center Mall in Malcolm X Blvd. between 120th St. and 121st St., and pedestrian ramp in the southwest corner quadrant of Malcolm X Blvd. and 121st St.
- Bronx: West side of Whittier Street northward of Ryawa Avenue, between the northwest corner of the intersection at Ryawa Avenue and the first driveway.
- Staten Island: Watchogue Road from Wooley Ave. to Demorest Ave.

The Contractor shall be required to visit and inspect the applicable Borough location as it will be used as a standard of reference for approving and/or rejecting the Contractor's workmanship. Workmanship will be judged for uniformity in surface finish, texture, color, joint construction, joint tooling, line and grade, and overall appearance of sidewalk in comparison to the reference standard. Where the Contractor fails to meet the established standard of workmanship for sidewalk installation, as determined by the Commissioner, he shall be required to replace or rebuild the finished work as directed, in accordance with the Maintenance and Guaranty provisions, under Article 24 of the Standard Construction Contract.

Furthermore, prior to the start of any concrete sidewalk installation work, the Contractor shall construct, for each different concrete color, test standard(s) for this project consisting of approximately 100 linear feet of ribbon sidewalk, if any, and approximately 100 linear feet of full-width sidewalk, if any, at location(s) directed by the Engineer, which shall match, in all respects, the below reference standard. When approved by the Engineer, these test standards shall become the quality standards for this project. The Contractor shall not proceed with the balance of the concrete sidewalk work required for this project until the Engineer has approved, in writing, these test standards.

2. Sidewalks with Saw Cut Joint Finish. Top surfaces shall be finished to true smooth planes by screeding, and finally by wooden floats, then lightly broomed to a uniform texture. Broom finish shall be applied in straight lines, at right angles to the direction of sidewalk traffic. Unless otherwise specified in the contract documents, shrinkage control joints in the concrete surface shall be scored by sawcutting

one-eighth (1/8") inch wide and three-quarters (3/4") deep immediately after the concrete has reached its initial set which is typically anywhere from 4 to 8 hours after the concrete has been poured, depending upon the weather, but in no case shall it be later than 12 hours after pouring. All sawcuts are to be straight, clean, and of consistent width. Joints are to be either perpendicular to the curb or parallel to the curb at 5'-0" on center, unless otherwise shown on the contract drawings.

Top surfaces shall be finished as specified above, except that the final color of concrete mix shall closely match the sidewalks at 120 Broadway, as approved by the Engineer, unless otherwise specified. Before providing the required sample panel(s) under **Section 2.19**, the Contractor shall prepare 6 inch x 6 inch x 4 inch samples of pigmented concrete. As many samples as necessary shall be produced until the color is satisfactory to the Engineer. Final color of concrete concrete curing membrane shall match the pigmented concrete pavement.

Furthermore, prior to the start of any concrete sidewalk installation work, the Contractor shall construct, for each different concrete color, test standard(s) for this project consisting of approximately 100 linear feet of ribbon sidewalk, if any, and approximately 100 linear feet of full-width sidewalk, if any, at location(s) directed by the Engineer, which shall match, in all respects, the below reference standard. When approved by the Engineer, these test standards shall become the quality standards for this project. The Contractor shall not proceed with the balance of the concrete sidewalk work required for this project until the Engineer has approved, in writing, these test standards.

3. Sidewalks with Saw Cut Joint Finish and Silicon Carbide Surface. In addition to the requirements for Sidewalks with Saw Cut Joint Finish, above, the top surface of sidewalk shall have silicon carbide applied at the rate of 20 to 25 lbs./100 S.F., as follows, unless otherwise directed by the manufacturer.

Immediately after substrate surface has been leveled and wood floated, before bleed water has appeared, the silicon carbide shall be applied evenly while there is sufficient moisture in the slab to saturate at least two dust-on coats. Troweling must be started early enough to complete all operations without use of additional water on the surface. Distribute the silicon carbide crystals uniformly (at the rate of 20 – 25 lbs, per 100 sq.ft.) either by hand or mechanical spreader over prepared wet slab. Crystals shall be applied in three separate shake coats. Use one-third (1/3) of the required quantity of crystals for the first application. Apply second application slightly after first application is floated. Do not throw the crystals or broadcast them with a shovel. Use an evenly distributed hand broadcast.

Trowel crystals uniformly into surface after each shake coat. After the second shake coat of crystals have been troweled once, sprinkle the third coat over the surface. The surface must be uniformly coated. Use a steel trowel to leave grains at surface covered with a thin film of cement paste.

The final finish may be lightly troweled to produce a smooth surface free from defects or blemishes. Finish trowelling shall be delayed until surface has set sufficiently to avoid burying the crystals, but must be accomplished before finish has hardened.

Exposure of the silicon carbide crystals shall be accomplished with either of the following methods provided it results in a satisfactory finish:

- a) Water and a soft broom, or sponge. Allow concrete surface to set sufficiently so that light scrubbing will not cause pitting; or,
- b) A light 5% to 10% Muratic acid washing to expose grains after the concrete is at least 2 weeks old. Acid shall be removed from the finished surface with clean water within 15 minutes after application; or,
- c) Other methods, as approved by the Engineer.

(J) BACKFILLING

Backfilling shall follow the removal of forms as soon as practicable and, unless otherwise permitted, shall be of clean earth, satisfactorily compacted.

(K) SURFACE CURING AND PROTECTION

Pigmented concrete sidewalk shall be covered with a color-matched curing membrane complying with the requirements of **Section 2.19**.

Unpigmented concrete sidewalk shall be covered with a clear curing compound consisting of a wax-free vehicle, ready mixed for immediate use without alteration, containing a fugitive dye that will fade uniformly, and complying with the requirements of **Section 2.14, Curing Materials**, Type 1-D, Clear. When applied to freshly placed damp concrete at the rate of one gallon per one hundred fifty (150) square feet, it shall provide a curing membrane displaying the following properties:

- (1) Drying. The compound shall produce a uniform coating at a minimum temperature of 40 Deg. F. and shall dry tack-free within four (4) hours.
- (2) Permeability. The moisture loss through the membrane shall be no more than 0.04 grams per square centimeter of surface area after three (3) days.
- (3) Durability. The membrane shall remain intact for at least seven (7) days.

Curing compound for pigmented concrete and for unpigmented concrete shall each be delivered to the Project only in the manufacturer's original containers which shall be legibly marked with the manufacturer's name, trade name, batch number and date. One batch number shall be used to represent not more than one formula. The containers shall only be opened in the presence of the Engineer.

After their use and prior to their disposal, the Contractor shall have available, for inspection by the Engineer, the empty compound containers, and may dispose of them only after certification by the Engineer. The re-use of any of the containers will be permitted only if approved by the Engineer.

Curing compounds shall be sprayed on the exposed sidewalk surfaces prior to the hardening of the sidewalk concrete and immediately after the concrete water sheen has disappeared. The application of the compounds shall comply with the requirements of **Section 2.14**. The treated surfaces shall be protected from injury for at least ninety-six (96) hours.

Where the Contractor fails to cure the concrete sidewalk in accordance with the requirements of this provision, the Contractor shall be required, at no additional cost to the City, to replace, in its entirety, any sidewalk slab which did not receive, in part or in whole, the specified cure.

Concrete sidewalk shall be carefully protected against injury from rain, frost, the drying effects of the sun and wind, traffic or other causes, by means of suitable guards and covering.

(L) MEETING EXISTING SIDEWALK GRADES

Asphaltic concrete mixture shall be placed, as directed, at locations designated by the Engineer behind newly constructed sidewalk in order to meet existing sidewalk grades.

4.13.5. MEASUREMENT. The area of concrete sidewalk in square feet and the amount to be paid for shall be determined by cores as provided in **Section 5.04**.

In determining the area of Concrete Sidewalk to be paid for, the areas occupied by the tree wells, bases of columns, manhole heads, gate boxes and similar structures will be deducted from the measured area of concrete sidewalk when they measure more than one (1) square foot and will not be deducted when they measure one (1) square foot or less.

The Engineer's estimate of quantity of concrete sidewalk for comparing bids is approximate and is based on non-compliance of the owners of the properties abutting this highway improvement with the Commissioner's notice to them to construct the sidewalk in front of their premises. The aforesaid quantity may be reduced or eliminated, after contract award, in the event property owners comply with the Commissioner's notice.

The Contractor is not to proceed with any sidewalk construction unless ordered to do so by the Commissioner or his authorized representative.

4.13.6. PRICES TO COVER.

(A) CONCRETE SIDEWALK

The contract price per square foot for concrete sidewalk shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)**, including, but not limited to, pigment when specified, **silicon carbide when specified**, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to construct test standards, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**.

(B) CONCRETE SIDEWALK WITH SPECIAL SCORING

The contract price per square foot for concrete sidewalk with special scoring shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)** and special scoring patterns shown on the Contract Drawings, including, but not limited to, pigment when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to construct test standards, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**.

(C) CONCRETE SIDEWALK ON EXISTING FOUNDATION

The contract price per square foot for concrete sidewalk shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct concrete sidewalk of the thickness specified, complete in place on existing foundation material, including, but not limited to, pigment when specified, **silicon carbide when specified**, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**.

(D) REINFORCED CONCRETE SIDEWALK

The contract price per square foot for concrete sidewalk shall cover the cost of all labor, materials, equipment, insurance, and incidentals required to construct a reinforced concrete sidewalk of the thickness specified, complete in place with foundation material in accordance with **Subsection 4.13.4.(B)**, including, but not limited to, reinforcement, pigment when specified, curing, excavation (other than rock excavation) and backfilling, in full compliance with the requirements of the specifications, to furnish such samples for testing and to provide such testing equipment, laboratory space and facilities as may be required and the cost of maintaining the sidewalk in good condition as specified in **Section 5.05**.

(E) SPECIAL SCORING FOR CONCRETE SIDEWALK

The contract price per square yard for special scoring of concrete sidewalk shall cover the cost of scoring dummy joints in new concrete sidewalks within the limits and in the pattern(s) shown on the Contract Drawings for Special Scoring.

New 4" and 7" Concrete Sidewalks will be paid for separately under their respective items. No separate payment will be made for standard scoring of sidewalk. Where no separate item of work is included in the contract, the cost of Special Scoring shall be deemed to be included in the price bid for Concrete Sidewalk.

(F) ASPHALTIC CONCRETE MIXTURE

Asphaltic concrete mixture placed in compliance with **Subsection 4.13.4.(L)** will be paid for at the upset price of Thirty Dollars (\$30.00) per ton, in place, except that such mixture will be paid for at the price bid therefor per ton when there is a scheduled item for Asphaltic Concrete Mixture.

Payment will be made under:

Item No.	Item	Pay Unit
4.13 AAS	4" CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 ABS	4" CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 AAT	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (UNPIGMENTED)	S.F.
4.13 ABT	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED)	S.F.
4.13 AAX	4" CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 ABX	4" CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 BAS	7" CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 BBS	7" CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 BAT	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (UNPIGMENTED)	S.F.
4.13 BBT	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED)	S.F.
4.13 BAX	7" CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 BBX	7" CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 BR	7" REINFORCED CONCRETE SIDEWALK (UNPIGMENTED)	S.F.
4.13 BRP	7" REINFORCED CONCRETE SIDEWALK (PIGMENTED)	S.F.
4.13 BRX	7" REINFORCED CONCRETE SIDEWALK WITH SPECIAL SCORING (UNPIGMENTED)	S.F.
4.13 BRXP	7" REINFORCED CONCRETE SIDEWALK WITH SPECIAL SCORING (PIGMENTED)	S.F.
4.13 CABS	4" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSABS	4" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CABST	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSABST	4" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CBBS	7" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSBBS	7" CONCRETE SIDEWALK (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 CABST	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS)	S.F.
4.13 CSABST	7" CONCRETE SIDEWALK ON EXISTING FOUNDATION (PIGMENTED) (SAW CUT TYPE JOINTS AND SILICON CARBIDE SURFACE TREATMENT)	S.F.
4.13 X	SPECIAL SCORING OF CONCRETE SIDEWALK	S.F.