

SECTION 03160 COLORED CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes requirements for integrally colored concrete.

1.02 GENERAL

- A. Provisions herein augment requirements specified under Sections 03300, Cast-in-Place Concrete, and 03350, Concrete Finishing, to add provisions specific to integrally colored concrete.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM International):
 - 1. C309 Liquid Membrane-Forming Compounds for Curing Concrete
 - 2. C979 Pigments for Integrally Colored Concrete

1.04 SUBMITTALS

- A. Submit product data and manufacturer's instructions for:
 - 1. Color additives
 - 2. Curing compounds
- B. Samples for Color Verification:
 - 1. Submit 8 inch by 10 inch by 2 inch samples (or comparable size approved by the Engineer) of specified colors indicating color additive number(s) and required dosage rate(s).
- C. Concrete Mix Designs: Submit under Section 03300, Cast-in-Place Concrete.

1.05 QUALITY ASSURANCE

- A. Maintain consistency in workmanship throughout colored concrete work.
- B. Installer Qualifications: Colored concrete work shall be performed by firm with five years experience with work of similar scope and quality.
- C. Colored Concrete Mock-Up:
 - 1. Provide full-scale mock-up for the Engineer's approval. Construct at least one month before observation and review to allow concrete to cure.

2. At location selected by the Engineer, place and finish 4 foot by 4 foot area for each concrete color and finish. Demonstrate methods of obtaining consistent visual appearance, including each forming and finishing condition required on Project using materials, workmanship, joint treatment, form ties, curing method, sealants, joint sealants, and patching techniques to be used throughout Project at color concrete.
3. Include specified concrete coverings, sealers, etc. as part of the mock-up if requested by the Engineer.
4. Retain samples of cements, sands, aggregates, and color additives used in mock-up for comparison with materials used in remaining Work. Make available to the Engineer upon request.
5. Accepted mock-up areas will be the visual standard for work of Section.
6. Remove when no longer required for comparison with finished work.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Color Additives: Comply with manufacturer's instructions. Deliver color additives in original, unopened packaging. Store in dry conditions.

1.07 PROJECT CONDITIONS

- A. Colored Concrete Environmental Requirements:
 1. Schedule placing to minimize exposure to wind and hot sun before curing materials are applied.
 2. Avoid placing concrete if rain, or frost is forecast within 24 hours. Protect fresh concrete from moisture and freezing.
- B. Schedule delivery of concrete to provide consistent mix times from batching until discharge.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cement, Water, and Other Admixtures: Refer to Section 03300, Cast-in-Place Concrete. Obtain each material, including cement and aggregates, from same source throughout color concrete work.
- B. Cement: Cement shall be grey or white, as specified in the Contract Documents and as required to match samples available with the Engineer.
- C. Integral Color Concrete Pigment: Conforming to ASTM C979, resistant to lime and other alkali, resistant to sunlight, and inorganic, and containing no carbon black. Provide ready-to-use, integral color material. Integral color material shall be Chromix additive by L.M. Scofield Company, or Davis Colors, or Engineer approved equal. Color additives shall contain pure, concentrated mineral

pigments specially processed for mixing into concrete.

1. Colors: To match samples available with the Engineer, utilizing cement, aggregates, and pigmented additive specified in the Contract Documents.
- D. Curing Compound for Colored Concrete: Curing compound shall comply with ASTM C309 and be approved by color additive manufacturer for use with colored concrete. Provide W-1000 Clear Cure & Seal, manufactured by David Colors, or Engineer approved equal.
- E. Form Facing Materials: Refer to Section 03100, Concrete Forming, for general requirements.
 1. For formed colored concrete surfaces, provide non-porous surface such as steel, plastic, or high-density overlaid plywood with watertight joint seals to prevent leakage.
- F. Sealants for Colored Concrete: Joint sealants shall be type specified in Section 07250, Joint Sealants. Provide in color to match colored concrete.

2.02 CONCRETE MIX DESIGNS

- A. Concrete mix design shall conform to the requirements specified in Section 03300, Cast-in-Place Concrete, and the following additional requirements:
 1. Match the sample available with the Engineer, utilizing the cement, aggregates, and pigmented additive specified in the Contract Documents.
 2. Use of admixtures, in addition to pigmented additive itself, shall be subject to the written approval of the color additive manufacturer.
 3. Dosage rate of color additive shall not exceed 10 percent of weight of cementitious materials in mix.
- B. Maintain water content and control slump to maintain constant color.
- C. Color Additives: Mix in accordance with manufacturer's instructions. Mix until color additives are uniformly dispersed throughout and disintegrating bags, if used, have disintegrated.
- D. Patching Mix: If any patching is permitted, mix according to pigmented additive manufacturer's written instructions. Refer to Section 03170, Concrete Finishing, for additional requirements for patching.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Refer to Sections 03300, Cast-in-Place Concrete, and 03170, Concrete Finishing, for general requirements for finishing and curing concrete.

- B. Finishing and Curing of Colored Concrete:
1. Finish in accordance with color additive manufacturer's written instructions and Section 03170, Concrete Finishing.
 2. Colored Concrete: Cure in accordance with color additive manufacturer's recommendations. Apply curing compound in accordance with curing compound manufacturer's instructions. Apply curing compound at consistent time for each pour to maintain color consistency.

END OF SECTION