

GUIDE SPECIFICATION

SECTION 02750 [02760] [3360]

INTEGRALLY COLORED CONCRETE

[STAMPED/IMPRINTED CONCRETE PAVEMENT]

This guide specification is intended to be used by a qualified construction specifier. It is not intended to be used verbatim as a project specification without appropriate modifications for the specific use intended.

Notes for review by the specifier are set off from specification text by rows of asterisks. Optional text requiring a selection is enclosed within brackets, e.g., "Color shall be [gray] [white]." Items requiring input specifier input are enclosed within brackets, e.g., "Color: [_____]."

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section.
- B. Section Includes:
 - 1. Integrally colored concrete [slabs-on-grade,] [sidewalks,] [driveways,] [patios,] [roads,] [parking lots,] [_____,] [and] [other exterior concrete pavements].
 - 2. [Stamping/Imprinting].
 - 3. Curing of integrally colored [and imprinted] concrete.
- C. Related Sections:
 - 1. Division 3 Section "Cast-in-Place Concrete" for general applications of concrete and coordination of sample submittal [and color selection].
 - 2. Division 7 Section "Joint Sealants" for colored sealants for joints.

1.2 REFERENCES

Other useful publications about colored concrete include:
PCA PA124 - Finishing Concrete Slabs with Color and Texture.
PCA SP021 - Color and Texture in Architectural Concrete.

- A. American Concrete Institute (ACI):
 - 1. ACI 301 "Specification for Structural Concrete for Buildings."
 - 2. ACI 302 IR "Recommended Practice for Concrete Floor and Slab Construction."
 - 3. ACI 303.1 "Standard Specification for Cast-In-Place Architectural Concrete."
 - 4. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete."
 - 5. ACI 305R "Recommended Practice for Hot Weather Concreting."
 - 6. ACI 306R "Recommended Practice for Cold Weather Concreting."
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM C309 "Liquid Membrane-Forming Compounds for Curing Concrete."
 - 2. ASTM C494 "Standard Specification for Chemical Admixtures for Concrete."
 - 3. ASTM C979 "Standard Specification for Pigments for Integrally Colored Concrete."
- C. American Association of State Highway and Transportation Officials (AASHTO):
 - 1. AASHTO M194 "Chemical Admixtures."

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's complete technical data sheets for the following:
 - 1. Colored admixture.
 - 2. [Powder antiaging release agent.]
 - 3. [Imprinting/Texturing tools.]
 - 4. Curing compound.
- B. Design Mixes: For each type of integrally colored concrete.
- C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.
- D. Qualification Data: For firms indicated in "Quality Assurance" Article, including list of completed projects.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with 10-years experience in production of specified products.
- B. Installer Qualifications: An installer with [5-] [_____] years experience with work of similar scope and quality.
- C. Comply with the requirements of ACI 301.
- D. Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

- E. Notification of manufacturer's authorized representative shall be given at least 1-week before start of Work.

Color charts and small sample submittals provide only a general indication of color; color and appearance of completed work may differ. On large or critical projects, specify a mockup or field sample to demonstrate that proposed materials and workmanship produce acceptable concrete appearance.

F. Integrally Colored Concrete [Mockups] [Field Samples]:

1. Provide under provisions of Division 1 Section ["Quality Control."] [_____].
2. At location on Project selected by [Architect] [Landscape Architect] [Engineer], place and finish [10 feet by 10 feet (3 by 3 m)] [4 by 4 feet (1.2 by 1.2 m)] [_____] area.
3. For accurate color, the quantity of concrete mixed to produce the sample should not be less than 3 cubic yards (or not less than 1/3 the capacity of the mixing drum on the ready-mix truck) and should always be in full cubic yard increments. Excess material shall be discarded according to local regulations.
4. Construct [mockup][sample panel] using processes and techniques intended for use on permanent work, including curing procedures. Include samples of control, construction, and expansion joints in sample panels. [Mockup] [Field sample] shall be produced by the individual workers who will perform the work for the Project.
5. Retain samples of cements, sands, aggregates and color additives used in mockup for comparison with materials used in remaining work.
6. Accepted [mockup] [field sample] provides visual standard for work of Section.
7. [Mockup] [Field sample] shall remain through completion of the work for use as a quality standard for finished work.
8. Remove [mockup] [field sample] when directed.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Colored Admixture: Comply with manufacturer's instructions. Deliver colored admixtures in original, unopened packaging. Store in dry conditions.

1.6 PROJECT CONDITIONS

A. Integrally Colored Concrete Environmental Requirements:

1. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.
2. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.
3. Comply with professional practices described in ACI 305R and ACI 306R.

- B. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer's written recommendations.

1.7 PRE-JOB CONFERENCE

- A. One week prior to placement of integrally colored concrete, a meeting shall be held to discuss the Project and application methods.
- B. It is suggested that the [Architect,] [Landscape Architect,] [Engineer,] General Contractor, [Construction Manager,] Subcontractor, Ready-Mix Concrete Representative, and a Manufacturer's Representative be present.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Sika Corporation (Scofield brand).

2.2 MATERIALS

- A. Colored Admixture for Integrally Colored Concrete: CHROMIX® P Admixtures, CHROMIX® G Admixtures, and CHROMIX® L Admixtures, Sika Corporation.
 - 1. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are lime proof and UV resistant.
 - 2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494, and AASHTO M194.
- B. [Stamping/Imprinting Tools and Materials:] LITHOTEX® Pavecrafters® imprinting tools, Sika Corporation.
- C. [Powder Antiquing Release Agent:] LITHOCHROME® Antiquing Release Pro, Sika Corporation.
 - 1. Powder antiquing release agent shall be recommended by pattern tool manufacturer and compatible with integral color additives.
- D. Curing Compound for Integrally Colored Concrete: Curing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.
 - 1. Exterior Integrally Colored Concrete: LITHOCHROME® COLORWAX, Sika Corporation. Use to cure exterior flatwork that will be allowed to cure naturally with only occasional maintenance.

Select either a curing compound in the paragraph above or a curing and sealing compound in the paragraph below.

- E. Curing and Sealing Compound: Scofield® Cureseal-W™ [Semi Gloss] [Gloss] and Scofield® Cureseal™ 700 [Gloss] [Matte], Sika Corporation. Curing and sealing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.
- F. SUBSTITUTIONS: The use of products other than those specified will be considered providing that the Contractor requests its use in writing within 14-days prior to bid date. This request shall be accompanied by the following:
 - 1. A certificate of compliance from the material manufacturer stating that proposed products meet or exceed requirements of this Section, including standards ACI 303.1, ASTM C979, ASTM C494 and AASHTO M194.
 - 2. Documented proof that proposed materials have a 10-year proven record of performance for staining concrete substrates, confirmed by at least 5 local projects that [Architect] [Landscape Architect] [Engineer] can examine.

2.3 COLORS [AND PATTERNS]

- A. Concrete Color[s]:
 - 1. Cement: Color shall be [gray][white].
 - 2. Sand: Color shall [be locally available natural sand.] [be manufactured white sand.] [match [Architect's] [Landscape Architect's] [Engineer's] sample.]
 - 3. Aggregate: [Concrete producer's standard aggregate complying with specifications.] [_____].
 - 4. Colored Admixture: As selected by [Architect] [Landscape Architect] [Engineer] from Scofield Color Chart A-312P.
 - 5. [Stamp/Imprinting Pattern:] As selected by [Architect] [Landscape Architect] [Engineer] from LITHOTEX® Pavecrafters® pattern sheets.
 - 6. [Powder Antiquing Release Agent:] As selected by [Architect] [Landscape Architect] [Engineer] from manufacturer's standard colors. [_____].

 Delete paragraph and subparagraphs above and retain subparagraph below if matching color[s].

- B. Concrete Color[s]: [Provide cement, sand, aggregate and colored admixture as required to match [existing building] [Architect's] [Landscape Architect's] [Engineer's] sample.] [_____].
- C. Curing Compound: Color to match colored concrete.

2.4 CONCRETE MIX DESIGN

- A. Minimum Cement Content: [5] [_____] sacks per cubic yard of concrete.

- B. Slump of concrete shall be consistent throughout Project at 4-inches or less. At no time shall slump exceed 5-inches. [If super plasticizers are allowed, slump shall not exceed 8-inches.]
- C. Do not add calcium chloride to mix as it causes mottling and surface discoloration.
- D. Supplemental admixtures shall not be used unless approved by manufacturer.
- E. Do not add water to the mix in the field.
- F. Add colored admixture to the mix according to manufacturer's written instructions in premeasured bags, not by weight of cement content.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install concrete according to requirements of Division 3 Section "Cast-In-Place Concrete."
- B. Do not add water to the mix in the field.

 Retain subparagraphs below for finishes applicable to Project. Delete finishes not used.

- C. Surfaces shall be finished uniformly with the following finish:
 - 1. Broomed: Pull broom across freshly [floated] [troweled] concrete to produce [fine] [medium] [coarse] texture in [straight] [wavy] lines perpendicular to main line of traffic. Do not dampen brooms.
 - 2. Swirl: Float concrete. Work float flat on surface using pressure in swirling manner to produce series of uniform arcs and twists. [Use aluminum or magnesium float to produce medium texture.] [Use wood float to provide coarse texture.]
 - 3. Trowel: Precautions should be taken to ensure that surface is uniformly troweled so that it will not be slippery. Do not over-trowel or burnish surface.
 - 4. Rock Salt: [Float,] [trowel,] [and] [broom] concrete. Then sprinkle salt on concrete and press into surface leaving only tops of salt grains exposed. After 24 hours, wash salt away with water and brush. Allow surface and impressions to dry before applying curing compound.
 - 5. Sandblast: Allow concrete to cure to sufficient strength so that it will not be damaged by blasting but not less than seven days. Use [light] [medium] [heavy] sandblasting to remove cement mortar from surface and expose aggregate to match originally approved [mockup] [field sample].
 - 6. Exposed Aggregate: Finish concrete and apply chemical surface retarder according to manufacturer's written instructions. Wash surface to match originally approved [mockup] [field sample].

7. [Stamped/Imprinted: Apply pattern according to tool manufacturer's instructions. Touch-up pattern and finish edges with hand tools as necessary.]

3.2 CURING

- A. Integrally Colored Concrete: Apply [curing] [curing and sealing] compound for integrally colored concrete according to manufacturer's instructions using manufacturer's recommended application techniques. Apply [curing] [curing and sealing] compound at consistent time for each pour to maintain close color consistency.
- B. Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.
- C. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.
- D. Do not cover concrete with plastic sheeting.

3.3 TOLERANCES

As with any natural material, some variation in appearance is a normal design feature of concrete, whether colored or not. It is normal for the color of concrete to lighten as it cures; allow up to 28-days for process to occur.

- A. Minor variations in appearance of colored concrete, which are similar to natural variations in color and appearance of uncolored concrete, are acceptable.

3.4 APPLICATORS

- A. For a list of qualified contractors, contact your local Scofield representative.

END OF SECTION

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