

GUIDE SPECIFICATION

SECTION 02750 [03360]

INTEGRALLY COLORED GROUND AND POLISHED CONCRETE

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,] [_____,] [and] [interior floor slabs].
 - 2. Curing of integrally colored 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 sealant for joints.

1.2 REFERENCES

Other useful publications about integrally 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. 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.
- E. Submit the following in accordance with Division _____ Section "Submittal Procedures."
- F. Product data for each grinding machine, including all types of grinding heads, dust extraction system, joint filler, concrete densifying impregnator, penetrating sealer, and any other chemicals used in the process.
- G. Applicators qualification data.
- H. Polished concrete samples: Size _____, for each Polished Concrete finish required.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with 10-years experience in the 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.
- F. Approved Applicators:
 - 1. Insert Company Information.
- G. Pre-installation Conference: Conduct conference at project site to comply with requirements in Division _____, Section "Project Management and Coordination."
- H. Provide project names, addresses, contact names, phone numbers of at least three (3) projects of similar scope completed by the installer.
- I. Installer/Applicator shall be certified by concrete finish equipment and chemical manufacturer and shall provide adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
- J. Manufacturer's Certification: Provide a letter of certification from both the equipment and chemical manufacturer stating that the installer is a certified applicator and is familiar with proper procedures and installation requirements recommended by the manufacturer.

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.

- K. Integrally Colored Ground and Polished 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)] [_____] 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. Aggregate selected must be tested to ensure it will accept polish.
7. Select from Part 4 – Schedules cut and shine level and finish coat.
8. Edges should be included in mockup.
9. Accepted [mockup] [field sample] provides visual standard for work of Section.
10. [Mockup] [Field sample] shall remain through completion of work for use as a quality standard for finished work.
11. Remove [mockup] [field sample] when directed.

Small sample submittals provide only a general indication of color—color 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.

L. Environmental Limitations:

1. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting chemical performance.
2. Flatness and levelness
 - a. Finish concrete shall have a minimum Floor Flatness rating of at least 50.
 - b. Finish concrete shall have a minimum Floor Levelness rating of at least 30.
 - c. Finish concrete shall be cured a minimum of 28 days or at which point equipment can be put on the slab and does not displace aggregate.
3. Application of finish system shall take place a minimum of 21 days prior to fixture and trim installation and/or substantial completion.
4. Finish concrete area shall be closed to traffic during finish floor application and after application for the time as recommended by the manufacturer.

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 will be held to discuss the Project and application materials.
- 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, (800) 800-9900.

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 ultra-violet resistant.
 - 2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194.
- B. 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.

- C. Curing and Sealing Compound: Cureseal-W™ [Gloss] [Semi-gloss] and 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.

Select below if ground and polished surface is desired.

D. Chemical Hardener/Densifiers Manufactured by Sika Corporation:

1. Materials:
 - a. SCOFIELD® Formula One™ Lithium Densifier MP, Sika Corporation, is a high performing hardening and dust proofing compound that is chemically reactive and permanently bonds to concrete formulated to be used in conjunction with integrally colored concrete. (No substitutes)
 - b. SCOFIELD® Formula One™ Finish Coat, Sika Corporation.
2. 3 head or 4 head counter rotating variable speed floor grinding machine with at least 600 pounds down pressure.
3. Dust extraction system, pre-separator, and squeegee attachments with minimum flow rating of 322 cubic feet per minute.
4. Grinding heads:
 - a. Metal bonded 16, 25, 40, 60, 80, 150 and 300 grits.
 - b. Resin bonded, phenolic diamonds, 100, 200, 400, 800, 1500 and 3000 grits.
5. Grinding pads for edges:
 - a. 40, 60, 100 and 120 grits.
 - b. 200, 400, 800, 1500 and 3000 grits.
6. Hand grinder with dust extraction equipment and pads.

E. Curing Compound for Polished, Hardened Concrete: LITHOCHROME® COLORWAX™, Sika Corporation. Use to cure in the same color as the concrete directly after finishing process.

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 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, confirmed by at least 5 local projects that [Architect] [Landscape Architect] [Engineer] can examine.

2.3 COLORS

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-312.

Delete paragraph and subparagraphs above and retain paragraph 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 integrally 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 or mid-range water reducers 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 concrete mix according to manufacturer's written instructions.

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 concrete 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. Trowel: Precautions should be taken to ensure that the surface is uniformly troweled so that it will not be slippery. Do not over-trowel or burnish the surface.

2. Ground and Polished Concrete Surface: Precautions should be taken to insure the surface is in tolerances to perform this function.

3.1.1 POLISHED CONCRETE APPLICATION

- A. Applicator shall examine the areas and conditions under which work of this section will be provided and the General Contractor shall correct conditions detrimental to the timely and proper completion of the work and the Applicator shall not proceed until unsatisfactory conditions are resolved.
- B. Grind the concrete floor to within 2 – 3 inches of walls with 16, 25, 40, 60, 80 and/or 150 grit removing construction debris, floor slab imperfections and until there is a uniform scratch pattern and desired concrete aggregate exposure.
- C. Apply material approved by architect for color effects in accordance with the architectural drawings and the manufacturer's recommended guidelines.
- D. Fill construction joints and cracks with filler products as specified in accordance with manufacturer's instructions colored to match (or contrast) with concrete color as specified by architect.
- E. Apply densifying impregnator undiluted at approximately 200 square feet per gallon using a stiff, long bristled broom. Cover the entire area liberally. Using a broom, work the densifier into the substrate for 30 minutes. During this 30-minute period, continually keep the substrate wet with densifier. Squeegee excess material off the floor. Allow 12 to 24 hours for full cure.
- F. Grind the floor to within 2 – 3 inches of walls with metal bonded diamond grits of 150 and 300—grinding 90 degrees from each previous grind and removing all the scratches from the previous grit. Vacuum the floor thoroughly after each grind using a squeegee vacuum attachment.
- G. (If specified) Grind the edges with 40, 60, 120 and 220 grit grinding pads removing all of the scratches from the previous grit. Vacuum the floor thoroughly after each grind using a squeegee vacuum attachment.
- H. Polish the floor, to desired sheen level, with phenolic resin bonded diamond grits of 100, 400, 800, 1500 and 3000—first polishing the edges (if specified) with pads of the same grit and then the field of the floor removing all scratches from the previous grit. After each polish, clean the floor thoroughly using clean water and an auto scrubber or a mop and a wet vacuum.
- I. After the floor has dried, apply densifier at a rate of 300 square feet per gallon. Using a broom, work the material into the floor for a minimum of 10 minutes. Tight squeegee the remaining material from the floor without leaving squeegee marks or puddles. Allow to cure for 12 – 24 hours.

- J. Using a high speed (2000 – 3000 rpm) burnishing machine and hogs hair burnishing pad, buff the surface to a high shine.
- K. Upon completion, the work shall be ready for final inspection and acceptance by the customer.

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 integrally colored or not. It is normal for the color of integrally colored concrete to lighten as it cures; allow up to 28 days for process to occur.

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

3.7 CLEANING

- A. The work area shall be kept clean and free of debris at all times.
- B. Remove slurry and dust from adjoining surfaces as necessary.
- C. Dispose of material containers in accordance with local regulations.
- D. Protect finished work until fully cured per manufacturer's recommendations.

1. FLOOR PROTECTION

- A. The General Contractor is responsible for using Temporary Floor Protection throughout the project to safeguard the surface quality of concrete slabs before and after application of decorative finishes or installations of other materials.
- b. All concrete floors that will be not be covered by other materials will be protected throughout the project. The concrete slab must be treated as a finished floor at all times during construction.
- c. Temporary Floor Protection will be removed only while finish work to the concrete is being performed and will be replaced after the final finish has cured sufficiently.
- d. Temporary Floor Protection will be SCOFIELD® Proguard™ Duracover™, Sika Corporation. Seaming of the temporary floor protection will be performed with SCOFIELD® Proguard™ Heavy Duty Seaming Tape. Both products will be installed following the manufacturer's published installation procedures.
- e. DO NOT APPLY THE HEAVY DUTY SEAMING TAPE TO BARE OR FINISHED FLOORS OR WALL SURFACES AT ANY TIME. IT WILL PERMANENTLY DAMAGE THE FLOOR

No substitutions will be allowed

3.8 APPLICATORS

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

PART 4 – SCHEDULES

4.1 CUT AND SHINE LEVELS

- A. Cut Level (Depth of cut)
 - 1. Grade 1 – cream finish
 - 2. Grade 2 – light exposure of course aggregate
 - 3. Grade 3 – heavy exposure of course aggregate
- B. Shine Level
 - 1. Class 1 – 400 grit polish
 - 2. Class 2 – 800 grit polish
 - 3. Class 3 – 1500 grit polish
- C. Polished concrete finish coat
 - 1. At a distance of 100 feet, the floor will reflect images from side lighting.

2. Apply two applications of SCOFIELD® Finish Coat.
- D. Specified for project
- Grade: _____
- Class: _____
- Finish Coat applications: _____

END OF SECTION

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