



Troubleshooting Guide for Integrally-Colored Concrete

1. Integrally-Colored Concrete Does Not Match Color Card

- a. Colors represented on our color selector card should be viewed as approximate matches to the finished concrete's color. Colors shown approximate the color of broom-finished concrete flatwork made with a medium-gray cement without supplementary cementitious materials (SCMs) such as flyash and ground, granulated blast furnace slag at a consistent and near normal water/cement ratio.
- b. *Possible Causes*
 - i. Placing and Finishing Practices
 1. Addition of water to concrete surface
 2. Variable finished surface textures
 3. Improper curing/sealing practices
 4. Not curing with LITHOCHROME Colorwax or COLORCURE Concrete Sealer
 - ii. Concrete Materials
 1. Cement color variations from region to region
 2. Aggregate characteristics and color variations from region to region
 3. Variations in concrete mix proportions
 4. Use of calcium chloride

2. Concrete Surface Looks "Light" or "Bleached"

- a. *Possible Causes*
 - i. Use of water during finishing of concrete surface – sometimes called "blessing" the surface
 - ii. Overwatering of concrete mix
 - iii. Wet broom finishing
 - iv. Concrete finished with bleed water on surface
 - v. Hot or cold weather conditions
 - vi. Efflorescence
 - vii. Improper curing/sealing practices
- b. *Suggested Remedies*
 - i. Clean concrete surface
 - ii. Sandblast or acid etch performed per ASTM D 4260

- iii. After surface problem is removed, apply LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins A-514 or A-634

3. Color is Blotchy

a. Possible Causes

- i. Concrete surface closed too early with magnesium floats and steel trowels
- ii. Concrete surface burnished by hard troweling procedure
- iii. Curing blankets or film has touched the surface in some areas and not others
- iv. Use of calcium chloride
- v. Variation in concrete setting due to jobsite environment (i.e. sunny vs. shady areas)
- vi. Inconsistent subgrade conditions
- vii. Improper curing/sealing practices

b. Suggested Remedies

- i. Clean concrete surface
- ii. Sandblast or acid etch performed per ASTM D 4260
- iii. After surface problem is removed, apply LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins

4. Nonuniform Broom Texture

a. Possible Causes

- i. Inconsistent broom moisture
- ii. Changing broom direction
- iii. Inconsistent brooming procedure
- iv. Worn broom
- v. Use of different textured brooms i.e. horsehair versus nylon

b. Suggested Remedies

- i. Change the surface texture by sandblasting or acid etching performed per ASTM D 4260

5. Efflorescence – Efflorescence can be a naturally occurring process for cementitious materials. Concrete practices and remedies exist to minimize efflorescence.

a. Possible Causes

- i. Jobsite water addition
- ii. Use of calcium chloride
- iii. Availability of soluble salts from subgrade or concrete and water evaporation from surface
- iv. Abundant environmental water
- v. Improper curing/sealing practices

b. Suggested Remedies

- i. Clean concrete surface
- ii. Sandblast or acid etch performed per ASTM D 4260

- iii. After surface problem is removed, apply color-matches LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins

6. Post Construction Discoloration

a. Possible Causes

- i. Water marks from landscape irrigation, water runoff
- ii. Efflorescence
- iii. "Bird bath" depressions in finished surface
- iv. Entrapped moisture
- v. Surface stains from external sources i.e. rust, oil, paint, deciduous trees, etc.
- vi. Sulfate attack
- vii. Application of rock salt, calcium chloride or other deicing chemicals to the surface
- viii. Use of landscape features such as potted plants

b. Suggested Remedies

- i. Clean concrete surface
- ii. Sandblast or acid etch performed per ASTM D 4260
- iii. After surface problem is removed, apply color-matched LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins

7. Curing Related Issues

a. Problem

- i. Color-matches cure/sealer does not match substrate

b. Possible Causes

- i. Full 28 days of concrete curing has not occurred
- ii. Integral color and color matches cure/sealer not from same manufacturer
- iii. Tint component was incorrect color
- iv. Improper mixing of tint component into base
- v. Tint Component not added to base
- vi. Surface not protected from rain or other source of water (sprinklers, irrigation, etc.)

c. Suggested Remedies

- i. Wait at least 28 days for full evaluation
- ii. If the problem persists, remove cure/sealer and reapply LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins

d. Problem

- i. Cure/sealer is white or cloudy

e. Possible Causes

- i. Applied too heavily
- ii. Applied while concrete surface was visibly moist
- iii. Application by other than airless sprayer

- iv. External moisture on surface i.e. rain, irrigation, etc.
- v. Applied when temperatures below manufacturer's suggested recommendations
- vi. Tint component not added to base
- f. *Suggested Remedies*
 - i. Remove cure/sealer and reapply LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins
- g. *Problem*
 - i. Cure/Sealer is peeling off
- h. *Possible Causes*
 - i. Substrate not properly prepared
 - ii. Applied to heavily
 - iii. Inconsistent placement practices
- i. *Suggested Remedies*
 - i. Remove remaining cure/sealer, prepare surface properly, and then reapply LITHOCHROME Colorwax or COLORCURE Concrete Sealer to a test area following recommendations in Scofield's Tech-Data Bulletins. If the test area is successful, apply to remainder of project.
- j. *Problem*
 - i. Cure/sealer has streaks, drips and/or roller marks
- k. *Possible Causes*
 - i. Applied by pump-up sprayer
 - ii. Applied unevenly by roller
 - iii. Inconsistent pressure on airless sprayer
 - iv. Nozzle clogging
- l. *Suggested Remedies*
 - i. Do not apply more cure/sealer
 - ii. Remove cure/sealer and reapply LITHOCHROME Colorwax or COLORCURE Concrete Sealer following recommendations in Scofield's Tech-Data Bulletins

8. Practices for Successful Integrally-Colored Concrete

- a. *Best Practices*
 - i. Quality integrally-colored concrete begins with quality concrete placed utilizing proper concreting practices published by the American Concrete Institute (ACI). Successful concrete placement of both integrally-colored and uncolored concrete requires consistent mix proportions and the use of proper ACI concrete placement, finishing and curing procedures.
 - ii. Such factors as natural shade, the color of local concrete materials and the concrete finish selected all have a bearing on the finished appearance. An understanding needs to be established between the contractor and purchaser as to the expectations of the finished concrete surface. Actual test areas should be placed and agreed to by all concerned parties.
 - iii. Concrete is comprised of natural materials, with variations like those occurring in other natural building materials such as wood and stone. There are many factors that can impact the finished appearance of the in-place material. The

minor variations that naturally occur in the surface of finished concrete can add to its aesthetic appeal.

9. To Prevent Problems BEFORE Concrete Placement Begins, Complete this Checklist

a. Plan Well

- i. Plan for control and expansion joints in accordance with ACI guidelines.

b. Proper Site Preparation

- i. Comply with ACI 302 *Guide for Concrete Floor and Slab Construction*
- ii. Place concrete on a well-drained, damp subgrade that has adequate and uniform load bearing characteristics
- iii. If a vapor barrier is considered for use, ensure that a pervious sand bed 2 inches in thickness is placed on top of the barrier
- iv. Grade the subgrade and screed elevations so that the concrete is of uniform thickness and properly sloped for drainage
- v. Do not place concrete on a subgrade that is not thoroughly compacted and dampened
- vi. Do not place concrete over free standing water, muddy or frozen ground, or soft spots

c. Ordering

- i. Select a reputable concrete supplier that is capable of providing concrete with consistent quality and quantity necessary for a successful project
- ii. Ensure that the desired color is clearly communicated and ordered from the ready mix supplier
- iii. Select a mix that has both the plastic and hardened state design properties required for the environment of placement and service
- iv. Order batch quantities at intervals so as to provide for a consistent, steady supply of concrete to the jobsite to ensure steady, sequential slab setting characteristics necessary for the available labor force to complete successful finishing operations
- v. Schedule incoming loads based on the slowest part of the placement process

d. Batching/Mixing/Delivery

- i. Ensure that concrete supplied complies with ASTM C-94 as well as other applicable local, state and/or federal standards
- ii. Do not schedule or accept deliveries of less than 3 cubic yards (2.3 cubic meters) per load

e. Placing

- i. Comply with ACI 302 *Guide for Concrete Floor and Slab Construction*
- ii. Control the mix for good uniformity. Don't allow the mix slump to vary from load to load
- iii. Do not add water after the initial discharge of any load

f. Finishing

- i. Comply with ACI 302 *Guide for Concrete Floor and Slab Construction*
- ii. Comply with ACI 305 and 306 recommendations for Hot and Cold Weather concreting, respectively

- iii. Use monomolecular film evaporation retardant fog sprays
- iv. Do not use wet finishing tools or brooms
- v. Do not sprinkle water onto the surface of concrete
- vi. Use wood bull-floats and hand-floats to keep the surface open
- vii. Do not prematurely close the concrete surface with metal or magnesium finishing tools
- viii. Do not finish bleed water into the surface of concrete
- g. *Stamping*
 - i. Ensure proper timing for stamping: after the concrete is hard enough to support the stamping operation but plastic enough to provide full detail
- h. *Curing and Sealing*
 - i. Comply with 308.1 *Standard Practice for Curing Concrete*
 - ii. Use LITHOCHROME Colorwax or COLORCURE Concrete Sealer color-matched curing compound in accordance with Scofield's published technical data sheets, immediately following the conclusion of all finishing operations
 - iii. Do not cure with water, burlap, vinyl-backed burlap, polyethylene sheeting or other materials not approved by Degussa Admixtures, Inc. and the L. M. Scofield Company
 - iv. Seal all joints in areas subject to pedestrian or vehicular traffic

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