

# SCOFIELD®

## INTEGRAL COLOR SG

### STANDARD GRADE



## L. M. SCOFIELD COMPANY

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An economical blend of synthetic iron oxide pigments for coloring ready-mix concrete or manufactured concrete products.

**1. Description and Uses:** SCOFIELD® Integral Color SG Standard Grade provides a basic, cost-effective alternative for permanently coloring concrete throughout the batch. Concrete colored with this system has maximum resistance to ultraviolet (UV) radiation and is suitable for use when minor color variation is acceptable in vertical, precast, cast-in-place, and tilt-up construction or architectural flatwork.

SCOFIELD Integral Color SG is available in 10- and 12-pound SCOFIELD® Tossin™ disintegrating bags to accommodate 5-sack and 6-sack mix markets. One, two or more pounds of SCOFIELD Integral Color SG are added to the ready-mix truck for each sack of cement, depending on the color desired. Where possible, the Tossin bag is normally added, unopened, directly into the mixer, minimizing dust, lowering disposal costs and reducing labor.

For best results, floors and hard-scapes colored with SCOFIELD Integral Color SG should be cured and sealed using either SCOFIELD® Cureseal™ or SCOFIELD® Cureseal-S™. Additional information is available in Scofield's Tech-Data Bulletins *B-204 SCOFIELD Cureseal* and *B-604 SCOFIELD Cureseal-S*.

SCOFIELD Integral Color SG is ideal for use in the manufactured concrete products industry for the production of colored concrete block, brick, pavers, and other precast applications.

**SCOFIELD Integral Color SG is not an equivalent to CHROMIX® Admixtures for Color-Conditioned™ Concrete.** When maximum color uniformity is essential, the use of CHROMIX Admixtures for Color-Conditioned Concrete is recommended. CHROMIX Admixtures provide permanent, fade-resistant, uniform, and streak-free integral color-conditioning, producing concrete that is structurally superior as well as beautiful and cost effective. CHROMIX Admixtures not only color concrete, but increase its strength at all ages, control the set time, and improve freeze/thaw resistance while reducing color bleeding, laitance, and efflorescence. For full color development, concrete that is color-conditioned with

CHROMIX Admixtures should be cured and sealed with color-matched LITHOCHROME® Colorwax™ or COLORCURE® Concrete Sealer. Additional information is available in the appropriate Scofield Tech-Data Bulletins *A-304 CHROMIX Admixtures for Color-Conditioned Concrete*, *A-514 LITHOCHROME Colorwax*, or *A-634 COLORCURE Concrete Sealer*.

Before using, check with your Scofield Customer Service Representative to ensure that you have the most recent Scofield Tech-Data Bulletins.

**2. Limitations:** Synthetic iron oxides have an inherent water demand, and the user may need to adjust the mix accordingly. Under certain conditions, synthetic iron oxides may agglomerate, reducing the effective tint strength. For optimum results, the use of CHROMIX Admixtures for Color-Conditioned Concrete should be considered.

Due to the graying effect of most cements, there are some colors that can only be produced using very light or white cements, and some light or intense colors cannot be cost-effectively achieved. Variations in slump, cement type and brand, color variations in the cement or aggregates, finished texture, timing of operations, curing or forming methods, and the choice of release agents or surface treatments will each produce distinct, though in most cases slight, variations in apparent color.

The mix should have a maximum slump of 4 inches (100 mm) and must contain a minimum of 5 sacks of cement per cubic yard (275 kg/m<sup>3</sup>) for flatwork and 6 sacks per cubic yard (335 kg/m<sup>3</sup>) for vertical concrete. No calcium chloride should be added. The same brand of cement, source of sand, and water/cement ratio should be maintained for each load of concrete of the same color.

SCOFIELD Integral Color SG should never be added to an empty drum or at the tail end of a load. Though manufactured to disintegrate in typical concrete mixes, SCOFIELD Tossin bags may not completely disintegrate during mixing when certain batching and mixing procedures or equipment are used, or with some mix ingredients and proportions. A test batch may be required to determine mixing time and suitability, or the Tossin bag may be opened and the SCOFIELD Integral Color SG batched directly into the mix.

**3. Composition and Materials:** SCOFIELD Integral Color SG is a high quality coloring agent composed of pure synthetic iron oxide pigments.

**4. Applicable Standards and Building Codes:** As a formulated coloring agent, SCOFIELD Integral Color SG conforms to ASTM C 979.

Professional concreting standards and practices, including those published by the American Concrete Institute (ACI), the Portland Cement Association (PCA), and the National Ready Mixed Concrete Association (NRMCA) should be followed.

**5. Colors:** SCOFIELD Integral Color SG is available in a wide range of standard colors. Scofield's Color Chart A-322 depicts the colors that may be expected and correct dosages when using a medium-gray shade of cement and curing with SCOFIELD Cureseal or SCOFIELD Cureseal-S.

SCOFIELD Integral Color SG normally produces earth-tone colors. When more intense colors or when certain light colors are desired, the use of LITHOCHROME® Color Hardener should be considered.

**6. Sizes and Dosage:** SCOFIELD Integral Color SG is packaged to eliminate weighing and measuring errors. It is premeasured and packaged in SCOFIELD Tossin bags for easy and accurate addition into the concrete mix.

One, two, or more pounds of SCOFIELD Integral Color SG per sack of cement are added to the ready-mix truck to achieve the desired color. If the mix contains cement substitutes, such as fly ash or blast-furnace slag, their weight should be added to the weight of the cement when determining the correct SCOFIELD Integral Color SG dosage.

**7. Shelf Life:** Under normal conditions when kept dry and moisture free, the shelf life of SCOFIELD Integral Color SG is at least 1 year from the date of purchase. Inventory should be rotated.

**8. Cautions:** DO NOT TAKE INTERNALLY. KEEP OUT OF THE REACH OF CHILDREN. Use only with adequate ventilation. Add bag unopened to minimize dust. Should dusty conditions develop, wear dust (particulate) respirator (NIOSH TC-84A approved), safety goggles and gloves. Follow respirator manufacturer's directions for respirator use.

First Aid: Eyes—DO NOT RUB EYES. Immediately flush thoroughly with large amounts of water. Skin—Wash thoroughly with soap and water. Inhalation—Move to fresh air. If symptoms persist or develop, or if ingested, get medical attention.

Wash thoroughly immediately after handling. Store in a cool, dry, well-ventilated area, in unopened original packaging or in tightly closed, labeled containers. Avoid generating dust during recovery or disposal. Disposal of all residual or recovered product must be in accordance with applicable federal, state, and local regulations. Before using or handling, read the *Material Safety Data Sheet and Warranty*. FOR PROFESSIONAL USE ONLY.

**9. Concrete Mix Design:** Minimum cement contents are required to assure adequate fines for finishing and texturing architectural concrete. For flatwork, the cement content must be a minimum of 5 sacks per cubic yard (275 kg/m<sup>3</sup>) of concrete. For vertical concrete, the cement content must be a minimum of 6 sacks per cubic yard (335 kg/m<sup>3</sup>).

Addition of supplemental admixtures or cement substitutes may affect the color, finishing characteristics, and other qualities of the concrete. Calcium chloride should not be added to the mix since it causes mottling and surface discoloration. Supplemental admixtures, such as additional water-reducing admixtures, waterproofing agents, and superplasticizers, or cement substitutes, such as fly ash or slag, should not be used unless Scofield is consulted for suggestions. If a supplemental admixture or cement substitute is used, it must be added to all mixes on the project having the same color.

The mix should contain only nonreactive aggregates and have as low a slump as possible. A 4-inch (100 mm) slump or less is recommended.

**10. Jobsite Samples:** Representative jobsite samples should be produced and approved well in advance of concreting. Producing architectural concrete requires skill and practice. A separate sample should be cast for each color and mix design. Each sample should be of adequate size to be representative, be made with the job materials, and use the contemplated construction techniques. For accurate color, the quantity of concrete mixed should not be less than one-third of the capacity of the mixing drum (a minimum of 3 cubic yards in a 9 cubic yard load).

Vertical and tilt-up sample panels should be made using the selected form materials, snap-ties, spacers, inserts, pickup bolts, release agents, and surface treatments. Areas to be patched should be included so that patching techniques may be developed. Horizontal samples should be cured and if

specified, finished with the appropriate, color-matched curing and finishing material or clear sealer. All surfaces should be textured as specified.

Portions of the actual cement and aggregates used to cast the jobsite samples should be retained. Cement and aggregates from the same source should be used throughout the job and periodically sampled for comparison of color and gradation with the material used in the approved sample.

**11. Batching and Depositing:** Weather conditions should be considered when planning installation. Professional practices as described in ACI standards 305R *Hot Weather Concreting* and 306R *Cold Weather Concreting* should be followed.

The concrete mix should be controlled to provide good batch-to-batch uniformity. Ready-mix trucks should be in good condition. The cement should be weighed accurately. The same brand of cement, source of sand, and water/cement ratio should be maintained for each load of concrete of the same color.

Before batching, the drum must be thoroughly clean and wet. The quantity of colored concrete mixed should not be less than one-third of the capacity of the mixing drum (a minimum of three cubic yards in a nine cubic yard load) and should always be in full cubic yard (cubic meter) increments. Approximately 40 gallons (150 L) of the mix water, and preferably, a portion of the aggregates should be batched into the mixer drum. Then the correct number of unopened Tossin bags for the specified color of SCOFIELD Integral Color SG should be added. The remaining ingredients should be added, and the load mixed at the specified mixing speed for a minimum of 130 revolutions, before discharging. SCOFIELD Integral Color SG should never be added to an empty drum or at the tail end of a load.

When pumping, the pump should be capable of depositing a low-slump concrete mix containing 1-inch rock and must be primed with an identically colored slurry mix. The SCOFIELD Tossin bag should not be added to the slurry mix but opened, and the SCOFIELD Integral Color SG batched directly into the mix.

When depositing, the concrete should be deposited near its final position to avoid segregation due to rehandling or flowing. If held-back water is added at the jobsite, the concrete should be mixed at mixing speed for a minimum of 30 revolutions after addition of the water and before depositing. The slump of the concrete should be consistent throughout the project at 4 inches (100 mm) or less. No water should be added after a portion of the load has been discharged. Measuring and adjusting the air content of the load is recommended immediately prior to placement. Concrete that

has started to set must not be retempered, but should be discarded.

The addition of SCOFIELD Integral Color SG into a block or precast mixer should occur after all other mix materials have been batched. For best results open the Tossin bag and sift the SCOFIELD Integral Color SG into the mix evenly and mix until the color is fully dispersed. Do not deposit the bag into the mixer.

## **12. Flatwork Installation and Curing:**

Only uniformly slip-resistant textures, such as broom, swirl, sponge float, exposed-aggregate, or sandblasted should be considered for concrete flatwork. When a flat surface is required, extra precautions should be taken to ensure that the surface is uniformly troweled so that it will not be slippery. Representative jobsite samples as described in *10. Jobsite Samples* should be produced prior to concrete installation to verify safety and approve the adequacy of wet and dry slip resistance.

The concrete should be placed and consolidated so that it completely fills all space inside the forms and provides a suitable surface for finishing. Concrete adjacent to the forms should be spaded.

Hard steel troweling should be minimized to avoid trowel burns. For uniformity of appearance, consistent finishing practices should be used when applying the specified texture. The edges should be finished first. All surfaces should be finished within reasonably the same time after placing. Water must not be sprinkled or otherwise added to the surface of the slab while finishing. Long-handled fresnos must not be used. All final hand-finishing should be done in the same direction.

When concrete is placed and finished in hot windy weather, precautions must be taken to prevent plastic cracking resulting from excessively rapid drying at the surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.

Until it is completely cured, the color of concrete is normally less uniform and appears darker than the final color. Flatwork that is air cured may exhibit some whitening of the surface and be less brilliant in color.

Freshly placed concrete should be cured with SCOFIELD Cureseal or SCOFIELD Cureseal-S. Scofield's curing materials have been specially formulated for use with colored concrete and conform to the moisture retention requirements of ASTM C 309 *Liquid Membrane-Forming Compounds for Curing Concrete*. When curing with SCOFIELD Cureseal, an optional thin seal coat may be applied, if needed or desired. The appropriate Scofield Tech-Data Bulletin *B-204 SCOFIELD Cureseal* or *B-604 SCOFIELD Cureseal-S* must be read completely before using.

Though not normally recommended for colored concrete, when curing colored concrete that is to be chemically stained or have the aggregate exposed, new and unwrinkled, nonstaining, high-quality kraft curing paper should be used. Concrete curing paper should conform to ASTM C 171 *Sheet Materials for Curing Concrete*. Additional information is available in the appropriate Scofield Tech-Data Bulletins *A-414 LITHOCHROME® Chemstain™ Classic* or *T-204 LITHOTEX® Top Surface Retarder*.

Scofield should be consulted prior to curing by other methods. Curing with water is usually detrimental to color uniformity. Curing with burlap and other wet coverings, plastic sheeting, or other liquid-membrane type curing compounds is not recommended as mottling or staining normally occurs.

All surfaces should be thoroughly inspected to verify and approve installation and safety, including wet and dry slip resistance, before opening the area to traffic.

**13. Tilt-Up Concrete Installation:** Prior to commencement of construction, a representative sample panel should be cast as described in *10. Jobsite Samples*.

Following the procedures in ACI 551 *Tilt-Up Concrete Structures* is suggested. All concrete panels that are to serve as a casting bed should be trowel finished to produce a flat, level surface. The casting surface must be coated with a nonstaining, surface-sealing release agent capable of preventing the passage of any moisture into the casting bed. Otherwise, curing of the bottom surfaces will be uneven, creating discolorations that cannot be removed by sandblasting. Panels that are stacked, normally do not exhibit as uniform a color and should be placed in less visible areas of the building.

**14. Vertical Concrete Installation:** Prior to the start of construction, a representative sample panel should be cast as described in *10. Jobsite Samples*.

Formwork for architectural concrete must be of the highest quality to obtain

smooth, straight, nonyielding surfaces. Unless a form liner has been specified, a resin, high-density overlay or an epoxy or urethane-coated plywood should be used. Alternatively, all plywood plugs (boats) must be filled and the forms coated with a material that is sufficiently heavy to prevent unwanted grain transfer, such as a polyurethane. If the grain pattern is meant to transfer and a natural wood-grain form is to be used, the forms should be seasoned prior to their first use with a cement slurry containing the specified color of SCOFIELD Integral Color SG so that the same color is achieved with new forms as with forms that have been repeatedly used. To minimize variations in color, procedures and materials used in preparing the forms must not be varied during the job. All forms should be cleaned thoroughly prior to use or reuse. Release agents must be nonstaining.

Any leakage causes the water/cement ratio of the cement paste to vary near the leakage points and discoloration of the finished concrete will result. This staining will not be removed by sandblasting or bush-hammering. All plastic snap-tie cones should be of the non-leaking type. After cleaning, joints in the forms should be sealed with a 2-inch wide vinyl or polyester tape. Alternatively, the joints may be sealed with a silicone sealant applied to the edges during assembly.

To prevent staining of the finished concrete surface, form ties should leave no metal closer to the surface of the concrete than  $1\frac{1}{2}$  inches. The location of tie holes is normally selected so as not to detract from the overall appearance of the structure, since it is virtually impossible to conceal them completely.

All walls should be cast to their full height between engineered horizontal joints. For design reasons, a taper-cut recessed chamfer strip is often placed at the horizontal joint locations.

Since grinding and patching often result in color variations, concrete should be placed carefully to avoid or minimize the need for these operations. When possible, both external and internal vibrators should be used.

Over-vibration should be avoided, and internal vibrators must not be used to move the concrete.

To minimize variations in color, all forms should be stripped when the concrete is the same age. Vertical surfaces may be sandblasted to remove minor form marks and any colored residue resulting from water, cement, and coloring agents migrating (bleeding) toward the forms during concrete placement, vibration, and compaction.

**15. Maintenance:** Colored concrete flatwork or floors should be maintained by sweeping. Spills should be cleaned up when they occur. Dirt may be hosed off with water. Heavily soiled areas may be cleaned by wet mopping or scrubbing with a stiff-bristle brush and a properly diluted, high-quality commercial detergent. For larger areas, walk-behind or ride-on scrubbing machines are efficient and cost effective.

For concrete floors or hardscapes cured or sealed with SCOFIELD Cureseal or SCOFIELD Cureseal-S, a maintenance application should be made periodically to protect the base sealer. Additional instructions for the maintenance and resealing of concrete surfaces are available in the Scofield Tech-Data Bulletins *B-204 SCOFIELD Cureseal* and *B-604 SCOFIELD Cureseal-S* which must be read completely before using.

**16. Availability:** SCOFIELD Integral Color SG is marketed nationwide through strategically located ready-mix firms, dealers, and representatives. Scofield should be contacted for ordering information.

**17. Warranty Summary:** For the complete warranty statement and important limitations, read the *Material Safety Data Sheet and Warranty*. Generally, Scofield represents and warrants only that its products are of consistent quality. No other oral or written statement is authorized. Any liability is limited to refund or replacement of defective product. The end user shall determine product's suitability and assume all risks and liability.

## Do's & Don'ts – SCOFIELD® Integral Color SG

THIS GUIDE IS MEANT AS A QUICK REFERENCE ONLY. Before designing the mix, read the Scofield Tech-Data Bulletin A-314 SCOFIELD® Integral Color SG.

	Do's	Don'ts
<b>Mix Design</b>	<ul style="list-style-type: none"> <li>• Use a minimum of 5 sacks of cement/yd (275 kg/m<sup>3</sup>) of concrete for flatwork and a minimum of 6 sacks of cement/yd<sup>3</sup> (335 kg/m<sup>3</sup>) for vertical concrete.</li> <li>• Use a slump of 4 in (100 mm) or less.</li> <li>• Use an air-entraining admixture in all concrete flatwork subject to freeze/thaw cycles or when required by the engineer for workability or durability.</li> </ul>	<ul style="list-style-type: none"> <li>• Don't use reactive aggregates.</li> <li>• Don't use calcium chloride or any admixture containing calcium chloride.</li> <li>• Don't use cement substitutes (such as fly ash or slag), additional water-reducing admixtures, waterproofing admixtures, or superplasticizers unless Scofield is first consulted for suggestions.</li> </ul>
<b>Batching</b>	<ul style="list-style-type: none"> <li>• Maintain good concrete mix control to ensure batch-to-batch uniformity.</li> <li>• Use ready-mix trucks that are in good condition.</li> <li>• Thoroughly clean and wet the drum prior to batching color-conditioned concrete.</li> <li>• Add approximately 40 gal (150 L) of the mix water and, preferably, a portion of the aggregates before adding the SCOFIELD Integral Color SG.</li> <li>• Add appropriate unopened Tossin bag(s) packaged for the mix design. Then add the remaining ingredients.</li> <li>• Mix the load at mixing speed for a minimum of 130 revolutions before depositing.</li> <li>• For slurry mixes, open the Tossin bag and batch the SCOFIELD Integral Color SG directly into the mix.</li> </ul>	<ul style="list-style-type: none"> <li>• Don't batch colored concrete containing reactive aggregates.</li> <li>• Don't change brand and/or type of cement or source of sand for mixes of the same color on the same job.</li> <li>• Don't add SCOFIELD Integral Color SG to an empty drum or at the tail end of a load.</li> <li>• Don't batch less than 3 yd<sup>3</sup> of colored concrete in a ready-mix truck for small jobs or for sample and cleanup loads.</li> <li>• Don't batch in other than full yard increments.</li> <li>• Don't allow the slump to exceed 4 in (100 mm) for any load.</li> <li>• Don't pump concrete without first priming the pump with an identically colored slurry mix.</li> </ul>
<b>Subgrade</b>	<ul style="list-style-type: none"> <li>• Place concrete on a well-drained, damp subgrade that has adequate and uniform load-bearing characteristics.</li> <li>• Grade the subgrade so that the concrete is of uniform thickness and properly sloped for drainage.</li> </ul>	<ul style="list-style-type: none"> <li>• Don't place concrete on a subgrade that is not thoroughly compacted and dampened.</li> <li>• Don't place concrete over freestanding water or muddy, frozen, or soft spots.</li> </ul>
<b>Concrete Installation</b>	<ul style="list-style-type: none"> <li>• Protect surrounding areas, landscaping, and adjacent surfaces.</li> <li>• Consolidate well and spade the concrete adjacent to the forms.</li> <li>• Vibrate or tamp and screed the concrete, then float it to the specified finished grade, flatness, and levelness.</li> </ul>	<ul style="list-style-type: none"> <li>• Don't allow the slump to vary from load to load. Control the mix for good uniformity.</li> <li>• Don't add held-back water without mixing at mixing speed a minimum of 30 revolutions before depositing concrete.</li> <li>• Don't add water after a portion of the load has been discharged, or retemper concrete that has started to set.</li> </ul>
<b>Finishing</b>	<ul style="list-style-type: none"> <li>• Texture all surfaces adequately and uniformly for slip resistance.</li> <li>• Finish all surfaces within reasonably the same time after placing.</li> <li>• Finish the edges first and do all final hand-finishing in the same direction.</li> </ul>	<ul style="list-style-type: none"> <li>• Don't sprinkle or otherwise add water to the surface during finishing.</li> <li>• Don't use long-handled fresnos.</li> <li>• Don't use inconsistent finishing practices.</li> <li>• Don't over-trowel (burn or burnish) the surface.</li> </ul>
<b>Curing</b>	<ul style="list-style-type: none"> <li>• Cure all surfaces with SCOFIELD® Cureseal™ or SCOFIELD® Cureseal-S™.</li> <li>• Apply the curing compound when the concrete is hard enough to walk on gently without marring, surface moisture has evaporated, and no condensation can occur.</li> <li>• Protect the curing surfaces from damage by other trades and traffic. Thoroughly inspect all flatwork to verify and approve installation, safety, and wet and dry slip resistance prior to opening the area to traffic.</li> </ul>	