

# LITHOTEX®

## TOP SURFACE RETARDER



## L. M. SCOFIELD COMPANY

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TECH-DATA BULLETIN T-204.03

A surface-set retarder for producing exposed-aggregate finishes on freshly placed, architectural concrete flatwork.

**1. Description and Uses:** LITHOTEX® Top Surface Retarder is designed to conveniently and economically produce quality exposed-aggregate concrete. Inviting, cost-effective walkways can be economically created by revealing the natural colors of the aggregates contained in the mix. Hardscapes can be brought to life with the unique colors of specially selected, hand-seeded stones. Driveways with attractive, slip-resistant, multicolored, exposed-aggregate surfaces can make oil and tire marks disappear. Malls and plazas can be lifted out of the ordinary by alternating exposed-aggregate sections with broom-finished colored concrete in eye-catching patterns.

Applied to freshly placed concrete, LITHOTEX Top Surface Retarder significantly delays the set of the surface without disturbing the setting rate and strength gain of the underlying concrete. When the aggregate is later exposed by hosing and brushing, aggregate displacement is minimized and depth of reveal is more accurately controlled. Compared to sandblasting, a more natural look is achieved, with no scarring of the aggregate or concrete matrix.

The use of LITHOTEX Top Surface Retarder offers results superior to those obtained when aggregates are exposed by hosing and scrubbing after the concrete is strong enough to walk on, but while the surface is still weak enough to be easily removed by water and abrasion. This method of exposure can allow aggregates to loosen or become dislodged during scrubbing or later during wear. When LITHOTEX Top Surface Retarder is used in the exposure process, the underlying concrete gains strength normally, allowing the aggregates to bond firmly to the concrete matrix, minimizing popouts at all ages, and creating a surface as durable as it is attractive.

Without the use of a surface retarder, exposure depths are difficult to control by hosing and scrubbing. The concrete is hardening as the work proceeds, making it more difficult to remove the

surface. This often results in the production of a progressively more shallow reveal as exposure procedures continue. More-uniform exposure depths are made possible by the use of LITHOTEX Top Surface Retarder, since the surface stays in the same state of retardation for an extended period. Scheduling is more flexible, adequate time is allowed for revealing the aggregates by hosing and scrubbing, and larger areas can be exposed at one time, saving labor costs.

Since aggregates will be exposed only in the areas to which the retarder is applied, the shapes of exposed-aggregate pattern sections can be controlled with precision by use of LITHOTEX Top Surface Retarder. Use of straight edges or templates when applying the surface retarder allows accurate placement of such design elements as exposed-aggregate strips or specially shaped, exposed-aggregate design features.

Exposed-aggregate surfaces should be initially and periodically sealed with CEMENTONE® Clear Sealer, SCOFIELD® Cureseal-W™, or SCOFIELD® Cureseal-S™. CEMENTONE Clear Sealer produces a clear, low-gloss finish while SCOFIELD Cureseal-W produces a clear, semigloss to gloss finish. SCOFIELD Cureseal-S is a clear, solvent-based sealer available in a gloss or matte finish. The color of the aggregate is enhanced and the porous concrete matrix is sealed and protected. Each sealer produces an attractive, low-maintenance film that is resistant to abrasion, surface staining, and many chemicals. For optimum performance SCOFIELD® Selectseal-W™, a highly durable, abrasion- and stain-resistant acrylic-polyurethane formulation, is recommended for protecting the exposed-aggregate surface. Additional information about sealing and protecting exposed-aggregate surfaces is available in the Scofield Tech-Data Bulletins A-764 CEMENTONE Clear Sealer, B-204 SCOFIELD Cureseal-W, B-604 SCOFIELD Cureseal-S, and B-504 SCOFIELD Selectseal-W.

Color-conditioning the concrete matrix with a contrasting or blending color greatly enhances the beauty of

exposed-aggregate concrete. Using CHROMIX® Admixtures for Color-Conditioned® Concrete in the matrix adds permanent, natural color while increasing concrete strength and improving freeze/thaw resistance. CHROMIX Admixtures are available in a wide range of earth-tone colors to complement any aggregate and design. Additional information about coloring exposed-aggregate flatwork is available in Scofield's Tech-Data Bulletin A-304 CHROMIX Admixtures for Color-Conditioned Concrete.

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

**2. Limitations:** LITHOTEX Top Surface Retarder retards, but does not prevent initial and final set of the concrete surface. Removal must take place approximately 8–20 hours after concrete placement or the concrete surface will harden, making aggregate exposure difficult or impossible without sandblasting.

**3. Composition and Materials:** LITHOTEX Top Surface Retarder is a water-based surface retarder with a viscosity that is optimized for surface penetration and ease of application by sprayer, brush, or roller without thinning. Cleanup is with soap and water.

**4. Exposure Depth:** The depth of exposure obtained with LITHOTEX Top Surface Retarder will depend primarily on the surface porosity of the concrete when the retarder is applied. The deepest exposure is produced on an open surface (wood-float finish). Closed surfaces (steel-trowel finish) produce lighter exposures. Minor variations in depth will be caused by differences in finishing, retarder coverage, length of time the retarder remains on the surface, concrete setting time, ambient conditions, and other factors.

A wood-float finish will normally produce an exposure depth of approximately  $\frac{3}{16}$  inch (5 mm). A steel-trowel finish will normally produce an exposure depth of approximately  $\frac{1}{8}$  inch (3 mm).

Representative jobsite samples as described in 9. Jobsite Samples must

be produced to determine application and removal procedures that will produce the required depth of exposure and desired appearance.

**5. Sizes:** LITHOTEX Top Surface Retarder is available in 1-gallon (3.8 L) and 5-gallon (18.9 L) pails.

**6. Coverage:** LITHOTEX Top Surface Retarder must be applied full strength (unthinned). The coverage will vary depending on the porosity and texture of the surface and the method of application. Freshly placed concrete with a flat-troweled finish will require less material than concrete having a wood-float finish.

One application of LITHOTEX Top Surface Retarder should be made at the coverage rate of approximately 100–150 square feet per gallon (2.5–3.5 m<sup>2</sup>/L). A more exact coverage rate can be determined by producing representative jobsite samples as described in 9. *Jobsite Samples* and noting the amount of material required per square foot.

**7. Shelf Life:** When stored indoors in the original unopened containers the shelf life of LITHOTEX Top Surface Retarder is at least 1 year from the date of purchase. Inventory should be rotated.

**8. Cautions:** Avoid contact with eyes. DO NOT TAKE INTERNALLY. KEEP OUR OF THE REACH OF CHILDREN. Protect from freezing. Ensure fresh air entry during application and removal. If you experience eye watering, headaches or dizziness, wear a properly fitted respirator (NIOSH TC-84A approved) during and after application. Follow respirator manufacturer's directions for respirator use.

**First Aid:** Eyes—DO NOT RUB EYES. Immediately flush thoroughly with large amounts of water and get medical attention. 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. Close container after each use. Before using or handling, read the *Material Safety Data Sheet and Warranty*. FOR PROFESSIONAL USE ONLY.

**9. Jobsite Samples:** Producing architectural, exposed-aggregate concrete requires skill and practice. Timing, mix design, aggregate choice, color of the concrete, concrete finishing and application techniques, experience in use of the material, ambient conditions, curing, sealing, and other factors will each

affect the final performance and appearance of exposed-aggregate flatwork. Representative jobsite samples must be produced to verify and approve performance and appearance prior to installation.

Samples should be of adequate size to be representative. The samples should be produced by the same workers who will install the exposed-aggregate flatwork using the contemplated job materials, tools, and techniques. All samples should be finished, exposed, cured, and sealed, as specified.

**10. Concrete Mix Design:** Scofield's Tech-Data Bulletin *A-304 CHROMIX Admixtures for Color-Conditioned Concrete* must be completely read prior to designing a mix using CHROMIX Admixtures to color-condition the concrete.

A normal or retarded-set, water-reducing admixture may be used in uncolored concrete. An air-entraining admixture should be used in all concrete flatwork that will be subject to freeze/thaw cycles and as specified or required by the engineer for workability or durability. Since they interfere with the chemical action of the surface retarder and may discolor the concrete matrix, accelerating admixtures, such as calcium chloride, should not be used.

When the aggregates used in the mix are to be exposed, a sufficient and uniform amount of coarse aggregate must remain near the surface. For best appearance, the mix should be extremely harsh, containing the highest possible percentage of coarse aggregate and having the lowest possible slump.

When special aggregates are used, they are normally graded to one size and are hand seeded over the surface of the concrete after floating. No special aggregate grading in the concrete or mix proportions are required. A slump of 4 inches (100 mm) or less is recommended.

**11. Concrete Installation:** Prior to placing concrete, representative jobsite samples must be produced and approved as described in 9. *Jobsite Samples*. Surrounding areas, landscaping, and adjacent surfaces should be protected. The work area should be roped off, nearby vehicles removed, and appropriate sections closed to traffic.

Weather conditions should be considered when planning installation. Climatic and ambient conditions will affect the length of time the concrete surface is retarded.

The concrete should be placed and consolidated so that it completely fills all space inside the forms and provides a

suitable surface for finishing. When the aggregates used in the mix are to be exposed, tamping or vibrating should be minimized so that coarse aggregate remains near the surface.

The concrete should be screeded to the finish grade specified by the architect and wood floated to the required flatness and levelness. If special aggregates are specified, they should be hand seeded over the surface, then tamped and floated in. The aggregates to be exposed should be completely embedded in the plastic concrete but remain close to the surface. The wood-float finish may be the final finish, or the concrete may be steel troweled, depending on the depth of exposure desired, as described in 4. *Exposure Depth*.

**12. Retarder Application:** The concrete should be designed and installed as described in 10. *Concrete Mix Design* and 11. *Concrete Installation*. LITHOTEX Top Surface Retarder (a red liquid) is normally spray applied by use of a hand-pump sprayer, but application may be made by roller or soft-bristle brush. An airless sprayer will facilitate application in larger areas. The surface retarder should be applied full strength (unthinned) at the coverage rate given in 6. *Coverage* and stirred thoroughly immediately prior to using.

LITHOTEX Top Surface Retarder should be applied uniformly over the surface as soon as concrete finishing is completed and the bleed water has disappeared from the surface. It retards, but does not prevent the initial and final set of the concrete surface. After application and before removal, the retarded surface should be protected from damage and from contact with water from any source.

The length of time the surface remains retarded is influenced by ambient conditions. If windy conditions, high ambient temperatures, or low humidity exist or are expected, surface retardation can be extended by covering the concrete with new, nonstaining, kraft curing paper until the aggregates are exposed.

**13. Aggregate Exposure:** Surface removal must take place approximately 8–20 hours after concrete placement or the concrete surface will harden, making aggregate exposure difficult or impossible without sandblasting.

A section of the retarded surface should be tested prior to general aggregate exposure to determine if the underlying concrete has reached sufficient strength so that the aggregates will not be loosened or dislodged during removal procedures.

The retarded surface may be removed by use of a long-handled, stiff-bristle

brush and a pressure washer or a strong jet of water from a hose. Pressure washing will facilitate removal, especially in larger areas. Runoff should be controlled in accordance with local, state, and federal regulations.

**14. Curing and Sealing:** After aggregate exposure, the concrete should be cured with new and unwrinkled, non-staining, high-quality curing paper conforming to ASTM C 171 *Sheet Materials for Curing Concrete*.

CEMENTONE Clear Sealer, SCOFIELD Cureseal-W, or SCOFIELD Cureseal-S should be applied to seal and protect the exposed-aggregate surface, after the moisture content of the concrete is low enough so that alkali and other salts do not become trapped beneath the sealer, normally 14–28 days after placement. The appropriate Scofield Tech-Data Bulletin *A-764 CEMENTONE Clear Sealer*, *B-204 SCOFIELD Cureseal-W*, or *B-604 SCOFIELD Cureseal-S* must be read completely before using.

For optimum performance and durability, SCOFIELD Selectseal-W is recommended for sealing and protecting

exposed-aggregate concrete flatwork. Before application of SCOFIELD Selectseal-W, the Moisture Vapor Emission Rate (MVER) of the concrete must be measured and be less than 5 pounds per 1000 square feet per 24 hours (2.5 kg/100 m<sup>2</sup>/24 hr). The Scofield Tech-Data Bulletin *B-504 SCOFIELD Selectseal-W* must be read completely before using.

All exposed-aggregate surfaces should be thoroughly inspected to verify and approve installation and safety, including wet and dry slip resistance, before opening the sealed surface to traffic.

**15. Maintenance:** Exposed-aggregate concrete flatwork 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 scrubbing with a stiff-bristle brush and a suitable commercial detergent.

A maintenance application of CEMENTONE Clear Sealer, SCOFIELD Cureseal-W, SCOFIELD Cureseal-S, or SCOFIELD Selectseal-W should be

made periodically as the sealer is worn off the surface. Additional information about the maintenance and resealing of exposed-aggregate concrete is available in Scofield's Tech-Data Bulletins *A-634 CEMENTONE Clear Sealer*, *B-204 SCOFIELD Cureseal-W*, *B-604 SCOFIELD Cureseal-S*, or *B-504 SCOFIELD Selectseal-W*.

**16. Availability:** LITHOTEX Top Surface Retarder is marketed nationwide and internationally, directly to the user and through strategically located warehouses, dealers, and representatives. Scofield should be contacted for its nearest representative.

**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.