

SECTION 033616 - REACTIVE CHEMICAL CONCRETE STAIN

This Section specifies a reactive chemical concrete stain incorporating L. M. Scofield's LITHOCHROME Chemstain Classic. Chemstain combines with cured concrete to produce unique permanent variegated or translucent color effects. An ideal product for exterior hardscapes, interior floors, and existing concrete surfaces. This is a VOC-free product meeting stringent air quality management regulations.

Refer to www.scofield.com for current Scofield Tech-Data Bulletins describing materials and installation requirements. Customer service number is (800) 800-9900.

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Chemically stained concrete floor finish.
 - 2. Sealer.
- B. Related Sections:

Edit to suit Project requirements.

- 1. Section 033000 "Cast-In-Place Concrete" for general concrete applications.
- 2. Section 079200 "Joint Sealants" for colored sealant installed in paving joints.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C 171: Standard Specification for Sheet Materials for Curing Concrete.
 - 2. ASTM C 309: Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 3. ASTM F 1869: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's technical data, including Material Safety Data Sheet (MSDS) and installation instructions, for each product specified.

Include LEED submittal for Credit IEQ 4.2 Low-Emitting Materials: Paints & Coatings if this project will be submitted for LEED certification.

- B. LEED Documentation, Credit IEQ 4.2: Verification of VOC content.

- C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.
- D. Qualification Data: For manufacturer and Installer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum 10 years of documented experience producing the specified products.
- B. Installer Qualifications: Minimum 5 years of documented experience with work of similar scope and complexity required by this Project and acceptable to, or certified by, concrete stain manufacturer.
- C. Regulatory Requirements:

Code of Federal Regulations 40 CFR 59, Subpart D and EPA Test Method 24 establish VOC emissions standards and test protocols for architectural coatings.

- 1. Products to comply with United States Clean Air Act for maximum Volatile Organic compound (VOC) content as specified in this Section.
- D. Material Source: Obtain each specified material from the same source.
- E. Notification: Give a minimum 7 calendar days' notice to manufacturer's authorized field representative before date established for commencement of concrete stain work.

For large projects or where color and appearance are critical, include provisions for a mockup to demonstrate finished appearance and workmanship standards.

- F. Concrete Stain Mockups:
 - 1. Construct a 10 foot by 10 foot mockup at location selected by Architect.
 - 2. Provide individual mockups for each color and pattern required.
 - 3. Construct mockup using materials, processes, and techniques required for the work, including curing procedures. Incorporate representative control, construction, and expansion joints according to Project requirements. Installer for the work to construct mockup.
 - 4. Mockup to be stained and sealed by the Installer who will actually perform the work for the Project. Record the amount of chemical stain needed per square foot of application to establish coverage rates for the work.
 - 5. Notify Architect and Owner a minimum of seven calendar days in advance of the date scheduled for each mockup construction.
 - 6. Obtain the Architect's and Owner's acceptance of each mockup prior to commencement of the work.
 - 7. Each mockup to remain until completion of the work to serve as a quality control standard for the work. Provide suitable protections to preclude damage to mockup.

8. Demolish and remove each mockup from site when directed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in original factory unopened, undamaged packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable.
- B. Store products in a location protected from damage, construction activity, and adverse environmental conditions, and away from combustible materials and sources of heat, according to manufacturer's printed instructions and current recommendations.
- C. Handle products according to manufacturer's printed instructions.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Maintain an ambient temperature between 50 deg F and 90 deg F during application and at least 48 hours after application.

1.7 PREINSTALLATION CONFERENCE

- A. Seven calendar days prior to scheduled date of installation, conduct a meeting at Project site to discuss requirements, including application methods. Attendees to include Architect, Owner, Contractor, Installer, and manufacturer's authorized field representative.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design: Provide products specified herein manufactured by L. M. Scofield Company (Scofield).

2.2 MATERIALS

- A. Reactive Chemical Concrete Stain: Reactive, water-based solution of metallic salts which react with calcium hydroxide in cured concrete substrates to produce permanent variegated or translucent color effects. Zero VOC content.
 1. Product: Scofield's "LITHOCHROME Chemstain Classic."
 2. Color(s):

Select one or more colors from the following list. Note: Colors CS-12, CS-11, and CS-13 for interior applications only, due to adverse color effects when exposed to moisture. When specifying CS-12, CS-11, or CS-13 a Moisture Vapor Emission test must be performed on the interior slab to test suitability. Refer to Technical-Data Bulletin for more information.

- a. CS-12 Weathered Bronze
- b. CS-11 Fern Green
- c. CS-13 Copper Patina
- d. CS-15 Antique Amber
- e. CS-16 Faded Terracotta
- f. CS-14 Dark Walnut
- g. CS-2 Padre Brown
- h. CS-8 Black

Select sealing compound from available choices below, and to suit project requirements. Consult the sealer selection guide at www.scofield.com/concrete_sealers22.html.

- 3. Sealers - choose from one of the following sealers:
 - a. SCOFIELD® Cureseal-S™
 - b. SCOFIELD® Cureseal-VOC™
 - c. SCOFIELD® Cureseal-100™
 - d. SCOFIELD® Selectseal-W™
 - e. SCOFIELD® Cureseal-W™
 - f. CEMENTONE® Clear Sealer

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which the concrete stain work will be performed and identify conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

Retain following paragraph if any of the following colors will be used for interior applications: CS-12, CS-11, CS-13.

- B. Interior Applications: Concrete substrates must have a moisture vapor emission rate of less than 5 lbs./1000 sq. ft. per 24 hour based on a 72 hour test period according to ASTM F 1869.

3.2 PREPARATION

- A. New Concrete: Comply with the following:
 - 1. Newly placed concrete to sufficiently cure for concrete to become reactive. Minimum cure time is 14 days.

Retain following paragraph for colors CS-12, CS-11, CS-13.

- 2. Interior Applications: Minimum cure time of concrete is 30 to 60 days, or longer if necessary to meet the specified water vapor transmission requirements.

3. Do not use liquid curing materials. Cure concrete flatwork with new, unwrinkled, non-staining, high quality curing paper complying with ASTM C 171. Do not overlap curing paper.
4. Immediately prior to chemically staining, thoroughly clean concrete to remove any contaminants deleterious to subsequent chemical stain application. Sweep surfaces, then pressure wash or scrub using a rotary floor machine with a Mal-Grit Brush from the Malish Corporation. Use suitable, non-acidic, high quality commercial detergents to facilitate cleaning. Rinse surfaces after cleaning until rinse water is completely clean. Allow floor to dry completely prior to application of concrete stain.
 - a. Pressure Washing: Use a pressure washer equipped with a fan tip and rated for a minimum pressure capability of 4000 psi.

B. Surface Preparation for New or Existing Concrete:

1. Concrete surfaces should be completely penetrable before applying the initial application of chemical stain. The surface of the concrete should be lightly mechanically abraded to remove weak cement paste and contaminants. The final surface preparation should approximate a Concrete Surface Profile of 1, (CSP1 as designated by the International Concrete Repair Institute, Alexandria, Virginia). Methods for mechanical abrasion include:
 - a. Pressure Washing: Use a pressure washer equipped with a fan tip and rated for a minimum pressure capability of 4000 psi.
 - b. Scrubbing with a rotary floor machine with a Mal-Grit Brush from the Malish Corporation.
 - c. Light sanding of the surface.

Surfaces should be tested to receive stain by spotting with water. Water should immediately darken the substrate and be readily absorbed. If water beads and does not penetrate or only penetrates in some areas, perform additional surface preparation and testing. On denser concrete floors, sand lightly to open up surfaces. Retest and continue surface preparation until water spots immediately darken and uniformly penetrate concrete surfaces.

2. Rinse concrete substrates until rinse water is completely clean.

Retain the following paragraph if decorative scoring is a design element.

- C. Scoring: Score decorative jointing in concrete surfaces 1/8 inch deep with diamond blades. Rinse until water is completely clean.
 1. Single Color Stain Applications: Score after staining.
 2. Multiple Color Stain Applications: Score before staining.

3.3 CHEMICAL STAIN APPLICATION

- A. General: Comply with chemical stain manufacturer's printed instructions and current recommendations.

1. Do not mix the specified chemical stain with highly alkaline materials. Doing so will result in a dangerous chemical reaction.
- B. Protect surrounding areas, landscaping, and adjacent surfaces from overspray, runoff, and tracking. Divide surfaces into small work sections using walls, joint lines, or other stationary breaks as natural stopping points.
- C. Apply chemical stains at the coverage rate recommended by the manufacturer and use application equipment according to the chemical stain manufacturer's printed instructions. Note the color of the liquid chemical stain will not be the final color produced on the concrete substrate.
- D. Transfer chemical stain to the substrate by brush or spray and immediately scrub into surface. Reaction time depends on wind conditions, temperatures, and humidity levels.
- E. When multiple coats of one or more colors are required, washing and drying between colors is desirable to evaluate the color prior to the next coat.
- F. Rinsing: After the final coat of chemical stain has remained on the surface for a minimum of four hours, neutralize unreacted chemical stain residue and then remove completely prior to sealing. After neutralization, thoroughly rinse surface with clean water several times to remove soluble salts. While rinsing, lightly abrade surface using a low-speed floor machine and red pad to remove residue and weakened surface material. Runoff may stain the adjacent areas or harm plants. Collect rinse water by wet vacuuming or absorbing with an inert material.
 1. Failure to completely remove all residue prior to sealing the surface will cause appearance defects, adhesion loss or peeling, reduced durability, and possible bonding failure and delamination of sealer.
 2. All stain residue, runoff liquid, and rinse water must be collected and disposed of according to applicable Federal regulations and governing authorities having jurisdiction.

3.4 SEALING APPLICATION

- A. Concrete substrate must be completely dry. Test surface for proper pH prior to applying sealer. A pH value of 7 or higher indicates all acid has been neutralized. If the tested pH value is less than 7, repeat neutralization step until the required pH value is achieved.
- B. Conduct a moisture vapor emission test prior to applying any sealer. Refer to the specific sealer's Technical-Data Bulletin for acceptable MVER.
- C. Apply sealer according to the sealer manufacturer's printed instructions at a rate of 300 to 500 square feet per gallon per coat. Maintain a wet edge at all times.

- D. Allow sealer to completely dry before applying additional coats.
- E. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application method and rates.
- F. Seal horizontal joints in areas subject to pedestrian or vehicular traffic.

3.5 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 Proguard Duracover as manufactured by L. M. Scofield Company, Douglasville, GA (800-800-9900). 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
- F. No substitutions will be allowed.

3.6 MAINTENANCE

- A. Maintain chemically stained and sealed floors by sweeping. Clean spills when they occur and rinse dirt off with water. Wet-clean heavily soiled areas by mopping or by scrubbing with a rotary floor machine equipped with a scrubbing brush and a suitable, high quality commercial detergent. Maintain interior floors that require polishing by using a compatible, premium-grade, emulsion-type, commercial floor polish, according to manufacturer's printed instructions and safety requirements.

END OF SECTION 033616

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