



# Perma-Cast® Sierra Stain™

## Technical Data Sheet PS-0204

**FOR PROFESSIONAL USE ONLY.** Read all applicable and current product information for your project: Technical Data Sheet (TDS), Color Chart, Installation Guide, Material Safety Data Sheet (MSDS). All information is available for download online at [www.butterfieldcolor.com](http://www.butterfieldcolor.com) and at point of purchase.

MasterFormat™ Guide Specifications, and Butterfield Color® Architectural Details and Specifications are available for the specifier/designer. All information is available for download online at [www.butterfieldcolor.com](http://www.butterfieldcolor.com) and at point of purchase.

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**1. Description:** Perma-Cast® Sierra Stain™ is a penetrating reactive stain that chemically combines with cured concrete to produce permanent, variegated coloring effects. Perma-Cast® Sierra Stain™ is suitable for exterior hardscapes, artificial rock formations, interior floors, walls, statuary, and countertops. Because there are so many variables involved in the chemical reaction process (i.e. mix design, age, porosity, texture and color of the concrete substrate), each application of Perma-Cast® Sierra Stain™ produces unique results. Expect wide color variations, mottling and unevenness of the color. If these coloring effects are not desired, Perma-Cast® Sierra Stain™ should not be used. When more uniformly colored concrete is desired for new concrete installations, Uni-Mix® Integral Concrete Colorant or Perma-Cast® Shake-on Color Hardener should be specified.

Perma-Cast® Sierra Stain™ is composed of metallic salts in an acid based solution. When applied to concrete or some other cementitious materials such as overlays, the stain reacts with the free lime to create colored mineral deposits in the pores of the surface. Perma-Cast® Sierra Stain™ is a concentrate that is formulated to mix 1:1 with water. On Butterfield Color® cementitious overlays, more water may be required for desired look (see section 4. Coverage).

Perma-Cast® Sierra Stain™ is available in 7 standard colors. Custom colors or color matching is difficult. However, different stain colors may be used in combination for more coloration affects.

For truly unique and creative concrete installations, use of Perma-Cast® Sierra Stain™ can be used in conjunction with other Butterfield Color® products: Uni-Mix® Integral Concrete Colorant, Uni-Mix® Liquid Integral Concrete Colorant, Perma-Cast® Shake-on Color Hardener, T1000™ Fine Overlay, T1000™ Stampable Overlay, MT Resurfacer™ and Micro-Cem™ Ultra-Thin Overlay.

**2. Limitations:** Perma-Cast® Sierra Stain™ must be able to penetrate the substrate for a proper chemical reaction. Perma-Cast® Sierra Stain™ colors Caribbean, Verdigris and Weathered Bronze must only be used for interior applications

since they may blacken when exposed to moisture from rain or sprinklers. Old or weathered concrete may not be effectively colored with chemical stain. Not all concrete can be stained. Concrete containing reactive pozzolans may not accept stain.

The colorations produced are translucent. Do not use chemical stain to hide surface blemishes or construction problems. Patching materials may not effectively react with chemical stains or may produce colorations distinctly different from the adjacent concrete.

**3. Packaging:** Perma-Cast® Sierra Stain™ is a concentrate available in 1 gallon (3.8 L) plastic containers. Samples bottles are available for a nominal charge.

Store upright in tightly closed original containers away from sources of heat and combustible materials. Do not store in unlabeled containers. Do not reuse empty container. Color in the container is not the same color of final stained concrete.

**3.1 SHELF LIFE:** 3 years, when stored in original, unopened containers, in dry storage. Do not use material that has been frozen.

**4. Coverage:** Coverage will vary widely depending on the porosity and texture of the concrete surface, application method, number of applications required and desired color intensity. **Mix 1 gallon of Perma-Cast® Sierra Stain™ with one gallon of clean water.** Do not use stain at full strength since excessive etching of the concrete surface may occur. Apply diluted material at 200-300 square feet/gallon depending on the porosity and texture of the surface. Two applications are recommended.

**5. Preparation:** Produce and approve a mock-up on the actual surface that will be chemically stained. Mock-up should include all the tools and techniques that will be used on the actual job, including sealer. If, during the mock-up application, Perma-Cast® Sierra Stain™ does not create a fizzing reaction, additional cleaning may be needed or the surface may be too old or weathered to react with the chemical stain. Consider using Elements™ Trans-

parent Concrete Stain on old and weathered concrete, or when the desired color effects cannot be achieved with a chemical stain. Read the Elements™ Transparent Concrete Stain Technical Data Sheet before using product. All information is available for download online at [www.butterfieldcolor.com](http://www.butterfieldcolor.com) and at point of purchase.

Clean surfaces to ensure adequate penetration of the chemical stain and the removal of contaminants that may adversely affect the chemical stain reaction. Do not use an acid solution to clean the surface. Dense concrete surfaces will require mechanical preparation. Concrete floors that appear glossy because of a hard troweled or burnished finish must be mechanically prepared to remove the surface shine before staining using a low speed floor machine with a cleaning pad, sanding screen or an aggressive grit brush depending on the surface porosity. Protect surrounding areas, particularly adjacent surfaces, during application of Perma-Cast® Sierra Stain™ and clean up of the residue. Do not use acidic cleaning products before or after staining.

**5.1. NEW CONCRETE:** Concrete should be at least 21 days old and dry before applying Perma-Cast® Sierra Stain™. Liquid curing compounds, liquid hardeners, densifiers or other film forming products should not be used on new concrete installations prior to chemical staining. All surfaces should be cured by the same method and chemically stained at the same age. Use clean, unwrinkled, non-staining curing paper, with minimal overlap between sheets. Overlaps may be secured using blue painters tape. Do not place tape directly onto concrete. Plastic sheeting should not be used for curing unless its affects upon the concrete are desired.

Once concrete has been placed, finished, and cured, protect surface from all construction activity prior to chemical staining. Use protective coverings while work is being done over the surface. Remove protective coverings after work is completed, allowing the concrete to uniformly dry. Do not store lumber, steel, plumbing, masonry, or chemicals on the floor. Pressure wash or scrub with a rotary floor machine, dirt, and dust from the surface. Use a low

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foaming, alkaline cleaner and scrub floor with a black pad or grit brush. Thoroughly rinse and wet vacuum cleaning residues. This method of cleaning is generally effective for water-soluble contamination prior to the application of topical stains and sealers. Test the surface for penetration prior to chemical staining.

**5.2. EXISTING CONCRETE:** Older concrete must be free from sealers, wax, mastics, grease, oil and other contaminants that are blocking the pores of the substrate. Determining the effective penetration by the chemical stain can be evaluated by wetting the surface with water. If the water is quickly and evenly absorbed, and darkens the surface, no extensive preparation may be required.

Surfaces that are densely burnished or heavily soiled will require mechanical abrasion. Use a 60-80 grit sanding screen or aggressive grit brush with a low speed floor machine. Note: Mechanical preparation may change the surface texture and color. Evaluate cleaning methods thoroughly before proceeding. Once surface cleaning and preparation is completed, use a low foaming, alkaline cleaner and scrub floor with a black pad or grit brush. Thoroughly rinse and wet vacuum cleaning residues. Test the surface for penetration prior to chemical staining.

**5.3. OVERLAYS:** T1000™ Fine Overlay, T1000™ Stampable Overlay and other similar cementitious topping products should be cured and dry before applying Perma-Cast® Sierra Stain™. T1000™ Fine Overlay requires 7 days of cure time at 70°F (21°C). T1000™ Stampable Overlay requires 14 days. Overlaid surfaces must be cleaned, rinsed and dry prior to applying chemical stain. Do not utilize aggressive cleaning methods until surfaces are thoroughly cured.

Self-leveling overlays will require mechanical preparation prior to the application of Perma-Cast® Sierra Stain™.

**6. Application:** Do not apply Perma-Cast® Sierra Stain™ to frozen concrete or if slab temperature will drop below freezing within 4-6 hours after application. At low temperatures above freezing, the chemical stain's reaction time will be slowed beyond the normal 4 hours. During elevated ambient and slab temperatures, low humidity or high wind, the rapid drying of the chemical stain may require additional applications to achieve the desired colorations. Lightly misting the concrete with

clean water prior to staining can minimize problems associated with hot and windy job site conditions. Evaluate misting technique on your mock-up panel.

All surfaces must be clean and dry. Protect adjacent surfaces with plastic. Duct tape should not be used, particularly on surfaces that will be stained, since adhesive residue may leave a shadow or inhibit the chemical stain reaction. Blue painters tape is preferred. Tape applied to hot surfaces or exposed to direct sun for extended periods will leave a residue. Plastic sheeting or tape should be removed as soon as staining is complete.

Divide surface into smaller working areas utilizing walls, control joints and other fixed objects as natural stopping points, ensuring a wet edge during application. Organize application to minimize walking through the wet stain and possible tracking into other areas. Restrict activity on the floor after it has been cleaned before staining.

Application tools such as brushes, sponges, containers, and sprayers must be acid resistant. Brushes must be capable of holding Perma-Cast® Sierra Stain™ without excessive dripping. Do not use application equipment that contains metal. Do not use tools that will soften or deteriorate, or leave a color residue when in contact with Perma-Cast® Sierra Stain™. Do not use a paint roller, as it will create distinct overlap lines. During application, avoid random dripping, spillage, and rundown from the equipment, which may produce undesirable colorations that will be difficult to remove.

For most applications, a manually pumped or pressurized plastic garden sprayer can be used to apply Perma-Cast® Sierra Stain™ in a random or circular motion. Chemical stain should fizz when applied. If it does not, additional cleaning is needed or the concrete is too old and does not contain enough reactive materials for a chemical stain reaction. Maintain a wet edge at all times. Keep the saturation amount consistent throughout application. If chemical stain is splashed, dripped, or puddled, those areas could produce undesirable effects. Evaluate application equipment and techniques with a mock-up panel.

Apply Perma-Cast® Sierra Stain™ to vertical surfaces in a similar manner, starting at the bottom and working upward. Avoid excessive rundown of material, as this will produce darker streaks. In confined areas,

where a sprayer is not practical, an acid resistant natural fiber or sponge brush may be used. Protective clothing is very important during vertical applications.

Allow Perma-Cast® Sierra Stain™ to react on the surface for a minimum of 4 hours. Reaction time may vary with ambient and slab temperatures, wind, and humidity. For one-color and multi-colored applications, a small area should be scrubbed and rinsed for effective color evaluation. Additional applications of chemical stain may be done to achieve the desired colorations.

The reaction of the Perma-Cast® Sierra Stain™ with the concrete will produce a powdery residue. The residue must be neutralized and removed to prevent tracking or acting as a bond breaker when a sealer is applied. Chemical stain can be neutralized by scrubbing with a solution of 1 pound of baking soda with 5 gallons of clean water. Avoid using excessive solution since its residue may act as a bond breaker when the surface is sealed. Surface should be rinsed and wet vacuumed until rinse water is clean and clear. If the surface is not thoroughly neutralized and rinsed, the longevity of the stained surface and sealer will be diminished. Do not use a string mop to clean rinse water. Always use a wet/dry vac.

Runoff from rinsing may discolor adjacent surfaces or be harmful to plant material. Control runoff by wet vacuuming or the use of an inert absorbent product. If the rinsed stain residue will contact uncolored concrete, pre-wetting the uncolored concrete prior to rinsing, can minimize absorption of the residues. All stain residue, rinse water, application tools, and cleaning materials should be disposed of in accordance with local, state, and federal regulations.

**7. Sealing:** After the stained concrete has been thoroughly neutralized and the rinsed concrete has dried thoroughly, apply Clear Guard® Cure and Seal or Clear Guard® PRO 350 Cure and Seal in regions that require 350 g/L VOC. For interior applications use Clear Guard® H<sub>2</sub>O Cure and Seal or Clear Guard® H<sub>2</sub>O Wet Look. Read Technical Data Sheet before using the curing and sealing products. All information is available for download online at [www.butterfieldcolor.com](http://www.butterfieldcolor.com) and at point of purchase. Before application of sealer, the Moisture Vapor Emission Rate (MVER) of the concrete or cementitious topping must be measured and be less than 3.75 pounds per 1000 square feet per 24 hours (1.7 kg/92.9 m<sup>2</sup>/24 hours).

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The MVER can be measured by using a calcium chloride test kit in accordance with ASTM F-1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride. A less accurate, but more readily available means of testing for the presence, but not quantity of moisture, can be done by taping down the edges of a clear 18' x 18" sheet of plastic in accordance with ASTM D-4263, Standard test Method for Indicating Moisture in Concrete by the Plastic Sheet Method. After 24 hours, the presence of moisture or condensation under the plastic generally indicates that conditions exist for an excessively high MVER.

Treated surfaces may be slippery during application prior to drying, and when wet with water or liquids after drying. Concrete should be textured sufficiently to eliminate potential slipping hazards. In addition, use a non-slip additive with the sealers. Interior floors may be maintained with a slip resistant wax. Test and confirm that the material is adequately slip resistant prior to opening installation to any traffic.

**8. Maintenance:** Periodically inspect cured and sealed surfaces for wear or damage. All concrete curing and sealing compounds will eventually exhibit the affects of weathering and traffic. For maximum coating life and performance, wipe up all chemical solvent or petroleum spills as soon as possible. Remove abrasive debris by sweeping or vacuuming. Do not drag, drop or place sharp edges on sealed surfaces. Periodic washings with mild detergents will help maintain surface luster. Do not use solvent or acid based cleaning materials for general cleaning. Hot car

tires or turning tires while car is standing may damage the sealer. Surfaces that will be subjected to car traffic, de-icing salts or chemical exposure, must receive minimally, two applications of Clear Guard® Cure and Seal, Clear Guard® PRO 350 Cure and Seal, Clear Guard® H<sub>2</sub>O Cure and Seal, or Clear Guard® H<sub>2</sub>O Wet Look.

Prior to re-coating, the surface and joints must be clean, dry, free from cleaning product residue, other contamination, or loose materials, which will affect the adhesion of sealers. When re-coating, a slip resistant additive may be added to the sealer.

**8.1. INTERIOR FLOORS:** Regularly clean by dry and wet mopping. Periodically machine scrub, rinse, and wet vacuum the surface. Apply a maintenance wax or slip resistant wax as directed by the wax manufacturer. This type of periodic maintenance will greatly enhance the appearance of the floor and minimize the need to strip and/or reapply the sealer. Stained and sealed concrete floors will require maintenance.

**9. Quality Control:** Cast a job site sample at least 21 days prior to the installation for approval of color and finish. Utilize all materials, tools, and techniques from the actual job in the mock-up. Consistent batching, pouring, finishing, curing, sealing, and preparation techniques, will ensure the uniformity of architectural concrete. Verify adequate wet and dry slip resistance. Verify maintenance requirements. Site visits by Butterfield Color, Inc. Personnel are for making technical recommendations only and not for supervising or providing quality control.

**WARNING: CORROSIVE LIQUID. MAY CAUSE SEVERE EYE AND SKIN IRRITATION OR BURNS. MAY BE FATAL IF SWALLOWED, INHALED OR WITH PROLONGED EXPOSURE TO THE SKIN. WEAR PROTECTIVE CLOTHING, RESPIRATOR, CHEMICAL RESISTANT SAFETY GLASSES, AND GLOVES. KEEP WORK AREA WELL VENTILATED DURING APPLICATION. DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN AND ANIMALS. READ MATERIAL SAFETY DATA SHEET (MSDS) BEFORE APPLICATION. ALL INFORMATION IS AVAILABLE FOR DOWNLOAD ONLINE AT WWW.BUTTERFIELDCOLOR.COM AND AT POINT OF PURCHASE.**

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**Suggested Short Form Specification for Butterfield Color® Perma-Cast® Sierra Stain™:**

Chemically stained concrete shall received two applications of Butterfield Color® Perma-Cast® Sierra Stain™ using [ ] color after concrete has cured 21 days minimum. Prepare surfaces, apply stain, neutralize acidic residue, and rinse according to manufacturer's instructions. Allow concrete to dry completely before sealing. Seal concrete with 2 coats Butterfield Color® Clear Guard® Cure and Seal with slip-resistive additive according to manufacturer's instructions.

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