

How Concrete Acid Stain Works



Concrete Acid Stain is a water-based liquid bearing minerals and acid. The acid stain penetrates the pores of the concrete forcing a chemical reaction between the muriatic acid and the available lime in the surface. Once acid stained, the color of the concrete is permanently altered. When sealed with an appropriate concrete sealer and for indoor applications, sealed and waxed, acid stain produces the unique, variegated finish associated with this process.

Before Acid Staining: Surface Preparation

Surface preparation is the most important step in the acid staining process. Prior to staining, a slab must meet the following criteria:

- ✓ The concrete must be free of debris, dirt and oils, paint, dry wall mud, adhesive, sealers, stains of any kind or similar materials. Acid stain cannot react properly with the concrete if these conditions are present.
- ✓ The slab should not have been treated with a **waterproofing agent**, cleaned with **muriatic acid** or a heavy **tri-sodium phosphate (TSP)** solution. The acid stain reaction cannot occur on surfaces treated with these products.
- ✓ For older concrete, the surface must be completely intact with no exposed aggregate. Concrete acid stain does not stain rocks, sand or aggregate.
- ✓ For slick machine-troweled surfaces, apply [DCI Hard-Troweled Floor Prep](#) according to the instructions to insure a complete acid stain reaction across the floor. Test by pouring water on the surface. If the water beads up and sits on the surface for more than a few seconds, the hard-troweled floor prep will be needed.
- ✓ Newly poured concrete should include less than 10% fly ash to insure a good chemical reaction with the acid stain. Concrete poured with excessive water in the mix can create a thin, unstable layer of concrete on the slab surface. To test for instability, press the tip of nail into the concrete. If breaking or damage of any kind occurs, the slab must be profiled with a sander or buffer using a 60-80 grit sanding disc before staining.

Notice: *NOTHING* takes the place of pre-application testing, particularly if you do not know the history of your slab. Always prepare a test area on the slab intended for staining prior to beginning a project. Direct Colors is not responsible for application problems resulting from a failure to start projects with a sample test.



Often, concrete surfaces will have dry wall mud, paint, wood stains, tile adhesives, carpet adhesives, grease, pet stains, etc. on the concrete. Concrete Acid Stain is not an over coat, but is an opaque, penetrating color that permanently changes the appearance of the concrete. Areas where debris remains on the surface will likely not accept the stain leaving color imperfections on the floor, particularly mastic, dry wall mud and paint. Use [Bean-E-Doo](#), for the removal of adhesives. Apply [Soy Gel Professional Paint Stripper](#) to remove epoxy, sealers, varnish or paint. For more information on these and other concrete cleaning products, visit www.directcolors.com/cleaners. Xylene can also be used to remove solvent-based sealers and clean up sprayers or tools. Soap and hot water can be used to remove water-based sealer from applicators immediately after application but Soy Gel Professional Paint Stripper or a similar product is required to strip water-based sealers from concrete. Cleaning floors that have been heavily soiled or have been previously tiled or carpeted to a stainable level is a considerable amount of work, but not impossible. If you desire a more even finish, consider overlay resurfacing

especially on slabs with exposed aggregate or surfaces so soiled that cleaning would prove too difficult.

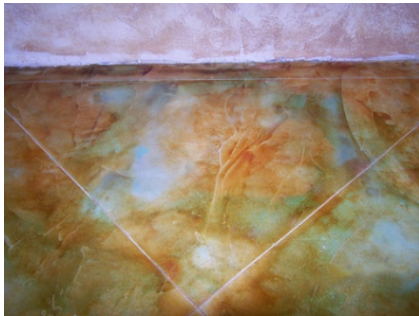
For best acid stain results on indoor slabs, sand the floor with a 150-200 grit pad applied with a floor buffer to properly prepare the surface for staining. Sanding will remove most if not all debris from the surface and correctly profile the concrete for staining.

The vast majority of slabs only require minimum cleaning using an organic degreaser (such as DCI Orange, Simple Green, etc.) diluted at a medium concentration with water. Scrub the surface with a soft nylon bristle brush or power wash on a low setting to prepare most floors for staining. Thoroughly rinse the surface with clear water to remove any remaining cleanser and leave the floor to dry. For interior projects, use a shop vacuum, mop and/or squeegee to contain the water and aid in drying.

Applying the Stain

Safety First! Remember to use goggles, gloves and a dust mask while working with concrete acid stain. A respirator may be required for applications with poor ventilation. The appearance of the finished product is very much influenced by the manner in which the acid stain is applied. We recommend spraying the stain on the surface using an all-plastic pump sprayer. If a darker, more even tone is desired, brush the acid stain into the surface using consistent circular strokes. If using a brush, spray on a second coat to eliminate any brush strokes on the surface unless that is the desired finish. Though new concrete may not always require a second coat of acid stain, older concrete does require two coats of stain for complete coverage. For a more diffuse look, spray the stain onto the surface without brushing.

To produce a “marbled” effect, spray enough stain on the surface to allow the color to naturally run and pool in the lower areas of the slab. This technique is particularly effective on outdoor concrete slab as they are generally poured on a slope. Applying the [Concrete Acid Stain](#) with the sprayer nozzle close to the floor will also produce “pooling” effects whether indoors or out. To produce a multi-colored effect with distinct areas of color, begin with your lightest color as a base coat. Base coat colors can either be a light acid stain color such as Azure Blue, Malayan Buff or one of the darker stains cut with water. Apply one heavy coat of your base color and immediately apply accent coats while the stain is still wet to encourage a more natural appearance on the slab. Continue to apply the lighter to darker colored accents until satisfied with the results. If walking on wet acid stain, wear acid resistant spiked shoes, golf shoes or similar cleats to avoid leaving foot impressions on the floor. For a veined appearance, spray your secondary or “veining” color on the surface first. While still wet, feather the primary color into and around the secondary color allowing it to flow together at the edges. Be careful not to cover your secondary color completely especially if it is a lighter shade. Contact a Direct Colors decorative concrete technician for additional information on application techniques.



No two finished floors are exactly same as acid staining is an artistic process. Always complete small test patches on your surface or prepare sample boards to practice with the sprayer and determine which look you prefer. Each of our acid stain colors can be cut with water to produce an array of different colors and shades. Keep in mind if the water content is too high, the chemical reaction between the stain and the concrete will be significantly reduced and may not be strong enough to produce the desired color, especially on older slabs. We do not recommend cutting our acid stains by more than 4 parts water to 1 part acid stain. Some colors vary more than others when increasing the water content and many factors determine how dark the final stain color will be such as age of concrete, cement content and weathering. As the acid stain dries, a chalky residue will likely form on the surface of the concrete and is a normal part of the staining process. Each stain has different activation times to fully color the concrete, generally from four to eight hours. However, the stains can be left on for longer if a darker color

is desired.

Summer Tip: Hot, dry conditions can cause acid stain to prematurely dry before properly reacting with the concrete. For best results, slightly dampen the surface before applying acid stain to outdoor concrete. Sealers should not be applied to concrete over 90 F. For outdoor projects, apply sealers either late in the evening or early in the morning when concrete temperatures are at their lowest.

Notice:

- Check your stain’s activation time before beginning the job. Stains can be left on the surface for longer but not less than the activation time. If you are working on a concrete countertop project or attempting to stain separate rooms the same color, use a timer to insure equivalent activation times for each countertop section or room.
- Remember to spray a second coat of stain over the dried residue of the first coat to assure complete coverage.
- **Do not walk on wet residue.** If you must walk on the processing surface use [acid stain resistant spiked shoes](#) to prevent marks or shoe impressions on the surface. Golf shoes, football cleats or plastic bags over sock feet can also be used.
- Avocado, Azure Blue, Sea Grass and Shifting Sand [concrete acid stain](#) are **not** recommended for outdoor use.

Color	1st Appearance of Color	Final appearance	Minimum Time Required on Surface
Azure Blue	Light Blue	Medium Blue	4-6 hours
Coffee Brown	Greenish Brown	Dark Brown	4-6 hours
Cola	Greenish Brown	Brownish Red	4-6 hours
Avocado	Greenish Brown	Greenish Yellow	4-6 hours
Black	Dark Brown	Black	4-6 hours
Malayan Buff	Greenish Black	Golden Tan	8 hours
English Red	Greenish Brown	Reddish Brown	4-6 hours
Desert Amber	Greenish Brown	Straw Color/Tan	8 hours
Shifting Sand	Greenish Brown	Greenish Tan	4-6 hours
Sea Grass	Greenish Brown	Greenish Brown	4-6 hours

Keep in mind that all concrete surfaces are not alike. Although acid staining overlaid surfaces generally produces similar results to that of new concrete slabs, variation between products can occur. To assure the desired results, *always prepare a small test area prior to beginning any acid stain project.*

Neutralizing the Surface and Removing the Residue

Once the residue has dried and the stain has been given at least the recommended minimum time to react, the surface should be neutralized and all debris or excess stain removed in the following manner:

1. Prepare a solution using baking soda at a ratio of 1-2 tablespoons of soda per gallon of water. Thoroughly spread the solution across the slab, scrubbing with a nylon scrub brush where needed to remove residue. A shop vacuum can also be used for indoor projects.



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For applications including [Lithium Hardener/Sealer](#), consider repeating this step to be absolutely certain all concrete acid stain has been neutralized before cleaning.

2. Wash the surface carefully using clean water until nothing but clear water is visible. All residue and excess color must be removed from the floor BEFORE leaving to dry. For stubborn residue or porous surfaces, use a floor soap or organic degreaser to aid in the removal. The clean, wet surface will be the approximate color of the final sealed surface.
3. Leave to dry. After the surface has completely dried, the floor should be ready to seal.

Sealing the Surface

After the surface has been neutralized, cleaned and has thoroughly dried, the acid stained floor must be sealed with an appropriate concrete sealer. Direct Colors offers both [solvent and water-based sealers](#) suitable for any concrete project. Sealers can be applied with either an applicator or a sprayer; however, due to more stringent VOC regulations, some solvent-based sealers are not legal for use in certain US states.



US Environmental/VOC Regulations

GRAY states can purchase all of our sealer products.

Green states, Blue states and California do not permit the use of Sprayable Satin Finish Sealer, and AC-1315 Solvent-based High Gloss Sealer.



CAUTION: Wear a mask or ventilator while applying; ventilate well to the outside if applying a solvent indoors.

Recommended application methods for machine troweled, ground, or smooth hand-troweled floors:

- **AC 1315 Solvent-based High Gloss sealers** should be applied with a [Padco® Floor Coater](#) or [Padco® Floor Trim Pad](#) on smooth surfaces and with a short-napped (3/8 in. or less) roller on textured/stamped surfaces.
- **DCI's Sprayable Satin Finish sealer (SSB)** and **DCI Lithium-based Sealer/Hardener** can be applied with a pump-up deck and fence sprayer. Sprayers can be purchased at your local hardware store. Separate instructions for DCI Lithium-based Sealer/Hardener can be found at www.directcolors.com/howto and are included with each order
- **DCI Water-based or Krystal Kote Sealers** should be applied with a [Padco® Floor Coater](#) or [Padco Floor Trim Pad](#) from a paint tray or with a short-napped roller (3/8 in. or less) roller on textured/stamped surfaces.

Textured or broom finished surfaces sealed with a non-sprayable solvent and water-based sealers should be rolled on using a short-nap roller (approximately 1/8") or less. For best results, use the pan grid to purge the roller of excess sealer and apply with slow, even strokes. Sealer bubbles, should they occur, can be removed with a hair dryer set to cool or a clean leaf blower set to low speed. SSB can be either sprayed or rolled on a textured/broom-finished surface.

Apply 1-2 thin coats of sealer to the surface. Thick coats will result in an inconsistent finish with tacky areas that may not set-up correctly. Sealers applied with an applicator should be "*pushed on*" only. Pulling back with the applicator will result in unattractive sealer streaks that often require stripping to correct. For best results with water-based sealers, soak the applicator in warm water and shake out excess before beginning the application. Depending on the sealer selected, leave the solvent-based sealers to dry for *at least* 4-6 hours between coats. With the exception of DCI Lithium-based Sealer which has a drying time of 1-2 hours, *Water-based sealers should be given up to 24 hours to set-up between coats.* If you live in a humid climate or the weather conditions are damp and overcast, give the surface additional time to dry. Do not walk on wet sealer, as it will leave permanent impressions on your surface. Cover your feet with plastic bags to protect your floor's finish. Do not allow foot or vehicle traffic for up to 24 hours after sealing.

If applying an acrylic-based sealer outside, expect to reseal once every 2-3 years depending on sun exposure and weather conditions.

Notice: DO NOT apply masking or duct-tape to a stained and sealed surface. The tape will adhere to the sealer and damage the acid stain finish.

Basement applications require special consideration when selecting a sealer. Basement floors with water seepage, high humidity or hydrostatic pressure under the slab **REQUIRES** a breathable sealer, such as the Lithium Sealer/Hardener or DCI Water-based Sealer. Breathable sealers allow water vapor to pass through the pores of the concrete reducing the possibility of future sealer failure. Generally, a water-based sealer would be preferred to a solvent for all residential basement projects because of reduced ventilation and odor migration concerns.



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Waxing Indoor Surfaces

With the exception of Lithium Hardener/Sealer, all indoor floors must be waxed with either a [Commercial](#) or [Residential Wax](#) to protect the sealer from daily wear and tear. All DCI floor polish products are water-based and can be applied using a mop with a hand wringer or a Padco Floor Coater/Trim Pad. Two to three thin coats are recommended for the first application. Drying time is 3-4 hours per coat. The surface should be clear with no tacky areas before proceeding to the next coat. Pour the floor polish into a paint tray rather than directly on the floor. Apply in exactly the same manner as the water-based sealer. Allow for up to 24 hours of drying time before permitting foot traffic. Commercial wax can be buffed after the initial application using a standard commercial buffer. Commercial wax is recommended for businesses, high-traffic areas or homes with large inside dogs. DCI Concrete Wax and Floor Polish should be re-applied once or twice per year depending on traffic. Spot-waxing is recommended for high-traffic areas as needed. Apply [DCI Concrete Countertop Wax](#) with a soft cloth and buff with a buffer attachment or continue with the soft cloth until the surface shines. Repeat as needed. Wax is not required for outdoor countertops.



Cold Temperature Warning: Water-based sealers and all DCI floor waxes must be applied to surfaces at temperatures greater than 60°F with an air temperature difference of 5 degrees or less. Central heating, radiant or convection heaters, or similar heating devices should be turned off during application. In-floor heating should be set at 60-65 degrees before application and turned off during the process.

Thank you for choosing Direct Colors for your projects. We hope this how-to guide has helped and answers most of the questions you have about acid stain applications. Feel free to contact us with any additional questions by phone at 405-275-6657 or by email at info@directcolors.com. We'd love to have your project photos, too!