Colored Concrete Finishes

Paving and floors can be finished with pattern-stamped, broomed, troweled, exposed aggregate, salt-finished, sand-blasted, or many other visually appealing textures. Cast-in-place, precast and tilt-up structures can be textured with sand-blasting, bushhammering, grinding, polishing, special forms or form liners. The combinations and possibilities are endless. Here are just a few:

Broomed
Made by pulling special brooms across stiff, freshly floated or troweled surface. For variety, broom texture can be heavy or light, and in straight or wavy lines.

Stamped
A powder release agent or plastic sheet is placed on the colored concrete surface after floating. Special stamping tools are pressed into the concrete to create a pattern and then removed. Follow recommendations of stamping tool manufacturer.

Salt Finish
Rock salt is pressed into the surface after finishing. After 24 hours, the salt is washed away with water and a brush. Pay attention to remove all traces of salt. Allow surface and pockets to dry before applying curing compound.

Exposed Aggregate
Aggregate is exposed by “seeding” the fresh concrete with aggregate. Or aggregate can be exposed by removing the surface cement “paste” by using a high-pressure water wash, sand blasting, grinding, bushhammering, or spraying a surface set-retarding compound. Exposure level can vary from barely revealing fine aggregate (“brush”) or up to 1/3 the diameter of coarse aggregate (“heavy”). Aggregates can be colored or sparkling, fractured or smooth.

CONCRETE COLOR

This Guide explains the basics of producing high quality colored concrete and the how-to’s for maximizing surface appearance. The Guide shares “Tips of the Trade” that are specific to colored concrete, but does not provide a complete guide to concreting. Observe applicable building codes, project specifications, appropriate safety procedures and follow good industry practices for concrete construction.

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- Meet or exceed ASTM C979 Standard: Pigments for Integrally Colored Concrete
- Lightfast, alkali-proof, weather-resistant, and long-lasting.
- Available in 40 standard colors and a wide spectrum of custom colors.
- Mix-in colors save labor and time.
- Accepted by architects, builders and homeowners everywhere.
- Available from ready-mix suppliers in your community.
- Exclusive Mix-Ready® bags are the easiest and cleanest way to add color.
- Color cards, sample kits, and sales literature help you sell more jobs and earn more profits.

W-1000 Cleartm cure & seal and Color Seal®, which is tinted in a slab-matching color, are made specifically for curing and sealing colored concrete.

WWW.DAVISCOLORS.COM

A Contractor’s Guide to Davis Colors™

Available At:
How to order
Your favorite ready-mix suppliers are probably Davis dealers. If not, tell them to get with it! Concrete can be ordered with any of 40 standard colors already mixed in. For custom colors or specified colors, your Davis dealer can call upon Davis Colors to match almost any color your customer desires. Contact Davis Colors or visit www.daviscolors.com for the names of nearby suppliers.

Adding Davis Colors
Ready Mix concrete suppliers use the Chameleon™ bulk handling system or Mix-Ready™ disintegrating bags to add color to concrete. Mix-Ready™ bags are tossed into the mix without opening or pouring. While it’s easiest to order concrete with the color already mixed-in, sometimes it makes sense to add color yourself. Mix-Ready™ disintegrating bags make adding Davis Colors clean and easy to do. To prevent mix toss unopened Mix-Ready® bags directly into the concrete mixer. Mix-Ready® bags travel deep into the mix and disintegrate under mixing action, releasing pigments to disperse uniformly. You’ll stay cleaner and there won’t be a bunch of empty bags to clutter the job site.

Follow mixing instructions printed on the bag or request a Mix-Ready® Data Sheet from your Davis dealer. Davis Colors is added by the concrete supplier. Low water content (water-cement ratio) minimizes shrinkage and cracking, maximizes hardness and promotes a richer, darker concrete color.

Specification
Specify air content range of 5 to 7% for improved workability and durability. (In mild climates, this may be unnecessary. Check with your ready-mix supplier.)

Mixing
“Consistency is Key” with mixing, too. Trucks should be scheduled for consistent mix times from plant until discharge. Allow no more than 1-1/2 hours between batching and placing.

Specifying a 4 slump. Slump greater than 5” should definitely be avoided unless a water-reducing or superplasticizing admixture is added by the concrete supplier. Low water content (water-cement ratio) minimizes shrinkage and cracking, maximizes hardness and promotes a richer, darker concrete color.

Consistency in materials and craftsmanship is the key to color uniformity. Follow the tips described in this Guide, allow extra time for placement and finishing, and above all, finish evenly and with care for beautiful colored concrete.

Consistency - the key to success

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Don’t allow the addition of calcium chloride set accelerator. It causes discoloration.

Subgrade
Consistency applies to the subgrade which has to support the weight of the slab and loads placed on it.

Subgrade must be uniformly graded, compacted and dampened. Do not place concrete if subgrade has standing water, hard or icy areas.

Add a 2-3” layer of sand, gravel or crushed stone and compact with vibrating equipment.

Grading should be sloped so that water drains away from the slab.

If a vapor barrier is used, a layer of uniformly damp sand should be placed over the barrier to minimize risk of cracking. Overlap sheets and tape any holes in the barrier.

Forms and reinforcement
For slabs, formwork should be positioned to achieve uniform slab thickness. American Concrete Institute (ACI) standards for reinforcement and joint placement should be followed to control cracking.

There are additional considerations for vertical formwork or tilt-up. Consult a Davis dealer or request a Davis Colors Specifier’s Data Sheet for more information.

Placing
Prevent segregation of mix ingredients. Place concrete near its final location and move as few times as possible. Don’t move by vibrate or tamp (in flat or muddy areas). Water added at job-site to mixer or pumps will cause color to pale. Keep additions to a minimum and consistent among loads. Don’t use wet finishing tools, brooms or sprinkle water on the surface.

Curing
Curing is one of the most important and often the most neglected aspect of quality colored concrete construction. However curing or proper drying = uneven color. Poor curing contributes to shrinkage cracks, dusting and surface delamination.

• Apply curing compound as soon as the surface will not be damaged by the application. (Salt finish is an exception. See back page)

• If sawcutting is used for control joints, it should take place before application of curing materials. Thoroughly rinse all cutting residue off the surface to prevent stains.

• Apply a membrane-forming curing compound formulated for colored concrete. We recommend our W-1000 Clear™ or Color Seal™.

Curing with water sprinkling, membranes, paper, sodium or fluoro silicate-type hardeners and non-approved compounds can cause discoloration. If water is used to cure, a lighter color is likely: the water must be clean, free of salts, and logged using spray tips made for this purpose.

To ensure uniform color, consider the potential for color change due to variation in temperature and placing conditions. Davis Colors are added to mix at the ready-mix plant where color uniformity is controlled.

Mixing Process
Mixing rates are determined by the Davis dealer. If not, tell them to get with Davis. Mix-Ready® Data Sheet from your Davis dealer. Davis Colors are added to mix at the ready-mix plant where color uniformity is controlled.

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Follow mixing instructions printed on the bag or request a Mix-Ready® Data Sheet from your Davis dealer. Davis Colors is added by weight in proportion to the content of cement in each cubic yard. Mix rates are listed on the Davis Color Selector™.

Add the corresponding weight of Mix-Ready® bags and mix at charging speed for at least five minutes (10 minutes for pea-gravel mixes).

In mixes with small aggregate or batches with short mixing duration, Mix-Ready® bags may not completely disintegrate. In sand-blasted or exposed aggregate finishes, use small bag sizes (15 lbs. maximum) or open bag and pour color normally.

The Chameleon™ is a computer-controlled automatic color discharging system that improves color accuracy, and handling efficiency.

Avoiding problems with colored concrete

Discoloration: Despite best efforts, minor surface discoloration can still occur. As with all natural materials, variation is an accepted feature of concrete whether colored or not. Discuss this with your customer while designing the job to avoid misunderstandings later. Can the customer tolerate natural variations, or is a uniform as-if-painted appearance a requirement? Discuss this with your customer while designing the job to avoid misunderstandings later. Can the customer tolerate natural variations, or is a uniform as-if-painted appearance a requirement?

Efflorescence
Efflorescence is a salt deposit that forms on concrete. It causes unsightly white stains which can be particularly objectionable on colored concrete. Efflorescence forms when water migrates through concrete, dissolves soluble compounds (calcium hydroxide), and evaporates, leaving the solids on the surface. Water, concrete permeability and soluble content determine how much and when efflorescence will occur.

Control efflorescence by mixing with low water/cement ratio, using curing compound, and designing for less permeability. Seal concrete against water penetration and leaks. Keep de-caing salts away from concrete which is not fully cured. Efflorescence is easy to remove with water wash if treated early. If not, it converts to calcium carbonate which is removed with a dilute acid wash that will affect the surface appearance.

More information: For more information on good concrete construction practices, contact your ready-mix supplier, Davis Colors™, or the organizations listed below:

American Concrete Institute 248-848-3700
Concrete Construction Publications 630/543-0870
National Ready Mixed Concrete Association 301/587-1400
Portland Cement Association 847/996-6200
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To mix your own color:
1. Add the correct amount of water to the concrete. The amount of mix-in coloring will vary according to the Davis Color used.
2. Pour theDavis Color into the concrete mixer. Mix-Ready® bags are added after the concrete is added. The Davis Color will disperse itself throughout the concrete.
3. Mix the colored concrete for at least five minutes. Add additional Davis Color as required. The Davis Color should be added in small increments to avoid an overly dark color.
4. Use your own color addition method (toss unopened bags directly into the mix or pre-mixed bags)

Mixing
- **Consistency is Key!**
- Ensure your concrete is mixed at the proper consistency. Inaccurate consistency can lead to poor workability and durability issues. If your concrete is too wet, it can cause surface segregation and result in a poor finish. If your concrete is too dry, it can cause air voids and result in shrinkage cracks. To ensure proper consistency, follow these tips:
  - **Controlled slump:** Mix the concrete to a slump of 4-6 inches. A higher slump will result in a more workable concrete, while a lower slump will result in a more dense concrete.
  - **Proper water content:** Ensure the water content is correct for the specific application. A high water content will result in a more workable concrete, while a low water content will result in a more dense concrete.
  - **Proper cement content:** Ensure the cement content is correct for the specific application. A high cement content will result in a more workable concrete, while a low cement content will result in a more dense concrete.

Avoiding problems with colored concrete
**Discoloration:**
- **Dilution:** Ensure that the Davis Color is added in the correct amount. Adding too much Davis Color will result in a light color, while adding too little Davis Color will result in a dark color.
- **Temperature:** Ensure that the concrete is mixed at the correct temperature. Mixing concrete at too high or too low a temperature can result in a poor finish.

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