



Cleaning and Sealing CASTinTACT® Concrete Tactile Warning Panels

A Maintenance and Protection Guide

When properly installed, CASTinTACT® concrete tactile warning panels have low maintenance and provide an attractive finish. Under foot traffic, CASTinTACT® become exposed to dirt, stains and wear. This is common to all pavements. This technical bulletin addresses various steps to insure the beauty of CASTinTACT® and to help restore their original appearance. These steps include removing stains, cleaning and sealing.

Stains on specific areas should be removed first. A cleaner should then be used to remove any efflorescence and dirt from the entire panel. A newly cleaned concrete can be an opportune time to seal it. In order to achieve maximum results, use stain removers, cleaners, and sealers specifically for colored concrete panels. These may be purchased from Masons Supply or other reputable dealers.

► Removing Stains

Commercial stain removers available specifically for colored concrete provide a high degree of certainty in removing stains. Many kinds of stains can be removed while minimizing the risk of discoloring or damaging the panels. The container label often provides a list of stains that can be removed. If there are questions, Masons Supply should be contacted for help with determining the effectiveness of the chemical in removing specific stains.

Identify the stains prior to applying the cleaner. A test application should be evaluated in a small inconspicuous stained area for cleaning effectiveness. Some stains may require repeated applications of the remover to achieve effective cleaning. This is often the case for deep set oil stains. Make sure that the cleaners will not remove or damage the CASTinTACT® panel. With all stain removers, cleaners and sealers, the label directions and warnings should be read and carefully followed for all precautions, and for first aid.

Start removal of stains at the bottom of the panel and work up the slope in manageable sections. By working up the slope, cleaning fluids will drain down the pavement. This technique assists in uniform removal while allowing the used cleaner to be rinsed away consistently.

Take care in selecting and applying cleaning products, as acidic ones may harm vegetation and grass. These cleaners should not run onto vegetation. When using strong acidic stain removers or cleaners that might drain onto vegetation, spread some agricultural lime on the ground around the perimeter of the concrete. This will help neutralize the cleaner and reduce the potential for damage to grass and/or vegetation. After cleaning, remove the lime from the vegetated ground in these areas.

► Removal of Common Stains

There are proprietary cleaning products specifically designed for colored concrete panels. Many have been developed through extensive laboratory and field testing to ensure cleaning effectiveness.

Using manufactured cleaning chemicals for specific stains relieves the user from the uncertainty of attaining the proper mixture of chemicals. These chemicals should be used whenever possible. If no proprietary stain removal products are available, a comprehensive source of information on stain removal is a 28 page booklet entitled Removing Stains from Concrete by William H. Kuenning. It describes chemicals, detergents or poultice (scrubbing) materials recommended for removing particular stains, and the steps to be followed in removal. Make sure that the cleaners will not remove or damage the CASTinTACT® panel. This publication recognizes that some of the treatments involve hazardous chemicals and it advises specific precautions. **Masons Supply disclaims any and all responsibility for the application of the information. The user is advised to use cleaners specifically made to remove stains that commonly occur on colored concrete. They will likely be more effective.**

► Proprietary Stain Removers

- Asphalt and emulsified asphalt | MASCO CITRI-CLEAN
- Cutback asphalt and roofing tar | MASCO CITRI-CLEAN
- Blood, candy, ketchup, mustard, grease drippings from food | MASCO CITRI-CLEAN
- Caulking | MASCO CITRI-CLEAN
- Chewing gum | MASCO CITRI-CLEAN
- Clay soil | DEIDRICH 202V
- Creosote | MASCO CITRI-CLEAN
- Leaf, wood rot, or tobacco stains | DEIDRICH 202V
- Mortar | DEIDRICH 202V
- Smoke | DEIDRICH 202V
- Oil or grease that has penetrated | MASCO CITRI-CLEAN
- Dried paint | MASCO CITRI-CLEAN
- Tire skid marks | MASCO CITRI-CLEAN

► Overall Cleaning

Overall cleaning of the panel can start after stains are removed. In preparation for cleaning, low tree branches, shrubs and vegetation adjacent to the pavement should be tied back or covered to protect from overspray of cleaning solutions or sealers. The area should be inspected for any cracked or broken units. These should be replaced. Badly stained units can be replaced, but it is usually easier to clean stains and less costly than replacing the panels.

When panels have stains too difficult to remove, replace them with the same type of units. If panels must be replaced, there may be a difference in color from the surrounding panels. This variation should eventually disappear. If color variation is unacceptable, controlled use of proprietary cleaners designed to improve the color of concrete panels can minimize variation.

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Removal of accumulated dirt and efflorescence is the objective of cleaning. It is essential in preparing the panels for sealing as well. Many cleaners effective in removing dirt and efflorescence are a mix of detergent and acid. Cleaners with strong acids will change the color of the panels slightly.

The degree of change can be controlled by the type of acid in the cleaner, its concentration and the length of time on the panels. Proprietary cleaners will give specific instructions on their application. These directions should be followed. In order to achieve proper results, cleaners should be tried on a small area to test results and any color changes. The concentration and time on the panel can be adjusted accordingly. Protective clothing and goggles should always be worn when using acidic solutions.

Anticipate where the cleaning fluids will drain, i.e., across the pavement and not onto grass or vegetation. Sediment or cleaners allowed to pond in low spots may stain the panels. Be sure to rinse these areas thoroughly. Turn off all automatic sprinkler systems during cleaning, sealing and drying.

► Professional Cleaning Methods

For most jobs, cleaning should be handled by a professional company experienced in the use of cleaners and spray equipment. Professionals typically use a pressure washer. The various methods for applying sealers are covered later.

A high pressure sprayer applies cleaner and water between 600 and 2,000 psi (4.1 and 13.8 MPa), and at a rate between 6 and 12 gallons/minute (22 and 45 liters/minute). The rate of flow is adjusted to ensure sufficient rinsing. The pressure loosens dirt and pushes water from the surface without the need for scrub brushes. The nozzle type and its distance from the panels surface influences the effectiveness of the cleaning as well. A nozzle that creates a wide spray enables a large area to be covered efficiently.

Cleaners to remove efflorescence are applied with a low pressure pump spray under 30 psi (0.2 to 0.7 MPa). A shower type spray nozzle will help ensure even distribution of the cleaner. Cleaning chemicals are applied, allowed to sit an appropriate time, then rinsed away with a high pressure sprayer. The final rinse should be water only.

For small areas, an adequate cleaning job can be achieved without this equipment. Cleaners can be applied by hand, the panels scrubbed to remove dirt and efflorescence, then thoroughly rinsed with water from a garden hose. Scrub brushes with steel bristles are not recommended. They will loosen from the brush, rust, and leave stains. Brass or plastic bristles are acceptable.

The additional time required to clean and seal panels without the help of a professional should be weighed against investing in a competent company to do the job. Professionals have the equipment and experience with the various chemicals. They can achieve the highest level of results in the least amount of time.

► What Is Efflorescence?

Efflorescence is a white powdery deposit or milky film which can appear

on the surface of concrete as water evaporates. Efflorescence occurs with all concrete and is most noticeable with colored concrete. It is generally accepted that the addition of inorganic color pigments does not enhance or retard the occurrence. Efflorescence is caused when soluble salts and other water dispersible materials migrate upward to the surface of concrete. This is caused by the sun evaporating the moisture on the surface. This capillary wicking action continues to draw moisture from within until the moisture is exhausted. Efflorescence is enhanced by low temperatures and moist conditions; condensation, rain, and dew. If concrete placement happens during a dry period of the year, the next cycle of colder, wet weather may trigger the efflorescence to occur. Efflorescence will continue until all the salts have been exhausted. It may remain for months and some of it may wear away. In no way does it affect the structural integrity of the concrete.

Any concrete product containing portland cement can produce efflorescence. Calcium hydroxide (free lime) a by-product is produced in the hydration process of portland cement with water (approximately 140 pounds per cubic yard of concrete). During this reaction period, the excess water mixture, a calcium hydroxide solution migrates through capillaries in the concrete to the surface where it evaporates. There it combines with carbon dioxide from the air to produce calcium carbonate (insoluble salt). Only 0.2 ounce of calcium carbonate per square yard of surface area is needed to cause a significant change in color. In colder temperatures calcium hydroxide is actually more soluble to migrate to the surface. Efflorescence can also be caused by sulfates of either sodium or potassium that are more soluble in water than calcium and can easily be rinsed away. These type of salts can come from cement, aggregates, water, or admixtures.

► Removing Efflorescence Powdery Efflorescence

The recommended procedure is to allow the natural process to occur. Powdery efflorescence can often be removed with a stiff brush on a dry surface. Pressure washing or wet scrubbing can put the efflorescence in solution with water so it can be rinsed away. You must be careful to rinse the entire surface with fresh water so that no residue is left to dry on the concrete. Use an air jet or a wet vacuum to remove any standing water. Any remaining water can cause new efflorescence to appear. Cleaning on dry sunny days is best.

► Hard Efflorescence (Milky Film)

Best results are obtained by using a proprietary masonry and concrete cleaner with pressure washing equipment. The acid in proprietary cleaning chemicals are buffered and blended with other chemicals to provide effective cleaning without damage to the surface when used properly. Always refer to the manufacturers recommendations for proper dilution, application and protection of adjacent surfaces. Cleaners are generally applied in sections beginning at the lowest point of the surface. If the area is large, a sprayer is an efficient means to apply the cleaner. The chemicals are scrubbed on the surface, then pressure washed away. Results can be verified after letting the area dry for 24 hours. In most instances one application is sufficient. However, in severe instances of efflorescence, a second application may be necessary.

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Note: All acid based cleaners and acidic residues are dangerous to cars, plants and people. Wear proper safety gear and take adequate precautions. It is always recommended to do a small scale test section to determine dilution ratios and effectiveness before a full scale cleaning operation are performed.

► Natural Process

If no attempt is made to remove efflorescence it can naturally breakdown after a period of time. Soluble calcium hydrogen carbonate gradually formed from the insoluble calcium carbonate with the continued influence of carbon dioxide and water. Calcium hydrogen carbonate is very soluble and easily washed away with rainwater. Depending on weather conditions this process may however take up to two years to complete.

► Sealers

Uses: Application of a sealer follows stain removal, efflorescence removal and overall cleaning. Sealers are used for aesthetic and functional reasons. Sealers offer many functional advantages.

► Sealers for Concrete Pavers

If the panels are sealed, Masons Supply should be consulted prior to verify that the sealer is compatible and will perform in the environment planned for its use. Sealers not recommended for use with panels are acrylics, urethanes, epoxies, alkyds, esters, and polyvinyl acetates.

Some municipalities regulate building materials with high volatile organic contents (VOC's). The restrictions usually apply to solvent based sealers. The VOC level of a sealer refers to the pounds per gallon (or grams per liter) of solvent which evaporates from the sealer, excluding the water. VOC's have been regulated since they can contribute to smog. Most water based sealers comply with VOC restrictions and some solvent based products may comply as well. The user should check with the sealer supplier to verify VOC compliance in those areas which have restrictions.

Many solvent based products are combustible and emit hazardous fumes. Therefore, flame and sparks should be prevented in the area to be sealed. Persons applying sealers should wear adequate breathing and eye protection. Never use solvent based sealers in a poorly ventilated or confined area.

► Silanes/Siloxanes

Silanes and siloxanes are durable and penetrate concrete well. Silanes are the simpler form that, when exposed to moisture begin to link up to other silanes. Siloxanes do the same linking together. Both chemicals become a polymer, curing as a film in the capillaries of the concrete. A hydrophobic barrier to moisture is created, preventing moisture from entering but allowing the concrete to "breathe" or release water vapor.

Because silanes and siloxanes reduce moisture from entering the concrete, they can deter efflorescence from appearing on the surface of concrete panels. They initially enhance colors and produce a flat, no

gloss finish on the panel surface. This makes silanes and siloxanes very suitable on exterior areas for resisting efflorescence. Silanes and siloxanes do not resist penetration of petroleum stains unless they have additives specifically for that purpose. When required, proprietary mixtures with additives can increase petroleum stain resistance.

Silanes have smaller molecules, so they penetrate farther into the concrete than larger siloxane molecules. However, they are more volatile (tend to evaporate) until they bond to the concrete. Silane sealers generally require a higher percent of solids to counteract their rate of evaporation. Therefore, silanes tend to be more expensive than siloxanes. Silanes and siloxanes are typically used as water repellents for concrete bridge decks, parking garages, and masonry walls. Their primary use for reinforced concrete structures is to prevent the ingress of chloride ions from de-icing salts. This intrusion causes reinforcing steel corrosion in the concrete, and a weakened structure. Their ability to decrease intrusion of chloride materials makes them useful on panels subject to deicing salts or salt air, such as walks, streets, parking lots, plaza roof and parking decks.

► Sealing Procedures

All dirt, oil stains and efflorescence must be removed prior to sealing. The cleaned surface must be completely dry prior to applying most sealers. Allow at least 24 hours without moisture or surface dampness before application. The panels may draw efflorescence to the surface, or the sealer may whiten.

Cover and protect all surfaces and vegetation around the area to be sealed. For exterior (low-pressure) sprayed applications, the wind should be calm so that it does not cause an uneven application, or blow the sealer onto other surfaces. For many sealers, especially those with high VOC'S, wear protective clothing and mask recommended by the sealer manufacturer to protect the lungs and eyes.

Sealers can be applied with a hand roller if the area is small (under 1000 ft² or 93 m²). For larger areas, more efficient application methods are a low pressure sprayer.

► Hazardous Materials

The U.S. Federal Government and Canadian Government require that all shipments of hazardous materials by common carrier must be accompanied by a Material Safety Data Sheet (MSDS). All chemical manufacturers must supply sheets to shippers, distributors and dealers of cleaners and sealers if the materials are hazardous. The MSDS must accompany all shipments and be available to the purchaser on request. The MSDS lists the active ingredients, compatibility and incompatibility with other materials, safety precautions and an emergency telephone number if there is a problem in shipping, handling or use. The user should refer to the MSDS for this information.

► References

1. [Cleaning and Sealing Interlocking Concrete Pavement - A Maintenance and Protection Guide.](#)

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