

Product Information

Cement Preparation for Coatings

Cement products are widely used, where weight is not a factor, because of cost, strength, and inertness to the effects of weather. Many times the surfaces must be protected against acids, salts, and alkali. Further modification is sometimes desired to achieve anti-skid properties or purely decorative effects.

Concrete consists mainly of hydrated calcium oxide and silicates along with sand or gravel to form a rigid material. Hydration occurs during the "cure" of the cement. The passage of escaping water vapor is unobstructed until a barrier such as a coating is present. If there is no other route of escape, the water vapor will cause blisters and loss of adhesion as it collects at the interface of the cement and the coating. Another major cause of failure is the lack of appreciation for the alkaline nature of cement. Most oil-based coatings are attacked by this alkaline environment.

Proper surface preparation prior to coating is as important for concrete as it is for metal and wood. The following are examples of surface conditions, which will interfere with coating performance; (1) Laitance – partially hydrated cement at the surface, (2) Efflorescence- a white deposit of salt at the surface. (3) Glaze – a smooth glossy surface resulting from hard toweling or machine finishing. (4) Hardness- solutions of calcium/magnesium silicates and lead/zinc fluorosilicates used to make the surface less permeable and somewhat more chemically resistant. (5) Oils and/or grease – generally present on floors that have been in service for some time. (6) Form release agents – low cost coatings applied to forms for the purpose of achieving easy separation from the cured concrete. (7) Surface Holes & Voids – not usually present on toweled surfaces, but always present in poured concrete despite careful compacting. These holes must be filled prior to coating to assure coating continuity. Generally, holes larger (or Deeper) than 3/16" to 1/4" are filled. (8) Curing Compounds – waxes or resinous solutions applied to fresh concrete to retard the loss of moisture prior to cure.

Oil, grease, wax or curing compounds must be removed before further preparation can be done. In cases of severe contamination, a specialist should be consulted.

Acid etching is the preferred preparation for flat, horizontal surfaces to remove laitance, efflorescence and glaze. Muriatic acid is corrosive and has an initiating odor when used. Alternate etching compounds are zinc chloride/phosphoric acid and sulfuric acid; a reliable source of information regarding these mixtures should be

consulted before their use. Any time corrosive substances are handled, great care should be used. If acid etching is used all acid must be removed after etching has been concluded. If acid residue is not removed or neutralized coating failure is guaranteed.

Vertical or sloping surfaces are most easily prepared by abrasive brush blasting with or without water injection. Care must be taken not to remove an excessive amount of the surface. This procedure will open up holes or voids where air pockets occurred or where aggregate has been dislodged. When immersion service is planned, these voids should be filled with an epoxy or polyester grout.

"Green" or fresh mortar and concrete usually contains an excess of water that must be allowed to escape. Most coating manufacturers recommend a curing period of no less than 30 days after pouring and before application of a coating.

Testing to determine if the floor is dry or is subject to hydrostatic water pressure is very important! As previously mentioned, new concrete should be allowed to cure 30 days before application of any coating. Always conduct a test to determine if moisture is present in any concrete surface, no matter how long the concrete has aged and before application of coating. Conducting a test by placing a rubber mat, rubber back carpet or a taped down sheet of plastic approximately 2 feet square on the floor overnight or longer. After 8-24 hours if moisture is present, it will be evident. The substrate will be darker if damp. If moisture is found additional drying time is required. Repeat test in 10-14 days and if moisture persists, the concrete surface should not be coated. Presence of moisture is most common on basement floors and any application where concrete is poured directly over the soil.

To determine if concrete is porous enough to coat or if there are wax or curing agents presence, pour one ounce of water on the surface. If the water beads up on the concrete an etching treatment will be required. If the water soaks in to the concrete the surface is porous and may not need treatment if no other contaminants are present. The presence of laitance (fine particles) will also require abrasive blasting or sanding to assure removal.

Any coating or curing compound must be removed with strippers such as "Old Masters"™-4 or TM-3 removers, or mechanical abrasion with grit or sand. To test for the presence of a coating, wet the floor in several spots and apply several drops of muriatic acid to the wet areas. Any

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coating will keep the acid from reacting with the concrete, and little or no bubbling will occur. Any coating, grease, oil or other foreign material, must be completely removed for satisfactory results.

The bare, clean concrete floor should then be etched with a liberal application of a 5% to 10% acid solution. This solution should be scrubbed with a stiff broom, spreading the acid over the floor to evenly etch the surface. After the bubbling stops, flood the floor with clear water removing all the acid. Do not allow the acid to wash to dry. When the entire floor has been rinsed and all acid has been removed, rinse one more time to ensure no acid residue is left behind. Closely watch to ensure over etching does not occur, leaving a sandpaper like surface. If the surface. If the surface is still smooth and slick in areas incomplete etch has occurred, repeat the above process. Thorough rinsing is very important as during the etching process a salt can be left behind that will attract moisture and cause re-activation of the acid salts or retard drying of the coating causing failure.

Always wear proper eye protection, rubber gloves, and protective clothing as needed to prevent contact with acid.

Allow the floor to dry thoroughly, testing for dryness as described earlier. Repair any holes, cracks with epoxy patching compound. It is common for heavy dust to be present after the etching process. If dust is present, remove with a vacuum to insure maximum adhesion of the coating to be applied.

There are many concrete coating systems available ranging from Polyurethane oil, Acrylic latex or Epoxy type coatings. For the average customer Van Sickle's Floor Enamel selection will be more than sufficient. In some high traffic areas where certain chemicals may be handled or there is very heavy abuse, a specialty coating such as epoxy may be needed. See your dealer or specialist for a recommendation.