



Mottling appearance of the underlayment characterized by overwatering, improper mixing, or both



Polymer float condition also due to overwatering, improper mixing, or both, whereby polymer rises to the surface, displaying a soft, rubbery layer that is easily peeled away

The Lowdown on Installing Underlayments

By Wes Smith

Please read instructions carefully before beginning”—truer words were never spoken. When working with cementitious, self-leveling underlayments, the importance of adhering to surface preparation guidelines, employing proper water ratios, and following manufacturers’ mixing and application instructions cannot be overstated. Designed specifically for fast, efficient leveling of floors, self-leveling underlayments, when properly installed, provide a durable, flat, and smooth floor surface with minimum labor and installation time. This very fluid material seeks its own level and produces a smooth and flat surface ready for the finished floor to be installed. Self-leveling underlayments have been used successfully in a variety of project types, from restaurants, retail stores, and offices to residential homes and industrial buildings.

On the downside, however, when proper installation instructions are not followed, self-leveling underlayments can have installation problems that include a mottled appearance, polymer float, pinholing, and cracking. Prior to beginning the project, giving proper consideration to the aspects of substrate preparation, priming, and mixing and application can make the difference between installation success or project failure.

Substrate Preparation

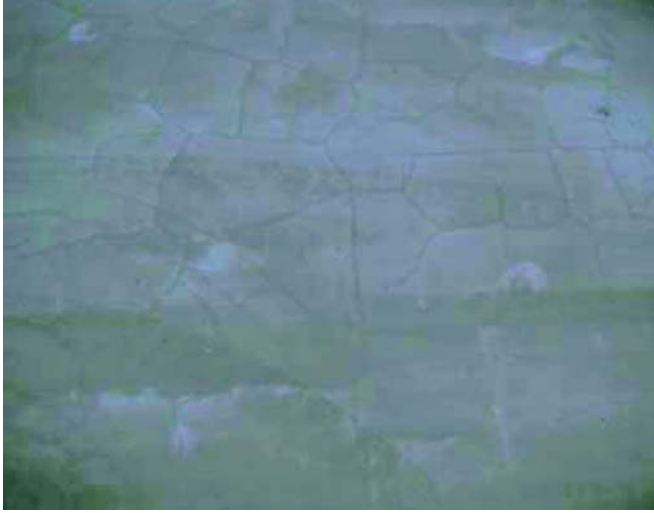
Proper substrate preparation is the starting point of any successful installation. Concrete floors must be structurally sound; stable; and clean and free from dust, oil, grease, paint, gypsum-based products, curing compounds, form-release agents, laitance, loose particles, and foreign substances

that could reduce or prevent adhesion of the underlayment. A concrete surface profile (CSP) of CSP 4 to CSP 6, as described in the International Concrete Repair Institute (ICRI) Guideline 03732, “Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays,” is recommended. At this time, it is recommended that a simple water-absorption test be performed to see whether water will be drawn into the created surface profile. New concrete pours should be a minimum of 28 days old, and the moisture of the slab should be checked to make sure it is within manufacturers’ guidelines.

Priming

Priming is another key element in the substrate preparation process. The role of the primer is to improve adhesion of the underlayment to the surface and fill air voids in the concrete, thus minimizing the formation of air bubbles and pinholes. Priming also retards the loss of moisture through the substrate, especially in the case of very dry, porous concrete. This helps reduce cracking and surface tension, thereby enabling better flow of the underlayment product.

Typical primers for cementitious underlayments will be latex and epoxy formulations. The selection of the primer is generally determined by the substrate involved and the manufacturer’s recommendations. Latex primers are typically used over prepared/profiled concrete. Epoxy primers are often used over low- to non-porous substrates, where bond is more difficult to achieve. ACI states that, “For epoxy adhesives, application rates



Cracking shown due to lack of or insufficient priming, over-watering, or both, of product



Pinholing as a result of not priming the substrate, mixing at a high speed, or both, which causes air entrapment to occur

should be between 25 and 100 ft²/gal. (0.61 and 2.45 m²/l) depending upon the surface profile. The maximum bond-line thickness for waterborne adhesives is limited by their viscosity.”¹

Mixing

Mixing of self-leveling underlayments, whether opting for batch mixing or pumping, requires careful attention to the manufacturer’s instructions. Water demands must be strictly observed and followed. **DO NOT OVERWATER!** Use of measuring pails to accurately portion water requirements is a must when batch mixing is to be employed. Mix the product using a low-speed mixer—typically, drill mixers are recommended—with a mixing paddle that will effectively mix and shear the particles, yielding a homogenous mixture that is free of lumps. Mixing at a high speed will potentially produce air entrapment, resulting in air bubbles and pinholes and a product of weaker strength and durability.

For pump applications, the consistency of the underlayment being delivered to the floor needs to be checked to ensure a uniform distribution of the aggregate at both the top surface and bottom. Segregation of the product is typically due to overwatering. Polymer float on the surface and brownish mottling are also indicative of excessive water, improper mixing, or both. Job site conditions during the installation, such as variations in water pressure, powder, substrate and ambient temperature, may require that the water setting on the pumps be adjusted during the placement.

Application

Application must proceed rather quickly, as self-leveling cementitious underlayments typically have a short working/flow time. Temperature, humidity, and other conditions at the job site can affect the working/flow time. Use of a gaging rake/spreader will assist in getting the product placed

quickly onto the floor, and at the proper depth. Immediately finish the surface with a smoother tool to achieve a consistent appearance. Spiked or athletic shoes with cleats are essential to avoid leaving marks in the liquid self-leveler. It is also important to observe the basic rules of concrete work. Do not install at temperatures below 50 °F (10 °C) or above 100 °F (37.8 °C) or mix with additives, unless approved by the manufacturer.

Once the self-leveler has reached the required cure, it is ready to accept the finished floor material. This would include such materials as ceramic tile, natural stone, glue-down engineered wood flooring, floating floors (hardwood and laminates), resilient floor coverings, as well as carpet and floor coating systems. Follow flooring manufacturers’ installation guidelines regarding acceptable vapor emission levels and/or moisture content for their flooring over cementitious underlayments prior to installing the finished flooring.

Self-leveling cementitious underlayments can be very useful products in the rehabilitation of floors, and have been used successfully over millions of square feet. The important thing to remember is that it is critical both to read the instructions carefully, and then adhere to them. If you follow this advice, you will end up with a smooth and leveled floor ready for installation of floor covering.

References

1. ACI Committee 503, “Guide for the Selection of Polymer Adhesives with Concrete (503.5R-92),” American Concrete Institute, Farmington Hills, Mich., 1992, p. 11.



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