

Becoming Sealer Savvy

Different concrete sealers come with their own pros and cons. Use these guidelines for sealer selection.

Concrete is a popular finish material for both the interior and exterior of structures, as it offers both aesthetic qualities and structural capabilities. The decorative concrete market in particular has exploded with growth. Planning for the long-term protection and maintenance of finished concrete surfaces should be a critical part of any project design and placement process.

Sealers are applied to concrete to act as a protective layer while safeguarding the concrete below. Despite its inherent strength and durability, concrete is a porous material with an absorptive surface, making it susceptible to the intrusion of water, chlorides, oils and other chemical substances that can cause damage ranging from surface stains and spalling to internal corrosion of reinforcing steel. By treating concrete with a sealer, the detrimental effect of these liquids can be prevented or at least reduced. Sealers are also used to enhance the appearance of concrete, highlighting colors and textures with finishes ranging from matte to high gloss.

This article will explain the different concrete sealer options, pros and cons of each, and provide guidelines for sealer selection.

Cure & seals

Film forming sealers block penetration of water and contaminants by



Common film forming sealers like cure & seals are applied in thin layers and typically last one to two years. Penetrating sealers can last as much as 10 years before reapplication is required.

forming a barrier on the concrete surface. Concrete curing and sealing compounds ("cure & seals") are a type of film forming sealer that can be applied to fresh concrete to help retain moisture or applied after the concrete has cured to protect the surface.

Usually the most inexpensive option, cure & seals are generally formulated with a blend of styrene and acrylic polymers and can be either water- or solvent-based. The primary purpose of a cure & seal is application on fresh concrete, as soon as final finishing has been completed, to form a membrane on the surface that prevents rapid evaporation of the water in the concrete. Additionally, a cure & seal gives moderate protection to the concrete surface from the damaging effects of weather, traffic, spills and stains. Because they are applied in very thin films — usually just two to three mils thick — the protection of a cure &

seal typically lasts one or two years in normal use conditions.

The use of a cure & seal to seal and protect concrete that has already cured can pose some performance issues, especially where the subgrade is consistently wet or on concrete slabs where a vapor barrier was not installed. When a styrene-acrylic formulated cure & seal is used on concrete that has already hydrated and hardened, the curing function is no longer needed. If the moisture level in hardened concrete is high, or if a slab on grade is placed without a vapor barrier, there is likely to be a strong driving force for internal moisture to move through the slab and evaporate out through its surface. When a cure & seal is present on the surface, it will work to prevent this evaporation. Under this evaporative pressure, the adhesion of the cure & seal to the concrete surface will fail, causing a multitude of

problems from whitening of the cure & seal (often called “blushing”) to flaking or peeling of the membrane.

This is not to say that concrete cure & seal products should never be used to seal previously cured or older concrete. Interior concrete, where the moisture level of the floor is normally low and consistent, and slabs on grade where the moisture vapor transmission (MVT) rate is low, are often protected by cure & seals. Where testing shows a high MVT rate, and on exterior concrete in often damp conditions, a “pure” acrylic sealer is a better choice.

Without styrene, an acrylic sealer has reduced moisture retention ability; it is a less efficient initial curing membrane but will perform very well as a protective sealer on concrete. Like cure & seals, acrylic sealers are relatively thin membranes that last just one or two years.

Epoxy and urethane film forming sealers

Epoxy and urethane sealers are used to protect concrete projects that require exceptional abrasion and chemical resistance, increased service life and high gloss. Because epoxy and urethane sealers are essentially impermeable to water vapor, new concrete should be at least one month old and have a low MVT rate when epoxies or urethanes are applied. Otherwise, moisture in the concrete will cause blistering and bond failure of the coating. Check with your sealer manufacturer for maximum MVT recommendations.

Most urethane sealers do not bond well to concrete and must be used in conjunction with an epoxy primer. It is good practice to always consult with the sealer manufacturer to ensure that all the components of the system specified will perform well together. Furthermore, because surface preparation, application method and coverage rates are all very critical when using epoxies and urethanes, the manufacturer’s recommendations should be followed precisely for best results.

Penetrating sealers

Penetrating sealers soak into the concrete surface to a depth of 1/8 inch to increase water repellency and stain

resistance on absorbent concrete while remaining breathable so water vapor within the slab can evaporate through the surface. Penetrating sealers provide protection without changing the surface appearance.

During application, penetrating sealers enter the voids and capillary pores at the surface of the concrete. These sealers are usually formulated with silane or siloxane polymers that react with alkaline materials in concrete to form hydrophobic compounds within the surface pore structure. Their primary function is to repel water, salts and chlorides while remaining breathable so water vapor within the slab can evaporate through the surface.

Because penetrating sealers soak in and do not leave a membrane on the surface, they do not provide any appearance benefits (no deepening of color or gloss enhancement) and are not as effective as film forming sealers in preventing chemical attack or staining of the concrete surface. However, no surface film means better durability; a penetrating sealer can last as much as 10 years before requiring re-application. Penetrating sealers are a good choice when no change in appearance is desired, or when the concrete will be frequently exposed to water or deicing salts.

Sustainability

The importance of using environmentally friendly building materials, coupled with tightening volatile organic compounds (VOCs) regulations nationwide, has made water-based sealers an increasingly popular option for protecting concrete.

Unlike their solvent-based counterparts, water-based sealers are sensitive to the environment during application and in service. At cool temperatures and/or in high humidity conditions, water will evaporate very slowly from a freshly applied water-based product, resulting in poor film formation. This problem will manifest in the form of a milky white appearance or a weakly bonded, powdery film. Water-based products are also susceptible to in-use performance problems in wet conditions.



Water-based sealers, unlike solvent-based sealers, are sensitive to moisture and humidity during application and while in service.

Low-VOC sealers based on “exempt” solvent technology are also available and often preferred for sealing exterior concrete in highly regulated areas of the United States and Canada. Exempt solvents, such as acetone and tertiary-butyl acetate, dry very quickly making application of sealers containing these solvents quite tricky, especially in warm temperatures. However, exempt solvent sealers are not sensitive to moisture and humidity like their water-based counterparts and can be used in cold weather conditions.

The use of concrete as a finished product will inevitably continue to increase in the future. Designers, owners and installers of concrete can truly optimize their return on concrete investments by selecting and applying the right protective sealer. **CC**

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