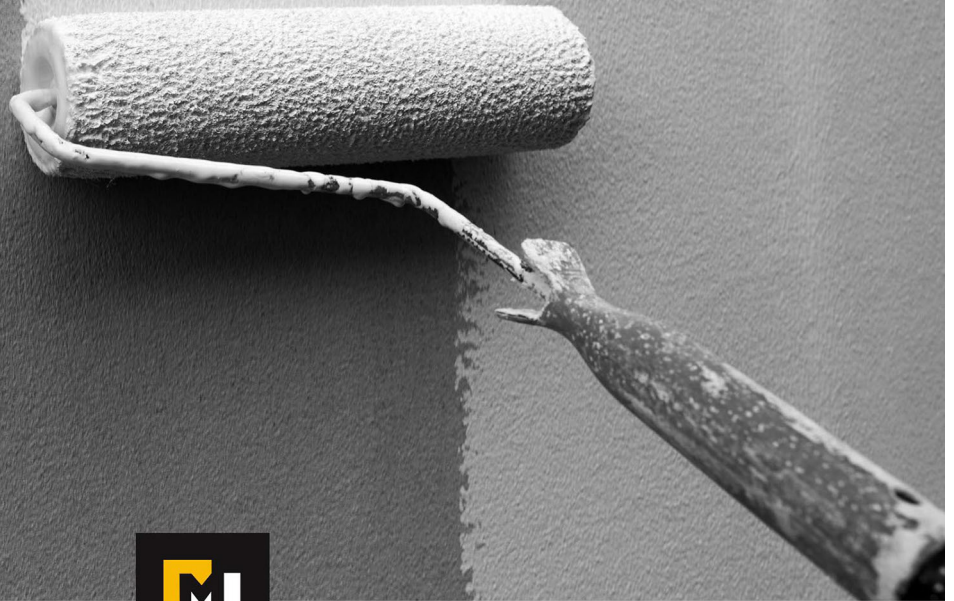


CONCRETE COATING



■ Reasons for Coating Concrete

There are several reasons for coating concrete and other cementitious surfaces. These include:

- Reducing water-permeability
- Lining tanks (primary containment)
- Secondary containment
- Controlling dust
- Protecting the substrate from chemicals
- Preventing and permitting easy cleanup of contamination
- Improving lighting by reflectivity
- Imparting identification or other information
- Providing a wearing surface
- Enhancing appearance

Many cementitious surfaces are attractive when unpainted and do not require finishing; they should not be painted unless it is necessary, because painting creates a continual maintenance problem. Other cementitious surfaces require a finish for aesthetic reasons only.

Sealing exterior or interior walls to prevent moisture entry may be necessary where severe environmental or service conditions exist. This is especially true in geographical areas where wind-driven rains are common. It is common to seal only the exterior walls in such areas to allow any moisture that enters from the exterior to pass to the interior of buildings through “breathing coatings.”



Concrete tanks are frequently lined to contain such products as water, fuels, and chemicals. The linings must be very resistant to the products to be contained.

Coating exterior concrete surfaces can reduce their deterioration by natural weathering and freeze/thaw cycling. It may also help control efflorescence and mildew growth.

Coating cementitious surfaces may help keep walls and floors clean in areas where sensitive equipment must be kept dust-free. FDA-approved coatings must be used in food processing areas. Even in common warehouses, coated floors are much easier to keep clean.

Reflective epoxy and polyurethane floor coatings have been effectively used to enhance interior lighting or reduce lighting costs. A good example of their use is on hangar floors, where the reflected lighting increases the visibility under aircraft wings. Aluminum oxide grit is often placed in a smooth coating to increase its slip-resistance.

■ Pre-Coating Materials Applied to Cementitious Surfaces

The following products are frequently applied to cured cementitious surfaces:

- Sealers and penetrants
- Block fillers
- Caulks
- Surfacing
- Coatings used by themselves or on any of the above products

■ Sealers and Penetrants

Sealers and penetrants are products (frequently colorless silicones) that soak into concrete surfaces to fill very small holes to provide dust control, promote adhesion, and reduce water penetration. They are easily applied by brush, roller, or spray and are relatively inexpensive.

The most commonly used sealers are:

- silicone-based products
- acrylics
- polyurethanes
- epoxies
- linseed oil

■ Fillers

Fillers are high-solids, water-borne products usually applied by roller to rough, relatively porous surfaces such as concrete cinder block. They are used to reduce the permeability of the block and provide a surface more suitable for coating.



■ Caulks

Caulks are used to (1) seal joints or other openings to keep out moisture, dust, heat, or other elements and (2) provide a surface for painting an attractive finish. Viscous liquid (pourable or self-leveling) caulks are applied to horizontal joints or openings and flow to form the contour of the desired surface. Mastic or high-viscosity, non-sag caulks retain their form whether applied to horizontal or vertical surfaces. Caulks must be elastomeric in moving joints but may be rigid elsewhere.

Although many generic types of caulks exist, those that cure to a hardened finish do so by one of the following mechanisms:

- Air-oxidation of drying oils
- Solvent or water evaporation
- Chemical reaction of components
- Moisture curing
- Hot melt

Selecting the best caulk for a particular job depends on:

- Special needs (odor, flammability, paintability, etc.)
- Joint design (horizontal/vertical, moving/fixed, damp/dry, etc.)
- Desired performance (impact-resistant, non-shrink, etc.)
- Compatibility with surfacing material.

Some examples of commonly used caulks are acrylics, silicones, polysulfides, butyl rubber, epoxy,

■ Surfacers

Surfacers are used to fill bug holes, tie-rod holes, cracks, and other voids. They are often high-solids, low-shrinkage thermosetting epoxies applied by trowel or squeegee.

■ Coatings for Cementitious Surfaces

The following different types of coatings have historically been used to coat various cementitious surfaces:

- Water emulsion coatings
- Textured coatings
- Elastomeric coatings
- Lacquers
- Heavy-duty, high-performance coatings
- High-build epoxies



■ Water Emulsion Coatings

Water emulsion coatings, normally acrylic or vinyls, are used extensively on interior and exterior concrete/masonry surfaces for cosmetic purposes. They are slightly porous to water vapor (“breathing”), and so allow the passage of limited amounts of entrapped water. These coatings are used extensively on stucco, plaster, drywall, and plasterboard surfaces.

■ Textured Coatings

Textured coatings are thick (e.g., 30 mils [750 μm] or more), rigid coatings used to seal walls from wind driven rain, cover minor surface defects, or provide a weather-resistant attractive finish. They can be used on interior or exterior walls and are available in fine, medium, and coarse finishes, depending on the type of inert filler material. The most common binder is an acrylic emulsion. A related type of thick textured coating uses hydration of cement as the film curing mechanism. It is normally applied by roller.

Textured coatings can provide fifteen or more years of service without cracking or peeling. When they become faded or discolored, or when a change of color is desired, they can easily be topcoated with conventional water emulsion coatings.

■ Elastomeric Coatings

Elastomeric coatings of acrylic emulsion or polyurethane composition are available to seal walls from wind-driven rain, cover surface defects (large cracks or other voids must first be caulked with a flexible product), or provide a weather-resistant, attractive finish. The more expensive, thickfilm, elastomeric polyurethanes are sometimes used to line tanks to utilize their good chemical resistance. These products may have elongations as much as 500 percent. They, like textured coatings, may require a special primer to bond them tightly to concrete/masonry surfaces. Because of their good overall properties, they have performed successfully on concrete roofs and in catchment basins in Bermuda used to collect rain water. They are usually applied by spray or roller.

■ Thermoplastic Lacquers

Lacquers (solutions of acrylic, vinyl, or chlorinated rubber binder in organic solvent) were once used extensively on concrete/masonry surfaces. They were normally applied in two or more coats to give two to eight mils of protection. In houses, they were often used in kitchen and bathroom areas to provide moisture resistance and scrubability. Lacquers are seldom used today because of their high VOC content. One common exception (in the US) is a variance usually given to coat exterior swimming pools with a chlorinated rubber coating. Epoxies perform well on interior concrete pools but chalk too much for exterior service.