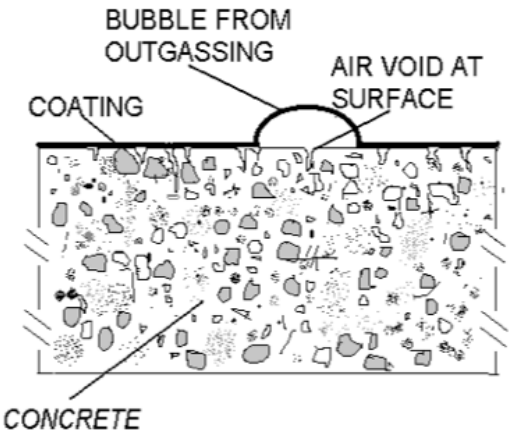
TECHNICAL BULLETIN CP-03

COATING DEFECTS CAUSED BY CONCRETE OUTGASSING

EUCLID CHEMICAL

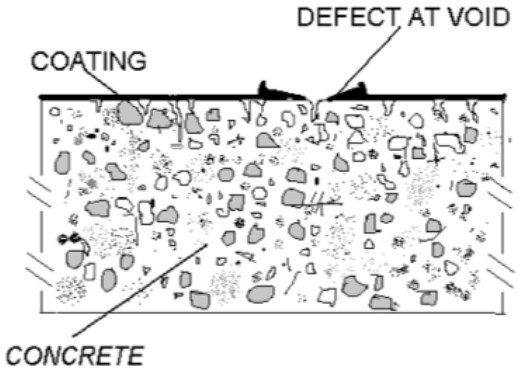
Concrete is an inherently porous material with many air voids contained within its matrix. Certain air voids are beneficial for concrete because they improve the freeze/thaw resistance; the entrained air allows room for expansion of internal freezing (and expanding) water, avoiding damage to the concrete. This is good for the durability of concrete, but this can cause problems when barrier coatings, such as epoxies and urethanes, are applied to the surface.

Air moves in and out of concrete with changes in temperature and barometric pressure. The phenomenon of air expanding and releasing itself through the concrete pores is called "outgassing". When barrier coatings or polymeric flooring systems are applied to a concrete surface that is outgassing, a blister can form in the coating at the pore location. This will result in a defect or void in the coating.



After the coating has cured, the defect will appear as a small bubble on the surface or a crater-like impression. This type of defect can also occur when a concrete surface is contaminated with a substance not compatible with the coating (ie. oil, soap, wax, dust) and is not properly cleaned before coating application.

A primary function of surface coatings or flooring systems is to provide a chemical barrier to the intrusion of chemicals into the concrete. Voids in the film will render the coating non-functional for this intended use.



There are methods to reduce the impact of concrete outgassing. The primary method is based on monitoring the surface temperature of the concrete substrate to which the coating is to be applied. An increasing surface temperature is a strong indication that outgassing will occur. Application of the coating in the afternoon or evening when the temperature is decreasing will likely reduce the possibility of outgassing. Also, the use of low viscosity primers, such as Dural Epoxy Primer or Duraprime WB, have been found effective in sealing the concrete surface prior to coating and will reduce the tendency for outgassing.

The repair of barrier coatings or polymeric flooring systems can be quite costly and time consuming. Often after repairing outgassing defects, the floor is functional but has reduced aesthetic appeal. As such it is imperative to monitor and be aware of the environmental conditions before, during and after the application of concrete coatings and flooring systems.