

AMINE BLUSH

Amine-cured epoxy formulations are widely used in ambient temperature cured coatings and flooring applications. These products are also used more and more in cold temperature applications. (See Successful Cold Temperature Application on the Technology Update page). If amine-cured epoxy resins polymerize during conditions of cool ambient temperatures or high humidity, i.e. condensation on the coating, they may develop an amine blush. The amine at the coating surface develops as an oily, waxy or milky film, sometimes amber to clear in color.

The amine component reacts with moisture and atmospheric carbon dioxide to form ammonium bicarbonate and/or ammonium carbamate. This may or may not be visible on the coating's surface but can interfere with adhesion if overcoated. Contractors and inspectors should be alert to this phenomena and test suspect surfaces.

These amine compounds are often hygroscopic and very efficient scavengers of carbon dioxide from the air, even though carbon dioxide is generally present at about 360ppm in outdoor environments. In indoor environments with human activity this may be increased 2-3 times. In the presence of gas burning motors (fork lifts, tow motors) and salamanders etc., the carbon dioxide would be even greater. These sources of heat may also produce copious quantities of water vapor resulting in exacerbated blushing problems.

If amine blush is detected it should be removed. Thorough washing of the surface with water and detergent (contact coating manufacturer) is recommended followed by retesting to ensure complete removal. If inside buildings, outer edges nearer walls are always suspect areas. If no overcoating is to be accomplished and no removal completed, the surface will be left very slippery. Horizontal surfaces for foot and/or forklift traffic may be hazardous. Shoes and tires will pick-up the amine and re-deposit it onto other surfaces.

Polyamide and polyamine curing agents can both produce amine blush. Polyamide curing agents have fewer tendencies to "blush" than polyamines but both are suspect to blushing.