

New Technology Review: Control of Water Vapor and Mold Using a New Type of Epoxy Coating

By Angus Reed, CJM



Introduction

One of the most misunderstood problems is the control of moisture within a jail. Damaging moisture originates not only from outside but also from the inside of the building as well.

Smoking, breathing, washing and drying clothes, gas stoves, furnaces, humidifiers, and air conditioning all produce moisture. Leaks from the plumbing, unvented bathrooms, dishwashers, sinks, toilets, and garbage disposal units also create moisture problems because they are not always found before water damage or mold growth occurs.

Solving moisture problems can be expensive and time-consuming. Eliminating such moisture problems is seldom as simple as coating the interior wall, but often requires consultation with an experienced contractor to identify the problem and develop a plan for correction. Coating the exterior foundation wall with waterproofing compounds and a membrane are often the only solutions. Excavating around the perimeter of the building to install or replace clogged footing drains may also be required.

Health Effects and Symptoms Associated with Mold Exposure

When moisture problems occur and mold growth results; building occupants may begin to report odors and a variety of health problems, such as

headaches, breathing difficulties, skin irritation, allergic reactions, and aggravation of asthma symptoms; all of these symptoms could potentially be associated with mold exposure.

Water Vapor

Understanding the role of water vapor control is essential in creating a healthy environment. Moisture can exist not only as liquid water but also water vapor. Water vapor exerts a great deal of pressure on anything that attempts to stop its movement through material. Because water vapor can move through any porous material such as masonry, stucco, or wood, it moves from an area of high concentration (outside) to an area of lower concentration (inside).

Vapor pressure can cause regular paint and even solvent based epoxy to peel off a wall. Neither product has enough adhesion to withstand the pressure of the water vapor. While solvent based epoxy paint has a very hard finish and is resistant to many chemicals, it will not adhere to masonry walls very well if any moisture is present. Not only do you have water vapor creating pressure against the epoxy paint, the difference in expansion between the wall material and the paint creates a sheering action, which loosens the paint from the wall.

New Technology

Having the reputation as a technology facilitator, jail sanitation and mold

expert, I frequently receive information about new products. In 2005, I became aware of a water based epoxy coating that claimed that it wouldn't peel off and wouldn't allow mold to grow. I thought, "Sure, Yea, I've heard that before".

I reviewed the technical information, MSDS, test results and photographs available from the manufacturer and found the product to have some interesting properties. These are:

1. Unlike normal epoxies that are solvent/oil based, the product is water based and the application equipment can be cleaned with soap and water.
2. The water base of the product allowed the resin/catalyst system to bind with the water in the masonry thereby becoming part of the masonry.
3. The product has an ingredient that appears to have bacteriostatic properties.
4. The product is flexible and will not crack if the wall moves.
5. The product does not attempt to block water vapor but allows approx. 10% of water vapor to pass through thereby greatly reducing the vapor pressure on the coating.

Field Test

Since an account executive for the product services the New England area and the manufacturer was willing to

demonstrate the product, I referred them to The Bristol County Sheriff's Office in New Bedford, MA. Sheriff Thomas M. Hodgson has the reputation for having a well-managed department and being an innovator in corrections technology. Working with Superintendent Peter Perroncello, Deputy Superintendent Said Thomas and Director of Facilities Ed Nicolau, the product was applied to several difficult environments such as a below grade store room, shower stalls in the N. Dartmouth Jail, a basement areas in the training facility, and a basement area of Civil Building in the old Ashe Street Jail complex. Inmate workers were used in the surface preparation and application of the product to help keep the cost down.

Evaluation

In February 2006, I visited the Bristol County Jail at the request of manufacturer to evaluate their product. At this time, it was approx. 2 months after their first applications. I inspected all the facilities and did not find any sign of mold or peeling on any of the surfaces coated.

I utilized "Hycheck" bacterial contact plates from Fisher Scientific to assess the microbiological contamination of surfaces for mold and bacteria. A "Hycheck" is a double-sided agar contact plate on a hinged paddle that bends for easy sampling. Samples were taken of both the coated surfaces and uncoated surfaces in the same environment. They showed substantial mold and bacteria on the uncoated surfaces and no growth on the coated surfaces.

The product is not a waterproofing product. Traditional waterproofing techniques must be used to control water infiltration before the product can be applied to interior walls. The effectiveness of the product depends on following the manufacturer's directions.

The field test at the Bristol County Jail showed that the product claims to control water vapor transmission, retard the growth of mold, and provide a coating resistant to peeling were valid. The unique properties of water based epoxies leads me to believe they will become an important part of the coatings market.

The field test has impressed the Bristol County Sheriff's Office sufficiently to contract for the application of the product to additional areas of the jails and other facilities. The test also showed that inmate workers when properly trained and supervised could easily apply the product.

For further information on the field test, contact the Bristol County Sheriff's Office at 508-995-6400 or Angus Reed at 770-732-1858.✪

Angus S. Reed is an expert in environmental health with 40 years experience. He is a consultant specializing in institutional sanitation, jail conditions, food safety, toxic mold and occupational health. Mr. Reed previously spent seven years as the Environmental Health Coordinator of the Fulton County Jail, Atlanta, GA. Prior to Fulton County, he spent twenty years with the Food and Drug Administration as an Investigator and Training Officer. He can be reached at angus.reed@comcast.net or 770-732-1858.


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