

# Lead Abatement or Encapsulation?

*Conventional paint will only temporarily seal lead into a surface.*

*By Rachel Hofmeister*

Lead-based paint has become the buzzword among property owners, cleaning contractors and facility managers responsible for the health and safety of a building's occupants or tenants. Lead is a serious health threat in all its various forms, but it is particularly dangerous in lead-based paint to children under the age of 6.

Lead-based paint chips have a sweet taste -- which comes from lead chromate -- that tastes similar to honey. This taste encourages children to continue eating them, ultimately causing lead poisoning. While lead chips constitute a serious health hazard, one of the primary causes of lead poisoning comes from lead dust.

Lead is a cumulative poison that, once ingested, travels through the bloodstream and attacks vital organs, causing a variety of health problems, including impaired motor functions, hyperactivity, retardation, convulsions, and learning and behavioral problems.

While the occurrence of lead poisoning in adults is not as frequent or severe as it is with children, lead-abatement workers and building occupants can be at great risk of being poisoned if renovations and de-leading are done without proper worker protection, waste disposal and cleanup.

When a lead-based painted surface is scraped or sanded, toxic lead dust is released into the air and can remain airborne indefinitely in a structure, endangering future occupants. Unless the proper respiratory protection is used, lead dust in the air will elevate the level of lead in a worker's bloodstream.

Until recently, the incidence of lead poisoning due to improper abatement was more likely due to the fact that the only means available for displacing lead-based paint was complete and total removal. Traditional lead abatement by removal is a costly method that requires occupants to vacate the facility, full containment measures to be installed (as required by OSHA), workers to wear complete bunker gear, and all waste to be considered hazardous and disposed of at a hazardous waste facility.

## **Billion-Dollar Cleanup**

According to the U.S. Environmental Protection Agency (EPA) extensive abatement procedures would have to be performed in 57 million residential units, at a cost of \$10,000 per unit to completely abate lead hazards nationwide. This \$570 billion estimate accounts only for residential structures and does not reflect the EPA's estimate of another \$500 billion for the cleanup of commercial facilities.

Within the past five years, encapsulation as an abatement technique has surfaced and been welcomed as a cost-effective alternative solution. U.S. Department of Housing and Urban Development (HUD) guidelines define encapsulation as "the process that makes lead-based paint inaccessible by providing a barrier between the lead-based paint and the environment."

Although a wide range of products are marketed as encapsulants -- everything from epoxies to cement -- most often, encapsulants are liquid coatings comprised of a combination of materials, including elastomeric polymers and thermoplastic resins (which gives them the characteristics of flexibility and high-impact resistance). Applied in a fashion similar to paint, encapsulation as an abatement method has none of the disadvantages that come from releasing lead into the environment through traditional abatement procedures.

The majority of encapsulants are water-based, non-toxic formulations that can be cleaned up with soap and warm water. In most circumstances, building users can return to the premises shortly after the encapsulant has been applied.

Encapsulation is a solution limited to applications where the paint is intact (or mostly intact). It is not a panacea for the abatement of lead-based paint, but an alternative -- where applicable -- to the expense and danger of scraping or sanding.

### **`Paint' It On**

Encapsulants can be applied with a brush, roller or airless sprayer, and don't require specialized training or painting experience. However, direct your crew to follow the manufacturer's recommendations regarding surface preparation, film thickness and environmental conditions. While the methods of application and final appearance resemble paint to the untrained eye, encapsulants are designed with performance capabilities necessary to encapsulate lead, capabilities that average paint doesn't have.

For example, most water-based encapsulants should be applied when the temperature is above 50 degrees Fahrenheit; humidity levels should be approximately 85 percent. These recommendations are similar to the application of latex paint.

However, while paint is applied in a thin layer and dries to a thickness of approximately 1 dry mil (1 millionth of an inch), encapsulants are formulated to dry to a thickness of 7 to 20 dry mils to prevent lead from leaching through the coating and gathering on the surface as dust.

Although hotly debated in the scientific community, the tendency for lead to migrate has been demonstrated in laboratory testing and is one of the main reasons that coatings specifically formulated as encapsulants were designed.

## **Testing the Surface**

The surface to be encapsulated must be prepared by washing it with a tri-sodium phosphate (TSP) solution, a liquid cleaner designed to remove surface debris, including dust, grease, oil, mildew, calcimine, wax and soap. For areas deemed inappropriate for encapsulation (friction surfaces such as window sashes, door jambs and floors) or surfaces that are chipping, peeling or otherwise deteriorated, a state-licensed de-leader must perform the necessary lead abatement.

Encapsulation is permitted in every U.S. state. However, because there are no federal regulations governing lead-abatement procedures, individual states have had to adopt their own lead policies concerning lead-abatement and encapsulation.

Massachusetts was the first state to develop its own lead-abatement policies and has the most comprehensive lead legislation in place, including a register of certified encapsulant products.

## **Lead Legislation**

Massachusetts established requirements for lead-based paint encapsulants in November 1994. The state invited encapsulant manufacturers to submit their products to an independent laboratory for testing according to state-established criteria.

Their products were required to meet standards in 13 categories, including the ability to withstand a direct blow of 80 pounds per square inch (psi), absorb 1,000 scrubs with a heavy scouring pad under wet and dry conditions with only an 80 percent loss in film thickness, and stretch as much as 30 percent without breaking. Massachusetts tested nearly 20 products and found several that met the state's performance requirements.

In Massachusetts, if a home is found to have lead, a licensed lead inspector will include with the inspection (at the owner's request) a surface assessment, which is performed to determine if the existing paint is suitable for encapsulation.

The inspector uses a number of tests, including a visual assessment, the application of pressure-sensitive tape to gauge adhesion of the existing paint, and application of a patch test of sample encapsulant to verify whether the surface condition is compatible with encapsulation. If encapsulation can be used, the homeowner or their agent must review the state's lead-training educational materials (which includes a free encapsulant video) and complete a one-page, take-home test.

Other states, such as Connecticut, New Hampshire, Ohio, New Jersey, Minnesota and Pennsylvania, have begun to develop their own policies, and are expected to incorporate elements of the Massachusetts protocol for liquid encapsulants into their lead legislation.

Many states insist on the use of only licensed professionals to perform encapsulation, but the nature of this technology suggests that eventually it will become a way for individuals and companies who do not specialize in traditional lead abatement to make a property lead-safe.

### **ASTM Standards**

In addition to new lead policies in the individual states, there has been some recent progress at the national level as well. The American Society for Testing and Materials (ASTM) -- the organization charged by HUD and EPA to develop minimum standards for encapsulants -- published in August 1995 the Provisional Standard Specification for Liquid Coating Encapsulation Products for Leaded Paint in Buildings. After three years of evaluation, ASTM has provided a list of qualifications that HUD and EPA can use to approve liquid encapsulants.

Although it is expected that the ASTM standard will form the basis for encapsulation guidelines included in eventual national lead legislation, what is important now is that a standard exists that defines what criteria a product must meet to be considered a true liquid encapsulant.

This is significant because some manufacturers have recently attempted to promote commercial paint for use as an encapsulant. Conventional paint is not an encapsulant and

Currently, there is no paint being manufactured that could meet the specification criteria established by ASTM for liquid encapsulants.

Conventional paint is, at best, a temporary measure to reduce the hazards of lead. HUD, in its Guidelines for the Evaluation and Control of Lead-Based Paint in Housing, released in late 1995, defined paint as an "interim control." Unlike abatement, which is considered a permanent solution to lead hazards, interim controls are only intended as temporary measures to control exposure to lead.

### **Interim Controls**

Interim controls include cleaning, repairing and repainting (with conventional paint) lead-paint surfaces. These methods must be monitored, evaluated and maintained on a regular basis by the property owner and a certified inspector.

ASTM evaluated products on 25 performance requirements and laboratory test procedures. Some of these included: adhesion, the ability of an encapsulant to bond to the substrate; dry abrasion resistance, the ability of a product to lose no less than 20 percent of film thickness after 1,000 scrub cycles; water vapor transmission, the capability of a product to not have water buildup underneath it; flexibility; paintability; and impact and

mildew resistance. A copy of ASTM's standards (which includes a listing of testing methods and procedures) can be ordered from ASTM by calling (215) 299-5400.

Lead found in paint presents a serious health risk. Because abatement by removal has many disadvantages, encapsulation is a solution that may work for you. Encapsulation is a practical alternative -- when the surface is in good condition -- that can save time, money, labor and disposal costs.

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