



Lead Resource Guide

for Owners of Older and Historic Buildings



This guide is not intended to meet specific federal, state, or local regulations, nor does it guarantee the elimination of any or all lead hazards. Rather, it provides guidelines for reducing lead hazards when paint is disturbed during repainting or rehabilitation/renovation activities.

The Lead Resource Guide was funded in part by the State Historic Preservation Office and the Michigan State Housing Development Authority with additional support provided by the National Trust for Historic Preservation. The views and opinions expressed in this publication do not necessarily reflect the official policy or position of the State Historic Preservation Office, the Michigan State Housing Development Authority, or the U.S. Department of the Interior.

This resource guide was developed by staff of the Michigan Historic Preservation Network; written by Rebecca Frey, PhD; and reviewed by two technical advisors: Steve Smith, MPA, Michigan Department of Community Health, Healthy Homes Section; and Jonathan Wilson, MPP, Deputy Director of the National Center for Healthy Housing.

TABLE OF CONTENTS

Goals of This Guide	4
Lead and Human Health	5
Where Does Lead Come From?	7
Lead Safety and Older Buildings	9
Making My Building Lead-Safe	10
Making My Building Lead-Safe: How to Work	12
Further Information about the EPA's Renovation, Repair, and Painting Rule	15
Interior Flat Plaster	16
Interior Wood Surfaces	17
Windows, Doors, and Floors	18
Wood Siding and Porches	20
Keeping My Building Lead-Safe	21
Frequently Asked Questions	22
Glossary	26
Additional Resources	28

Cover photo courtesy
of Ellen Thackery.



NATIONAL TRUST FOR HISTORIC PRESERVATION

Goals of This Guide

The goals of this guide are to:

- help building owners make decisions about how to preserve key historic features of their buildings while maintaining a lead-safe environment,
- inform owners of older and historic buildings about the potential hazards of lead-based paint,
- and introduce building owners to the legal requirements that contractors must meet when working on their homes.

Property owners doing the work themselves should learn and employ lead-safe work practices. Please consult the Additional Resources section at the end of this guide for more information.



Paint in good condition does not require removal, but the peeling paint on this siding will need to be removed before repainting. Safe methods include wet scraping, wet sanding, or stripping with low heat or chemicals. Disposable tarps to collect the loose, wet paint will also be necessary. Photo source: istockphoto.com

Lead and Human Health

Although people have known since ancient times that high levels of lead exposure can be fatal, scientists did not begin to understand until the 1960s that even lower levels of lead exposure could be damaging. Doctors measure lead exposure by testing the amount of lead in blood. Federal agencies protecting children's and workers' health have established blood lead levels of concern to guide government action, but there is growing consensus that no amount of lead in the blood can be considered safe.

Lead has no known positive function in human bodies. It has toxic effects on the brain, the digestive tract and kidneys, the muscles, the reproductive organs, and the nerves supplying the muscles. Lead, usually in the form of dust, enters the body in two major ways: ingestion (swallowing) and inhalation (breathing). It is then deposited in the blood, soft tissues, bones, and teeth. Lead migrates from the blood in a few weeks and from the soft tissues and organs in a few months, but will be absorbed and remain in the bones for 30 years or longer.

Symptoms of lead poisoning can develop gradually over a long period of time (chronic exposure), or they can develop fairly rapidly (acute exposure). Acute exposure is often related to remodeling work done without proper lead-safe work practices. In many cases, lead poisoning symptoms may be mistaken for the symptoms of other illnesses, such as influenza.

Young children are much more sensitive than adults to the harmful effects of lead exposure because their brains and bodies are still developing. Common effects of lead poisoning in children include (but are not limited to):

- moodiness, impulsiveness, and other behavior problems
- lowered IQ, developmental delays, and learning disorders
- muscle weakness and loss of coordination
- loss of appetite and weight loss
- nausea, vomiting, constipation, and abdominal cramping in severe cases

**CDC GUIDELINES
FOR CHILDREN WITH
BLOOD LEAD LEVELS
(BLL) ≥ 5 µG/DL**

Effects of lead exposure in adults may include:

- pain, numbness, or tingling sensations in the arms and legs
- difficulty conceiving (women) or abnormal sperm (men)
- headaches and memory problems
- digestive disorders
- depression, anxiety, and personality changes
- insomnia
- hallucinations
- muscle pains and weakness
- high blood pressure
- cataracts in the eyes

The only reliable way to determine exposure to lead is a blood test. Under current Centers for Disease Control (CDC) guidelines, blood lead levels are of concern when they exceed 5 micrograms per deciliter (µg/dL) in children younger than six and exceed 25 µg/dL in adults.

BLL (micrograms per deciliter)	TREATMENT
10* – 14	Instruction of parents and repeat screening
15 – 19	All the above, plus evaluation to remove source of lead
20 – 44	All of the above, plus medical evaluation of child and case management, including neurodevelopmental monitoring
45 – 69	All the above, plus treatment to remove lead from body
Above 69	Immediate hospitalization and therapy, case management

Source: CDC. *Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Council on Childhood Lead Poisoning Prevention*. Chapter 3. March, 2002.

*Any new treatments for BLLs between 5 and 10 µg/dL had not been determined by May, 2012. As of that date, the CDC is re-emphasizing a focus from treatments toward prevention of lead exposure.

Where Does Lead Come From?

Lead is one of the so-called heavy metals, widespread in the earth's crust, easy to extract from its various ores, and easy to work with because of its softness and low melting point (about 622°F). Lead is also corrosion-resistant, which made it popular in ancient times to make food and wine containers as well as building materials.

Greek and Roman physicians were the first to draw connections between lead exposure and illness. The symptoms of lead poisoning were not well understood, however, until the nineteenth century, when workplace exposure to lead increased dramatically as a result of the Industrial Revolution. Household exposure rose in the twentieth century as a result of the addition of lead to gasoline as well as its use in house paints to stabilize pigments, hide previous coats of paint, and speed the drying process. The first reported case of lead poisoning in children from deteriorating lead-based house paint occurred in Australia in 1897. In 1909, France, Belgium, and Austria banned the use of lead-based interior house paint. The earliest laws phasing out lead-based paint were not passed in the United States until 1971, and the products were not banned completely until 1978.

People in the twenty-first century are exposed to much higher levels of lead than those who lived prior to 1800, in part because of the recent use of lead to manufacture a wide range of products, from shotgun pellets, X-ray shields, and car batteries to ceramic glazes, inexpensive jewelry, and the PVC plastic used to insulate electrical cords. In houses and other buildings, lead has been used to make water pipes, roofing material, cladding, flashing, gutters, and gutter joints as well as lead-based paints.

Lead is most likely to enter the body in the form of lead dust, which can pass into the lungs from breathing dust-contaminated air; or into the digestive tract from carrying the fingers to the mouth after touching a dusty surface. The lead dust itself is usually formed from deteriorating lead-based paint—particularly paint applied to such high-friction surfaces as doors, window frames, and floors—but it may also result from renovation



Inexpensive metal children's jewelry and accessories often contain high levels of lead. Visit the U.S. Consumer Product Safety Commission website for information about lead-related product recalls (www.cpsc.gov). Photo source: istockphoto.com

activities or be tracked into the building from lead-contaminated soil. Children can also ingest lead by chewing on window sills or other surfaces with chipped or flaking lead-based paint even though there may be no visible dust.

Other sources of lead that may be found inside buildings include:

- toys and furniture that were painted before 1976
- plumbing, pipes, and faucets
- storage batteries
- imported children's toys, including paint sets and art supplies
- lead bullets, fishing sinkers, and curtain weights
- lead crystal or pewter pitchers, goblets, and dinnerware
- lead-based costume jewelry
- hobbies that involve soldering, glazing pottery, making jewelry, or making items out of stained glass

The likelihood that your house or other building contains lead-based paint depends on its age and geographic location. Buildings in the Northeast and Upper Midwest are more likely to contain lead-based paint than those in the Southwest or Southeast. The box below illustrates the percentage of houses built within specific time periods that were treated with lead-based paint.

PERCENTAGE OF HOMES IN THE UNITED STATES LIKELY TO CONTAIN LEAD¹

YEAR OF ORIGINAL CONSTRUCTION	PERCENTAGE OF HOMES LIKELY TO CONTAIN LEAD
Pre – 1940	87%
1940 – 1960	69%
1960 – 1978	24%

¹ Source: Environmental Protection Agency

Outside a building, the most common source of lead is soil contaminated by exposure to automobile exhaust, underground lead pipes, or industrial waste.

Lead Safety and Older Buildings

Several criteria are used to determine whether a building is historic. In general, a historic building is 50 years old or older, retains many of its original materials, and stands in its original location. Historic buildings can be lead-safe even though they are more likely to contain lead-based paint than buildings constructed after 1978, when leaded paint was banned. To make historic buildings lead-safe, the Department of Housing and Urban Development (HUD) has determined that such normal maintenance activities as repainting can eliminate lead-based paint hazards as long as the maintenance is continued and lead-safe work practices are employed. HUD uses the term *interim controls* to define any activity intended to temporarily reduce human exposure or likely exposure to lead-based paint hazards. The 2000 report, *Eliminating Childhood Lead Poisoning: A Federal Strategy Targeting Lead Paint Hazards*, states, "Both interim controls and abatement have been shown to produce lead-safe dwellings."

The current definition of lead-based paint is paint or other surface coating that contains lead equal to or exceeding 1.0 milligram (mg) per square centimeter (cm²); 0.5 percent by weight; or 5,000 parts per million by weight. **Lead-based paint presents a hazard only if the painted surface is in poor condition (such as peeling or flaking) or creates lead-containing dust through friction and/or repeated impact on painted surfaces.** Painted surfaces subject to friction during normal use, such as doors, windows, and painted floors or stair treads, may need special evaluation and treatment. As noted previously, the primary health hazard from lead-based paint is dust. Airborne lead dust is often created by such renovation activities as dry sanding; it may lead to significantly elevated blood lead levels (BLL). Using lead-safe work practices reduces exposure to lead dust.



The siding on this home in Kalamazoo is being stripped. The disposable plastic sheeting catches the wet deteriorated paint. Photo courtesy of Sharon Ferraro.

To make a building lead-safe, owners should begin by evaluating the structure for paint deterioration and dust accumulation. Such moisture problems as leaks around roofs or windows are common causes of paint failure. All areas where moisture is a problem should be corrected immediately. In addition, the building's ventilation should always be checked, as poor ventilation can also lead to moisture buildup and paint failure on interior surfaces.

The most common sources of moisture coming from outside the building include:

- roof leaks
- poorly installed or defective flashings, gutters, or downspouts
- rain water collecting in window troughs—the channel or well where the lower window sash rests when it is completely closed
- water collecting around the foundation
- water seeping into crawl spaces

The most common sources of moisture coming from the inside include:

- unvented dryers and/or unvented steam from showers and kitchens
- poorly ventilated attics
- plumbing leaks
- failed seals around showers, tubs, and toilets
- condensation within walls
- damp and poorly ventilated basements

Making My Building Lead-Safe

After an initial evaluation of your building for structural and moisture-related problems, the next step is an evaluation for lead hazards. HUD defines five forms of evaluation:

- **Presumption:** Presumption assumes that the building contains lead-based paint. The older the house, the more likely that the presumption of lead-based paint will be accurate (*see chart on page 8*). For example, houses built before 1940 have an 87% likelihood of containing lead-based paint. Presumption does not require formal training.
- **Visual assessment:** A visual assessment is a search for cracking, scaling, peeling, or chipped paint. It does not require special equipment.
- **Risk assessment:** A risk assessment is a comprehensive examination of a building for lead-based paint hazards that includes paint testing, dust and soil sampling, and a visual evaluation. It is followed by a written report and must be conducted by a State of Michigan-certified inspector or risk assessor.
- **Lead hazard screening:** A lead hazard screening is similar to a risk assessment but the sampling is less extensive. Some states—including Michigan—do not permit this form of assessment. Where it is permitted, it should be performed only by a state-certified assessor.
- **Paint testing:** Paint testing involves the use of laboratory testing of paint chips or an X-ray fluorescence (XRF) analyzer to test painted surfaces. The XRF analyzer is a device that emits X-rays into painted surfaces to determine the presence of lead in the paint. It must be used by a trained inspector. Paint chip testing is performed if an XRF device is not available or the XRF device cannot reach the surface needing testing. Lead check swabs are sometimes used by owners or renovators to determine the presence of lead. These swabs are less reliable, however, and should be used only in strict accordance with the manufacturer's instructions.

Lead was added to paint in part to increase durability, and lead-based paint was used in the past where weather or conditions would cause excessive wear on the paint. The probability that an older building's painted features have high lead levels runs from



Wet scraping of some deteriorating varnish. Some varnish on old wood windows contains lead, so lead-safe practices should be used when working on these surfaces. Photo courtesy of Sharon Ferraro.

higher to lower in the following order:

- exterior trim
- such porch features as railings, floors, and ceilings
- exterior wood siding
- trim in bathrooms and kitchens
- trim in bedrooms and other rooms
- bathroom and kitchen walls
- other interior walls and ceilings. In historic buildings, these may be decorated with special finishes, stenciling, murals, and similar painted ornamentation.

Making My Building Lead-Safe: How to Work

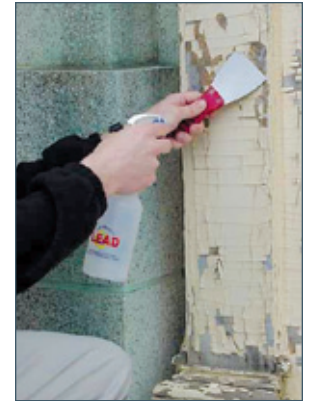
In the past decade, the federal government has come to recognize that historic buildings often contain examples of durable or expensive materials and superior workmanship that do not need to be removed or altered in order to make the building lead-safe. Many historic buildings can be made lead-safe without permanently altering their historic character.

The U.S. Department of the Interior has published guidelines for making historic buildings lead-safe:

- First, identify the building's historically significant features and finishes: These may include design by a major architect; high standards of craftsmanship in trim and decoration; unusual or distinctive features, and so on. Owners of a historic building should consider consulting the State Historic Preservation Office (SHPO) in their state for help in evaluating their building.
- Next, perform a risk assessment: While a building built before 1978 is likely to contain some lead-based paint, the paint is not necessarily a health hazard. A risk assessment performed by a state-certified assessor is needed to identify the location and condition of lead-based paint and lead-based paint hazards in the property as well as lead hazards

related to dust and soil.

- Last, use the least harmful methods of lead hazard control when a hazard is identified: The gentlest methods possible should be used to remove deteriorated paint. Historically significant features should be repaired whenever possible. Such features should be removed and replaced only when absolutely necessary; ideally, the treatment should be reversible. When a feature must be removed, it should be replaced by one that matches the original in finish, design, color, detail, and, if possible, material. In general, it is best to use interim controls—such short-term measures as lead dust removal, paint stabilization, repainting, washing and cleanup of painted surfaces, and covering of lead-contaminated soil—in making a historic building lead-safe. Paint stabilization involves repairing defects in surfaces just below the paint that cause paint to deteriorate, removing loose paint and other material from surfaces to be treated, and applying a new protective paint or other coating. Interim controls are less invasive than abatement measures, which involve permanent removal of deteriorating paint and other lead hazards. Interim controls, however, require ongoing monitoring and careful maintenance of the historic property.



Wet scraping—wetting loose paint before scraping it onto a tarp or into a bag for disposal—is a lead-safe way to prepare a surface for repainting. Photo courtesy of Monroe County Department of Public Health, New York.

REMEMBER

If a surface coating (paint, stain, or varnish) containing lead is in good condition—no peeling, cracking, blistering, etc.—and it is not likely to be damaged, it can be left in place.

If desired, a coating in good condition can be recoated with a new lead-free finish.

Use such lead-safe work practices as wet misting when any surface preparation, like sanding, is needed prior to application of the new finish coat.



Top: Plastic sheeting in this doorway keeps dust in the work area while allowing workers access. Photo courtesy of Sharon Ferraro.

Below: Dry sanding or working with electric sanders is never recommended with lead-based paint. However, if the sander has a HEPA shroud or attaches directly to a HEPA vacuum, then the dust is contained and those devices can then be used. Photo courtesy of CDC/Aaron L. Sussell.

There are three basic principles to renovating, repairing, or repainting an older building in a lead-safe way:

- **Keep dust and other debris contained inside the work area.** Containment refers to all measures used to prevent dust and debris produced by renovation from leaving the contained area. Containment measures include applying protective plastic sheeting to doors and windows during the work; covering floors, heating vents, and any furniture that cannot be moved; having workers use a separate entrance/exit to the work area; keeping doors and windows closed to prevent dust from spreading; and wearing protective shoe covers that are removed before leaving the work area. Contractors are required by law to use lead-safe work practices in houses constructed before 1978 unless tests prove that the paint they are disturbing is not leaded, or that they are disturbing only very small areas.
- **Use work methods that minimize dust.** To reduce the amount of dust produced by renovation or repair, workers should not use power tools that do not have High-Efficiency Particulate Air (HEPA) collection filters—particularly power sanders—on painted surfaces. The best approach is to “work wet”—that is, to use a spray mister or damp cloth to moisten painted surfaces before scraping, and to scrape the paint while it is still damp.
- **Clean each work area carefully during the renovation, and clean the entire building thoroughly after the work is done.** Cleanup includes removing paint chips and debris; folding and disposal of protective sheeting; vacuuming of all floors, window sills, and other horizontal surfaces with a commercial HEPA vacuum; damp-mopping and scrubbing of floors and sills; rinsing; and a final pass with a HEPA vacuum. The cleanup job should be tested by a state-certified risk assessor taking dust wipe samples.

Hiring a contractor vs. doing the work yourself: If your building is assumed or determined to contain lead-based paint, you may wish to hire an experienced and qualified contractor. The

contractor must be lead-safe certified by the Environmental Protection Agency (EPA). These contractors have taken the EPA’s Renovation, Repair, and Painting (RRP) training course. The EPA recommends: 1) verifying that the contractor is RRP-certified; 2) asking them about the lead-safe methods they will use to perform the work and clean up afterward; and 3) asking for at least three references from other recent jobs they have performed on older buildings. If you are planning to do the work yourself, it is a good idea to take an RRP training course, which will teach you how to manage the risks of removing or repairing lead-based paint. Consult the resources at the end of this guide for further information. *Please note that if you are not properly prepared and do not follow lead-safe work practices and you work on or demolish surfaces that have lead paint, you will most likely increase the levels of lead dust in your home.*

Further Information about the EPA’s Renovation, Repair, and Painting Rule

Common renovation activities like sanding, cutting, and demolition can create hazardous lead dust and chips by disturbing lead-based paint, which can be harmful to adults and children.

To protect against this risk, on April 22, 2008, the Environmental Protection Agency (EPA) issued the Renovation, Repair, and Painting Rule (RRP rule). It requires that firms performing renovation, repair, and painting projects that disturb paint in pre-1978 homes, child-care facilities, and schools be certified by the EPA and that they use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices. The rule also requires that the EPA’s *Renovate Right* brochure be given to homeowners and tenants, and also to child-care facilities and schools with facilities for children under the age of six.

The rule affects paid renovators who work in pre-1978 housing and child-occupied facilities, including:

- renovation contractors

This section is from the Environmental Protection Agency’s web site. EPA. Lead in Paint, Dust, and Soil: Renovation, Repair, and Painting (RRP). Last updated May 4, 2012. Available at <http://www.epa.gov/lead/pubs/renovation.htm#requirements>. Accessed May 6, 2012.

- maintenance workers in multi-family housing
- painters and other specialty trades.

Under the rule, child-occupied facilities are defined as residential, public, or commercial buildings where children under age six are present on a regular basis (more information below). The requirements apply to renovation, repair, or painting activities. The rule generally does not apply to minor maintenance or repair activities where less than six square feet of lead-based paint is disturbed in a room or where less than 20 square feet of lead-based paint is disturbed on the exterior, but this does not include window replacement, demolition, or prohibited practices.

According to the RRP rule, child-occupied facility means a building, or portion of a building, constructed prior to 1978, visited regularly by the same child, under six years of age, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least three hours and the combined weekly visits last at least six hours, and the combined annual visits last at least 60 hours. Child-occupied facilities may include, but are not limited to, day care centers, preschools, and kindergarten classrooms. Child-occupied facilities may be located in target (pre-1978) housing or in public or commercial buildings.

For more information about the RRP rule and child-occupied facilities, read the actual RRP rule available at the EPA's RRP web page <http://www.epa.gov/lead/pubs/renovation.htm#requirements>.

Interior Flat Plaster

As noted earlier, interior wall and ceiling surfaces are less likely to contain lead hazards than other surfaces. They should, however, be tested prior to repainting or replastering. If these flat surfaces are found to contain *deteriorating* lead-based paint, the paint should be removed down to the substrate (the surface just below the paint) by the least invasive method possible. The de-

teriorating lead-based paint may be wet-scraped or wet-sanded. Plaster should be repaired whenever possible; it can be treated with a skim coat or wet plaster repair. Sound lead-based paint on walls and ceilings can be left alone or recoated.

Two treatments for walls or ceilings with high lead content and extensive paint deterioration are encapsulation and enclosure. Encapsulation refers to covering the surface with a coating designed to seal the lead-based paint after surface preparation of the wall. Enclosure refers to mechanically fastening a rigid material—often drywall—to the substrate to cover the deteriorated paint or plaster. Drywall enclosure is recommended only when the condition of the plaster does not allow replastering.

Interior Wood Surfaces

Interior wood surfaces should also be examined for the presence of deteriorating lead-based varnish as well as lead-based paint. Nineteenth- and early twentieth-century varnishes and shellacs often contained lead. Historic interior woodwork with deteriorated paint or varnish should have the deteriorated paint or varnish stabilized prior to repainting or re-varnishing. Wet sanding or scraping is the preferred method for removing the paint or varnish, as it is gentle to the substrate and less likely to produce lead dust.

Wet scraping: The surface is wetted with a spray bottle and the wet paint or varnish is scraped onto a plastic drop sheet. The sheeting should be raised around the edges to prevent the dust escaping when the scraped paint dries. Alternately, a plastic shopping bag can be taped to the surface directly under the work to collect the flakes as they are removed. A respirator and protective clothing should be worn.

Wet sanding: The surface is wetted with a spray bottle before it is rubbed with wet and dry sandpaper. A sponge is used to remove the powdered paint debris from the paint surface. Do NOT use dry sandpaper or an ordinary power sander; these will release lead dust into the air and the rest of the house. A respirator and protective clothing should be worn.

Interior wood surfaces can also be treated with encapsulant coatings, provided they are not high-friction surfaces like floors, doors, and windows. Encapsulant coatings have two drawbacks, however—they can obscure fine details, and they are difficult to remove later if desired.

DO NOT USE THE FOLLOWING METHODS:

- Dry sanding or scraping
- High-heat methods of paint removal (above 1100°F), which vaporizes the lead
- Water blasting or power washing
- Paint-stripping chemicals containing methylene chloride, a chemical known to cause cancer

Windows, Doors, and Floors

Owners of historic buildings should pay special attention to painted or varnished windows, doors, and floors, as these interior components are high-friction surfaces. The movement of people or furniture over painted floors or the friction created when the parts of a window sash or door rub against each other will produce lead dust over time if these surfaces contain lead-based paint. Top layers of lead-free paint can be worn away by the repeated opening and closing of the door or window and expose the lead-based paint underneath.

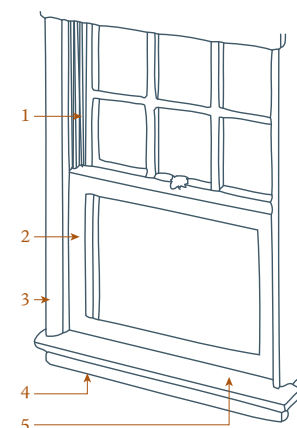
Doors can often be effectively treated by being carefully removed and having the lead-based paint stripped off-site before repainting. The door casing must be treated as well, however, and the door should be tested when it is rehung to make sure that the hinge screws are tight and that the door is not scraping against the jamb on either the hinge or the latch side. Some lead paint may be left in the wood even after stripping, so the usual precautions still apply when preparing these stripped doors for painting (working wet, wearing protective clothing, etc.). A loose or poorly hung door can crush old as well as new paint and generate lead dust.

Historic double-hung windows should be preserved whenever possible because they are usually made of higher-quality wood than newer windows and they are character-defining features of older buildings. Sashes can be removed and stripped off-site and repainted. Some lead paint may be left in the wood even after off-site stripping, so the usual precautions still apply when preparing these stripped windows for painting (working wet, wearing protective clothing, etc.). Jamb liners can be used to cover the remaining painted jambs, if the original wood sashes don't have to be cut to accommodate the liners. It is important, however, to check the inside window sill closely for evidence of deteriorated paint, as window sills are often at mouth level for small children and may be chewed or licked.

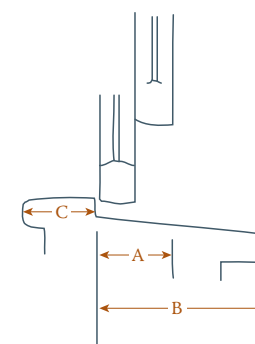
Deteriorated paint in window troughs should be stabilized and repainted. Window troughs are common collection sites for lead dust and therefore should be thoroughly cleaned in the spring, summer, and fall. Diligent maintenance is required to keep the new paint on the windows in sound condition so that the old lead paint underneath can't escape as dust. See *"Keeping My Building Lead-Safe"* on page 21 of this guide.

Painted or varnished floors can be difficult to treat because some lead dust may remain in the cracks between floor boards even after sanding and vacuuming with a commercial HEPA vacuum. Interim control measures may be applicable to some floors in historic buildings. They include the use of a high-grade deck paint or sealer; covering walkways with area rugs or runners; and placing rubber cups under furniture legs. In other cases it may be necessary to cover (enclose) the floor with new tongue-and-groove flooring. Routine cleaning of floor surfaces is required to prevent dust accumulation.

Staircases can be covered with a well-installed carpet runner as an interim control measure. Enclosure methods for stairwells include applying rubber treads on each step and enclosing the risers in plywood.



1. Jamb/Track
2. Window Sash
3. Window Casing
4. Window Apron
5. Window Interior Sill



- A. Window Trough
- B. Exterior Window Sill
- C. Interior Window Sill

Illustrations courtesy of U.S. Department of Housing and Urban Development.

Wood Siding and Porches

Painted wood siding and porches are most likely to have deteriorated lead-based paint because of their exposure to weather. Moisture coming from inside the house can also speed up the deterioration of exterior paint. It is important to check the outside of a building for deteriorated paint, because dust and paint chips from damaged exterior paint can settle on window sills, contaminate the soil around the building, or be tracked inside the building. Like interior window sills, porch railings should be inspected carefully, because they are another chewable surface that can be easily reached by children.

Most building exteriors require painting every 5 to 10 years in most parts of the United States. Porches often have high-friction surfaces like painted decks as well as railings and steps. In some cases, removal of deteriorated exterior paint on friction surfaces, then repainting, is cost-effective. In other cases, the wood surfaces may be in such poor condition that it may be necessary to replace the components, matching the originals as closely as possible.

Historic wood siding that can be repaired should be repaired. Whenever possible, the historic surfaces should be repaired, safely prepped, primed, and painted. Routine maintenance will be needed to ensure that the siding remains lead-safe. This method is the preferred approach. (Because siding is not a friction surface, old lead paint can remain on the surface and can be painted and maintained or it can be stripped as necessary for the new paint.) Any sanding that takes place in preparation for the new paint must be accompanied by water misting, and any paint stabilization or paint removal products used must be compatible with each of the materials on the building's exterior. The lead-safe work principles of containment, minimizing dust, and thorough cleanup must be followed when working outdoors as well. If the historic wood siding is in such poor condition that removal and replacement are necessary, the old siding should be replaced with wood siding that matches the original design. Historic wood siding should not be replaced with aluminum or vinyl siding or other contemporary materials because they can alter the appearance of the building, damage other historic materials during the installation process, and trap moisture within the building's walls.

The use of encapsulant coatings on exterior siding should also be avoided, particularly in moist or cold climates like the Upper Midwest. Encapsulants applied to a building's exterior can trap moisture or hide the existence of leaks that are causing the substrate to decay.

It is also important to check local environmental regulations before removing paint or deteriorated wood siding from the exterior of a building, because outdoor work may produce large quantities of lead-contaminated waste.

Keeping My Building Lead-Safe

Proper maintenance is as important to keeping a building lead-safe as is following safe renovation practices and cleanup methods. It is possible for lead-safe buildings in urban areas to be recontaminated from lead dust or soil from other buildings in the vicinity within a few years.

There are three basic steps to keeping a building lead-safe:

1. **Frequent cleaning:** The interior of the building should be vacuumed at least once a week, with vinyl, tile, and wood floor surfaces damp-mopped weekly, or even more often to keep dust levels low. Window sills and troughs should be damp-cleaned several times per year, particularly during spring and fall when the windows are open. Carpets and area rugs should be washed or steam-cleaned from time to time if they appear to hold dirt tracked in from outside.
2. **Regular monitoring for signs of deterioration:** Property owners should inspect their building(s) frequently for leaks, cracks, peeling paint, or any other signs that painted surfaces are being disturbed or damaged. Any chipped or damaged paint needs to be addressed as outlined in the previous sections. Tenants must be told about the location of any lead-based paint in their rented space and instructed to contact the landlord or building owner if they notice any signs of cracking or peeling. They must also be notified prior to any renovation or repair work that will generate lead dust.



Regular cleaning of floors and windows (especially the window sills and troughs) can help reduce lead dust levels in a home. Photos courtesy of CDC/Dawn Arlotta and Cade Martin.

3. **Yearly dust-wipe tests to certify that the building remains lead-safe:** It is a good idea to have a State of Michigan-certified Risk Assessor conduct a yearly dust-wipe test to be sure that the building is still lead-safe. If the building fails the test, it should be washed down, wet-vacuumed, and HEPA-vacuumed until a clearance test shows that the building is lead-safe again.

DID YOU KNOW: LEAD IN HISTORY

The oldest known human-made lead objects date from 6400 B.C. By the first century A.D., the Roman Empire was producing about 80,000 tons of lead annually. It was used to make water pipes—the English words plumber and plumbing are derived from *plumbum*, the Latin word for lead and the source of its chemical symbol (Pb)—as well as drinking cups, pottery glazes, and cosmetics.

Nicander, a Greek botanist, described the symptoms of lead poisoning in the second century B.C., while Vitruvius (c. 80–15 B.C.), Julius Caesar’s chief engineer, noted that drinking water was more wholesome when carried through ceramic rather than lead pipes. In the New World, Benjamin Franklin described the effects of lead poisoning from Boston rum contaminated during the distillation process in a 1786 letter to an English friend.

FREQUENTLY ASKED QUESTIONS

What lead-based paint hazards pose the greatest threats to health?

All of the following are health risks:

- chipping, flaking, or peeling and chewed lead-based paint on interior surfaces
- lead dust on floors and windows
- lead in exterior soil, gardens, and play areas
- deteriorated lead-based paint on exterior walls, porches, and other exterior surfaces
- leaded paint on windows, doors, floors, and other high-friction surfaces
- leaded paint on window sills, porch rails, and other surfaces that are accessible to children’s mouths

Where can I find more information about training classes in Michigan for lead-safe renovation, repair, and painting (RRP)?

The Michigan Department of Community Health (MDCH) website at <http://www.michigan.gov/leadsafe>.

Must I follow the EPA’s RRP rule if my building is not a child-occupied facility?

As of 2012, the EPA’s RRP rule applies to pre-1978 homes, child-care facilities, and schools—facilities the EPA calls “child-occupied facilities.” If you are not working on a child-occupied facility, the RRP rule does not currently apply. You are encouraged to work lead-safe in any case, but it is not required. It is important to note that *parts* of a building can be considered child-occupied facilities and the RRP rule applies in those sections of the building. For more information, see the EPA’s RRP website at <http://www.epa.gov/lead/pubs/renovation.htm#requirements>.

Must I follow the new EPA rule if I am doing minor maintenance and touching up paint in an older building?

First, see the above question about child-occupied facilities. The EPA’s RRP rule does not apply to homeowners who do renovations on their own houses, although everyone working on pre-1978 buildings is encouraged to work lead-safe. The rule does apply, however, to contractors or maintenance workers paid to do work in a house built before 1978 if they disturb more than 6 square feet of interior paint in any one room, or disturb more than 20 square feet of exterior paint. The contractor must be EPA-certified and must follow lead-safe work practices.

What should I expect from a contractor who is compliant with the EPA RRP rule?

The contractor must:

- have completed an 8-hour EPA lead safe work practices training course
- provide you with a valid EPA firm certificate
- be knowledgeable about the 2010 EPA lead regulations
- tell you what lead-safe work practices will be followed during renovation, repair, or painting

- ask you to share the results of previous lead tests, if any
- give you references to at least three recent RRP jobs carried out on buildings constructed before 1978
- keep records to show that he or she and the workers have been trained in lead-safe practices and that the work was carried out following these practices

What are the estimated costs to the contractor of certification, equipment, labor, cleanup, and cleanup verification?

According to the EPA, the mandated 8-hour renovator training course in lead-safe work practices costs about \$200 per person for a five-year certification following successful completion. The contractor must also pay a \$300 fee to the EPA for certification. The EPA believes that employing lead-safe work practices does not significantly increase the overall cost of the project.

What is the average cost of lead inspections and clearance tests?

As of late 2011 and early 2012, a full lead-based paint inspection of an average-sized home using an XRF costs between \$300 and \$500. A risk assessment costs about \$450 to \$500 for an average-sized house. Clearance testing following cleanup after RRP work is completed costs about \$140 to \$180, although costs vary according to the number of samples required.

There are no children living in or using a daycare facility in my historic building. Must I follow RRP rules?

As of 2012, the RRP rule applies to pre-1978 housing, schools, and child-care facilities, but there are some exemptions. According to the EPA's *Small Entity Compliance Guide to Renovate Right*, the following types of pre-1978 housing or child-occupied facilities are exempt from the current regulations:

- housing used exclusively by the elderly or persons with disabilities, with no children under the age of 6 living (or expected to live) in the building
- any rehabilitation that disturbs less than 6 square feet per room or 20 square feet on the exterior of the building
- zero-bedroom dwellings (any housing in which the sleeping

area is not separated from the living area—as in efficiency apartments, single-room occupancy housing, dormitories, or military barracks)

- buildings that have already been declared lead-free by a certified inspector or risk assessor
- non-residential properties

For more information, see the EPA's RRP website at <http://www.epa.gov/lead/pubs/renovation.htm#requirements>.

For nonprofit housing corporations and nonprofit community organizations rehabilitating older housing, what regulations apply? Can they use interim controls or must they abate all lead-based paint hazards?

At a minimum, every job must be completed in compliance with the EPA's RRP rule. Every organization must also review its agreement with its project funding agency and determine what other lead-based paint regulations apply. Projects funded by the U.S. Department of Housing and Urban Development (HUD) are covered by the Lead-Safe Housing Rule (LSHR). The rule requires different levels of lead hazard control based on the project type and cost. HUD issued *Lead-Based Paint Compliance Attachment 24-2* (available at http://portal.hud.gov/hudportal/documents/huddoc?id=DOC_13575.pdf) to help organizations comply with the LSHR at historic properties. Organizations can get further information about interim controls and abatement practices from the *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (available at http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines).

When interim controls are allowed by the funding agency, those are preferable for historic preservation purposes because they allow historic materials to remain in place while creating a lead-safe environment. However, when interim controls are used, it is imperative that the building receives regular maintenance and cleaning in order for those interim controls to remain effective. Residents can be placed at risk when lead-based paint is allowed to deteriorate, creating lead hazards. Consultation with the funding agency is recommended and the State Historic Preservation Office can often help as well.

GLOSSARY

Abatement

Work designed to permanently eliminate lead-based paint hazards. It includes permanent enclosure or encapsulation of lead-based paint; removal of lead-painted surfaces; removal or covering of lead hazards in soil; and all preparation and cleanup associated with such work. Abatement work must be completed by a certified abatement contractor.

Clearance

A set of evaluation procedures conducted after lead hazard control work to determine that the work was completed as specified and that the building is safe for residents and unprotected workers.

Containment

Measures taken during lead hazard reduction or control work to make sure that dust and debris resulting from the work do not spread from the inside of the work site to the outside.

Encapsulation

The application of a coating or covering that serves as a barrier between lead-based paint and the environment.

Enclosure

The use of rigid construction materials fastened to a painted substrate to form a barrier between the substrate and the environment.

HEPA vacuum cleaner

A vacuum cleaner that uses a high-efficiency particulate air (HEPA) filter to remove lead dust and other small particles from air passing through the filter. To meet U.S. Department of Energy (DOE) standards, the filter must remove from the air 99.97% of all particles greater than 0.3 micrometers.

Historic building

There are several criteria used to determine whether a building is historic. In general, a historic building is 50 years or older, retains many of its original materials, and stands in its original location.

Interim controls

Procedures to temporarily reduce exposure to lead-based paint hazards. Interim controls include specialized cleaning, repairs, maintenance, painting, temporary containment, and ongoing monitoring of lead-based paint hazards.

Lead inspection

A complete surface-by-surface investigation to determine the presence of lead-based paint in a building, but not lead-based paint hazards. Lead inspection includes a report explaining the results of the investigation.

Paint stabilization

Procedures that include repairing defects in substrates that cause paint to deteriorate, removing loose paint and other material from surfaces to be treated, and applying a new protective paint or other coating.

Permanent

A material or treatment that has an expected design life of at least 20 years.

Risk assessment

A complete on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards, along with a report from the person or company conducting the assessment. The report must state the results of the investigation and the options for reducing or treating any hazards found.

Substrate

The solid material directly underneath a painted surface. The substrate may be metal, wood, drywall, plaster, or concrete.

Visual assessment

A search for cracking, scaling, peeling, or chipped paint conducted with the naked eye, as distinct from X-ray fluorescence (XRF) or other specialized techniques.

ADDITIONAL RESOURCES

Books and Pamphlets

Department of Housing and Urban Development (HUD). *HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. Washington, DC: HUD, 1995. Available for a small handling fee from HUD USER at 1-800-245-2691 or at http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines. This is the guide that preceded the *Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work*.

Department of Housing and Urban Development (HUD). *Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work*. Washington, DC: HUD, 2001. (84 pages). Available online at <http://www.hud.gov/offices/lead/training/LBPguide.pdf>. This is a basic guide for contractors, painters, carpenters, and maintenance workers repairing or renovating older homes; it is also useful for do-it-yourselfers.

Environmental Protection Agency (EPA). *The Lead-Safe Guide to Renovate Right, revised edition*. Washington, DC: EPA, 2011. (12 pages). Available online at <http://www.epa.gov/lead/pubs/renovaterightbrochure.pdf>. A short basic guide to lead-safe household repair. It is not intended for do-it-yourselfers or contractors and does not contain specific information about historic buildings.

Environmental Protection Agency (EPA). *Small Entity Compliance Guide to Renovate Right: EPA's Lead-Based Paint Renovation, Repair, and Painting Program*. Washington, DC: EPA, 2011. (32 pages). Available online at <http://www.epa.gov/lead/pubs/sbcomplianceguide.pdf>.

Livingston, Dennis. *Maintaining a Lead Safe Home: A Do-It-Yourself Manual for Homeowners, Property Managers and Contractors, 4th ed.* (91 pages). Baltimore, MD: Community Resources, 2005. A good resource written specifically for do-it-yourselfers, it includes useful tips about hiring professionals as well as detailed information about paint sampling and testing procedures.

Park, Sharon C., and Douglas C. Hicks. "Preservation Brief #37: Appropriate Methods for Reducing Lead-Paint Hazards in Historic Housing." Washington, DC: National Park Service, Department of the Interior, Heritage Preservation Services, 2006 (16 pages). Available online at <http://www.nps.gov/history/hps/tps/briefs/brief37.htm>. An easily accessible recent resource for owners of historic buildings, it contains more detailed information about appropriate treatments for lead-based paint in older buildings and useful tables comparing interim controls and abatement measures.

Websites

Centers for Disease Control and Prevention (CDC). Lead Poisoning Prevention Tips. <http://www.cdc.gov/nceh/lead/tips.htm>. Basic information about household measures to prevent lead poisoning in adults as well as children.

National Trust for Historic Preservation (NTHP). Lead-Safe Practices for Older and Historic Buildings. <http://www.preservationnation.org/issues/lead-paint/>. This page is a portal to other pages on the NTHP website about the EPA's new rule, lead-safe work practices, basic renovation tips, and FAQs about lead-based paint.

Contacts

Preservation organizations

Michigan Historic Preservation Network
107 E Grand River
Lansing, MI 48906
phone: 517-371-8080
e-mail: info@mhpn.org

National Trust for Historic Preservation (NTHP)
1785 Massachusetts Ave. NW
Washington, DC 20036-2117
phone: 202-588-6000

Federal government

Advisory Council on Historic Preservation (ACHP)
1100 Pennsylvania Avenue NW, Suite 803
Old Post Office Building
Washington, DC 20004
phone: 202-606-8503
e-mail: achp@achp.gov

Centers for Disease Control and Prevention (CDC)
1600 Clifton Rd
Atlanta, GA 30333
phone: 800-CDC-INFO (800-232-4636)
e-mail: cdcinfo@cdc.gov

Department of Housing and Urban Development (HUD)
451 7th Street S.W.
Washington, DC 20410
phone: 202-708-1112

Environmental Protection Agency (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460
phone: 202-272-0167

National Institute of Environmental Health Sciences (NIEHS)
P.O. Box 12233, MD K3-16
Research Triangle Park, NC 27709-2233
phone: 919-541-3345
e-mail: webcenter@niehs.nih.gov

National Lead Information Center (NLIC)
422 South Clinton Avenue
Rochester, NY 14620
phone: 800-424-LEAD (5323)
e-mail: hotline.lead@epamail.epa.gov

State of Michigan

Michigan Department of Community Health (MDCH)
Capitol View Building
201 Townsend Street
Lansing, MI 48913
phone: 517-373-3740
website: www.michigan.gov/leadsafe

Michigan State Historic Preservation Office
702 W. Kalamazoo St.
P.O. Box 30740
Lansing, Michigan 48909-8240
phone: 517-373-1630
e-mail: preservation@michigan.gov
website: www.michigan.gov/shpo

This publication has been financed in part with Federal funds from the National Park Service, U.S. Department of the Interior, through the Michigan State Housing Development Authority. However, the contents and opinions herein do not necessarily reflect the views or policies of the Department of the Interior or the Michigan State Housing Development Authority, nor does the mention of trade names or commercial products herein constitute endorsement or recommendation by the Department of the Interior or the Michigan State Housing Development Authority. The U.S. Department of the Interior prohibits discrimination on the basis of race, color, national origin, disability, or age in its federally assisted programs. Michigan law prohibits discrimination on the basis of religion, race, color, national origin, age, sex, marital status, or disability. If you believe you have been discriminated against in any program, activity, or facility as described above, or if you desire further information, please write to: Office for Equal Opportunity, National Park Service, 1849 C Street, NW, Washington, DC 20240.



NATIONAL TRUST FOR HISTORIC PRESERVATION