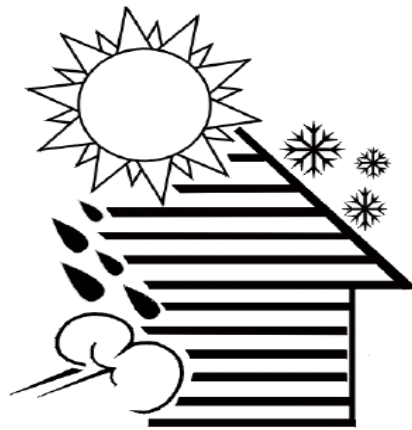




Lead-Safe Weatherization



A Training and Reference Manual For Weatherization Crews

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LEAD SAFE WEATHERIZATION GUIDANCE
Nebraska Energy Office
March 1, 2002

The Nebraska Energy Office has developed this guidance to minimize the exposure of weatherization workers and residents to lead dust during the weatherization process in homes constructed prior to 1978.

Introduction

Lead is a poison. The primary source of lead in homes is interior and exterior paints and varnishes used before 1978. The primary source of lead poisoning is lead dust. Lead can easily be inhaled or ingested into the body where it accumulates in the bones after circulating through the body. Lead can negatively effect every major system of the body and is particularly harmful to children and pregnant women. When weatherization workers disturb surfaces that may have lead-based paint, they must exercise caution to keep any dust that is generated from becoming a hazard to the clients, to themselves or to their families. Lead safe weatherization practices can reduce the risk of lead poisoning in the homes of weatherization clients and weatherization workers.

Lead Safe Weatherization Principles

The following principles have been established to minimize exposure during the weatherization process:

- Assume the presence of lead in all pre-1978 homes, including mobile homes
- Use personal protective clothing and respiratory protection
- Avoid creating and spreading dust by practicing appropriate set-up, removal and clean-up procedures
- Work wet and/or with HEPA attached equipment
- Clean the work area during and after weatherization activities
- Follow applicable federal, state and local regulations

When Should Lead Safe Weatherization Practices Be Followed?

Lead safe weatherization practices shall be followed when all three components of the following set of criteria are met:

1. The dwelling was constructed prior to 1978;
2. The dwelling has not been determined to be lead-based paint free; and
3. Either the amount of disturbed lead-based painted surface exceeds two square feet per room of interior surface, twenty square feet of exterior surface, or 10% of a small component type; or the amount of lead-based paint dust that will be generated by the weatherization work exceeds the Occupational Safety and Health Administration (OSHA) defined airborne levels for lead.

The DON'T'S of Lead Safe Weatherization

The following “don'ts” have been established to limit the exposure of clients and weatherization workers to lead dust:

- Do not turn lead paint into lead dust by dry scraping, sanding or planing lead-based paint (unless needed around electrical outlets)
- Do not perform machine sanding or grinding or conduct abrasive blasting of lead-based paint
- Do not use a torch (open-flame burning) or a high-temperature heat gun (above 1100F) to remove paint or glazing compound
- Do not smoke, eat, drink, chew tobacco or gum or apply cosmetics while working with leaded materials
- Do not allow children or pets in the work area until the weatherization work is finished and the area is thoroughly cleaned
- Do not cut lead-painted materials (doors, jambs, windows, etc.) inside a house
- Do not track lead dust from the work area to other areas
- Do not use reusable painters' tarps or drop cloths
- Do not leave anything for occupants to clean up
- Do not use the occupant's broom, dustpan or vacuum to clean up the area
- Do not change vacuum HEPA filters inside a residence
- Do not take lead dust home on your body, clothes, shoes, tools or vehicle

Lead Safe Weatherization Protocols

The following protocols have been developed to minimize exposure to lead dust during the weatherization process:

Interior Setup

- Remove items within five feet of the work area to the extent practical
- Cover the floor and items that cannot be reasonably removed with 6-mil poly sheeting
- Use a catch bag to keep dust and debris off the floor
- Leave tools in the work area throughout the job
- Close all windows and doors in the work area
- Turn off the HVAC system and other devices designed to move air
- Keep occupants and pets away from the work area

Exterior Setup

- Remove toys and other items from the work area
- Lay 6-mil poly on the ground below the work area ten feet in each direction
- Cover shrubs and garden plants with a disposable mesh such as landscape fabric
- Staple or tape protective sheeting to the wall or use a 2x4 board on the poly to hold it next to the wall
- Close all windows and doors within twenty feet of the work area
- Keep children and pets away from the work area

General

- Avoid or minimize the disturbance of lead-based paint surfaces whenever possible
- Wet the surface to be disturbed using an atomizer
- Score painted surfaces with a utility knife prior to cutting or prying
- Keep clothes and tools clean to prevent contamination and the spreading of lead dust
- Wear disposable coveralls and protective clothing when lead dust level is present
- Wear approved and properly maintained respiratory protection

Interior Cleanup

- HEPA vacuum work area from high to low
- Clean wet area surfaces from high to low
- Clean protective sheeting using a HEPA vacuum
- Remove 6-mil poly by folding it in on itself so that the work side is on the inside
- HEPA vacuum the area that was under the poly sheeting and at least two feet beyond
- Wet wipe all tools
- Dispose of poly sheeting, rags and towels in a heavy duty trash bag
- Properly dispose of bagged debris immediately after completing the job
- Inspect the work area to be sure there is no visible dust

Exterior Cleanup

- Collect and dispose of visible paint chips, wood chips and other debris from the work area
- If work takes place on an exterior porch or stairwell, HEPA vacuum, wet clean and mop

Note

For additional information on these activities please refer to Module 4 of *Lead-Safe Weatherization . . . A Training and Reference Manual for Weatherization Managers and Crews*.

Lead Safe Weatherization Training Policy

All subgrantee weatherization workers and all private contractors working for the Weatherization Assistance Program must attend a Lead Safe Weatherization Training Session. All attendees will receive a copy of *Lead-Safe Weatherization . . . A Training and Reference Manual for Weatherization Managers and Crews*. It is the responsibility of each subgrantee to request training from the Nebraska Energy Office for new hires and new contractors.

Lead Safe Weatherization Deferral Policy

Subgrantees shall determine when weatherization measures shall not be implemented on homes that have either tested positive for lead or are assumed to have lead-based paint surfaces. In making the assessment, subgrantees shall consider the following factors:

1. Does the agency's liability insurance allow work with lead based paint.
2. Is the condition of the painted surfaces in the home so seriously deteriorated that any activity around the home is enough to stir up lead based paint and pose a threat to clients and workers.
3. Will the cost of doing lead safe weatherization reduce the savings to investment ratio of the home to less than one.

Based on the consideration of the above factors, the subgrantee should determine whether to:

1. Proceed with all the weatherization measures, following lead safe weatherization practices; or
2. Do some of the weatherization measures and defer others; or
3. Defer all of the weatherization work

NOTE: It is assumed that crews and contractors have received training in lead safe weatherization work practices and that the necessary equipment is available.

Lead-Safe Weatherization

MODULE 1

LEAD – Background Information



INTRODUCTION

The purpose of this training and reference manual is to provide weatherization crews and managers with information needed to perform “Lead-Safe Weatherization” activities in homes constructed before 1978 in a manner that does not expose workers or residents to lead dust produced from weatherization activities. Additionally, this manual provides information dealing with the need to minimize lead dust production and contamination of clothing so weatherization workers do not expose others, such as co-workers and family members, to lead.

Upon completion of this module, you will be able to describe and discuss the following questions.

- 1. What is lead?**
- 2. Why was lead used?**
- 3. Where can lead be found today?**
- 4. How is lead measured in paint, dust and soil?**
- 5. What is a lead paint hazard?**



WHAT IS LEAD?

Lead is normally thought of as a heavy, durable, soft, gray metal. However, it may also be present in the form of dust or fumes. Due to the heaviness of lead, it tends to settle out of the air in about an hour. Lead does not break down or decay with time. The chemical symbol for lead is Pb, which comes from the Latin word *Plumbum*.

Lead is a poison when introduced into the body. Lead is most dangerous in the form of dust and fumes, which can't be seen or felt. When lead is dispersed into the air as dust or fumes, it can be inhaled and absorbed through the lungs and upper respiratory tract. Inhalation of airborne lead is generally the most common source of occupational lead absorption. Lead can also be absorbed through the digestive tract if it gets into the mouth and is swallowed. For example, lead dust on a windowsill gets transferred to the hand and then ingested when fingers, food, or cigarettes are placed into the mouth. Young children put their hands into their mouths frequently, so they are at a higher risk of being poisoned by lead.



INGESTION OR INHALATION OF LEAD IS NEVER HEALTHY!

Ingestion = Swallowing lead particles – This is usually in the form of dust through hand-to-mouth transfer.

Inhalation = Breathing in lead particles



WHY WAS LEAD USED?

Ancient Egypt

Lead was mined, refined, and used for sculpting, often as a substitute for bronze. It was also used as a pigment and binder in paints. The Egyptians knew that lead could kill people if they swallowed too much.

Ancient Greece

The Ancient Greeks used lead for sculpting. Greek Physician Nicander was the first person to document the “tortures” of lead poisoning – foaming lips, bloated belly, drooping limbs, and enflamed mouth.

Ancient Rome

The Romans were the first to utilize lead for industrial purposes. They used lead pipes for the water supply system. Lead was also used to line goblets. The Romans continued to use lead even though they were aware of lead poisoning.

The Middle Ages, Europe

Lead was used by craftsmen and painters, and for industrial purposes (pipes, roof waterproofing membrane). Doctors realized that the health problems of painters, miners, and artists were commonly caused by exposure to lead.

Europe

Throughout Europe, it was widely known that exposure to lead caused serious health problems. In the 1400s, France and Spain prohibited adding lead to wine. “Lead-free” paints were made available to the public by the 1800s.

1900's, United States

Use of lead paint was promoted in advertisements. Many doctors studied and wrote articles about lead poisoning. In 1913, Dr. Alice Hamilton documented the occurrence of “wrist and foot drop” among immigrant workers in Chicago. (MMWR 1999)



LEAD-BASED PAINT AD

Dutch Boy ad from Oil, Paint and Drug Reporter Magazine, 12/6/37

LEAD is a POISON

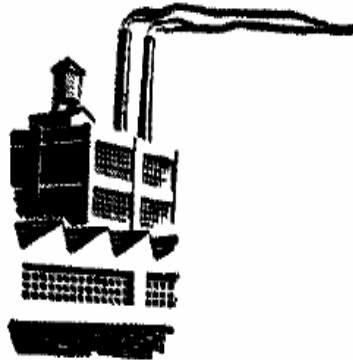
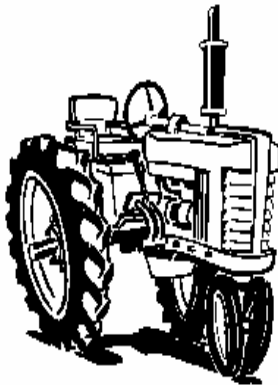


WHERE IS LEAD FOUND TODAY?

The characteristics of lead have made it useful for many applications over the years. For instance, lead has been used to make containers and vessels, coins, ornaments, cosmetics, plumbing, paints varnishes, and pesticides as well as a whole host of other products too numerous to mention. Lead paint can be found in homes, schools and other buildings. It can be found on furniture, toys, playground equipment, cars, boats and many other items. Lead paint is used by industries on towers, tanks, bridges, ships and warehouses. Lead can also be found in primers used on metal building components.

Industrial Paint

Lead-based paint is still allowed for industrial use today. It is used in shipbuilding and on bridges and steel structures to prevent rust and corrosion. Blasting and grinding of lead-based paint on steel structures is responsible for the creation of huge amounts of lead dust. The dust gets into the air, nearby soils, plants, and water, putting workers and community residents at risk. Additionally, individuals can be exposed to lead fumes from heated or burned lead-based painted structures. Welders and people using cutting torches on painted metal are examples of people who are at risk of exposure to lead fumes.



Industrial Releases

Industries use lead for a variety of processes and products. Lead is used to make batteries, ceramics, lead crystal, bullets, and some plastics. The use of these products can pollute soil, water, and air, and may also contribute to human ingestion of lead. Elevated lead levels can be also found in and around mines and smelters.



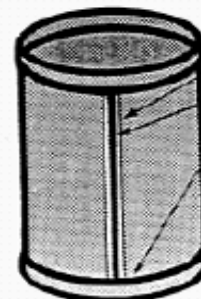
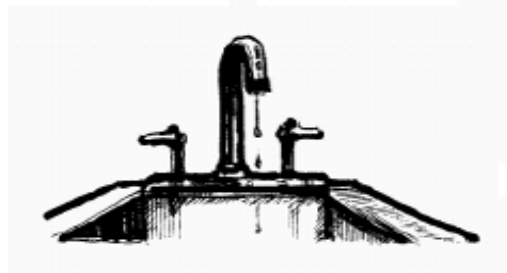
Leaded Gasoline

Before 1973, lead was added to gasoline. As it burned, lead was released into the air through the car exhaust. The lead then settled to the ground, polluting nearby soils and water. In 1973, the Environmental Protection Agency (EPA) issued regulations that gradually reduced the amount of lead added to gasoline. By the mid-1990s, the national average level of lead found in children's blood had dropped by 80 percent (MMWR, 1997). Leaded gasoline is still available in the United States for use in aviation, farm equipment, lawn and garden equipment, logging equipment, industrial and light commercial equipment, construction machinery, recreational vehicles such as all terrain vehicles (ATVs), snowmobiles, and boats, and competitive race vehicles. In countries like Mexico and England, leaded gasoline is still used in automobiles.

Food

Food can become contaminated in many ways:

- Plants absorb lead from contaminated soils (vegetables or fruits).
- Use of lead containing ceramic ware, pottery, and glassware.
- Cans are sealed with lead solder.



Water

Lead was used in pipes and solder until the mid-1980's. Lead from the plumbing leached into the drinking water. The Safe Drinking



Water Act (1986 and 1988) made it illegal to use lead in residential plumbing.

**Soil**

Traces of lead can be found in most soils. High levels of lead in soil can come from paint dust, leaded gas exhaust, and industrial releases. Some playgrounds have high levels of lead. Children who play in these areas have an increased risk of exposure to lead, which could poison them. Pets, such as dogs and cats, can transfer the lead from an outside source into our homes. Since lead does not dissipate, degrade or decay, the lead in soil becomes a long-term source of lead exposure. Even though lead emissions from gasoline have been virtually eliminated, an estimated 4 - 5



million metric tons of lead used in gasoline remain in dust and soil.

(Agency for Toxic Substances and Disease Registry. The nature and extent of lead poisoning in children in the United States: a report to Congress. Atlanta: ATSDR, 1988.)

Occupational and Hobby Exposure

People who work with lead-containing materials are in danger of lead poisoning. Lead dust on clothes, shoes, hair and skin may also contaminate their cars and homes. In this way, workers and hobbyists can expose their families to high lead levels.

Occupational Exposure

- Steel welders and cutters
- Carpenters
- Renovators
- Plumbers and pipe fitters
- Painters
- Lead crystal makers
- Electronics workers
- Plastic manufacturers
- Wire and cable manufacturers
- Firearm production and use
- Car mechanics
- Printers and artists

Hobbies

- Home remodeling
- Glazed pottery making
- Target shooting
- Electronics
- Car and boat repair
- Furniture refinishing
- Artistic painting
- Making lead fishing sinkers and lures
- Stained-glass making

Lead in Housing

Based on the National Survey of Lead and Allergens in Housing, The number of housing units with lead-based paint is as high as 38 million. The primary concern for a weatherization program is the use of lead in paints and varnishes. Lead was used in paints for several reasons: as a pigment, it made colors more vibrant, made paint more weather resistant, resisted the growth of mold and mildew, and helped prevent corrosion of metal surfaces. Lead was also added to paint to make it dry faster.



The following items were not listed in the original CPSC ban:

- Paint for agricultural and industrial equipment
- Industrial and commercial paints (i.e., traffic marking paint)
- Graphic art paints (used on billboards, road signs, etc.) and paints used by artists
- Touch-up paint for agricultural equipment, lawn and garden equipment, and appliances
- Catalyzed coatings on radio-controlled model airplanes
- Paint on the back of mirrors
- Metal furniture bearing factory-applied coatings
- Items whose lead hazard was not due to lead paint (mini-blinds, crayons, jewelry, and figurines used for game pieces).
- Candle wicks and cosmetics

HOW LEAD IS MEASURED IN PAINT, DUST, SOIL AND AIR

Although the Department of Energy (DOE) does not require testing before or after the completion of weatherization work, there are circumstances when testing should be done such as some housing receiving federal funds. In this section we will discuss testing for lead in paint, dust, soil and air.

Measuring Lead-Based Paint in Targeted Housing

Target housing is defined as any housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless a child of less than 6 years of age resides or is expected to reside in such housing for the elderly or persons with disabilities, or any 0-bedroom dwelling.) In the case of jurisdictions that banned the sale and use of lead-based paint prior to 1978, HUD may designate an earlier date. Federal law requires that anyone providing lead-based abatement be properly trained and accredited by the EPA or state agency. Lead inspectors and risk assessors use specific procedures to measure or sample lead in paint, dust, or soil. Risk assessors also identify the presence of lead-hazards and make recommendations for correcting them. Lead levels are tested in painted surfaces, in dust, and in soils to determine if they exceed EPA and HUD lead standards.

X-ray Fluorescence (XRF) Analyzer

An XRF instrument analyzes paint by emitting a radioactive ray. When the ray hits the paint, the paint returns energy to the XRF in the form of fluorescence. The XRF measures the returned energy and computes the amount of lead on the surface. An XRF measures lead in milligrams per square centimeter (mg/cm^2). One milligram = one thousandth of a gram; one square centimeter is about the size of a thumbnail. HUD recommends using XRF analysis for testing paint; however, it must be used according to the EPA Performance Characteristic Sheet for the particular brand and model being used.





Paint Chip Analysis

Paint chip analysis involves scraping a very small amount of paint off a surface and sending it to a laboratory. Labs generally use atomic absorptive spectroscopy (AAS) to measure the amount of lead in the sample. The laboratory reports the results of the analysis in either mg/cm² or in percent lead by weight. Title X, The Residential Lead-Based Paint Hazard Reduction Act of 1992 which is discussed in more detail in Module 3, defines lead-based paint as any paint, varnish, shellac, or other coatings on surfaces that contains more than 1.0 mg/cm² of lead or more than 0.5 percent lead by weight.



In order for the laboratory to report the results in mg/cm² the sample must be taken from a precisely measured area so that the amount lead in the sample can be reported in units of mass per area (in this case mg/cm²). If sampling from a measured area, it is best to include some of the substrate to insure that the full thickness of paint is included in the sample. If the results are reported by percent lead by weight (mg/kg) the sample is subject to error due to paint being left on or in the substrate, or by getting substrate included in the sample. The American Society for Testing and Materials (ASTM) standard for measuring lead in dried paint samples can be used for more information on this subject.

Spot Test Kits

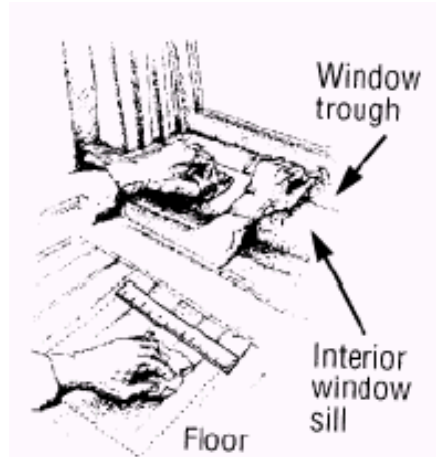
Spot test kits are available for testing to determine if lead is present in paint. The tests rely on a chemical reaction, which will give a color change when the paint is scratched. These tests cannot be used to determine lead concentrations in paint. These types of tests kits can be affected by the substrate to which the paint is applied. For example, if metals are present in the substrate, it is possible that the test will give a false positive indication. This means the test shows a positive result, indicating lead in the surface, when in fact, the paint is not lead-based paint. Additionally, the color change may be difficult to observe on dark colored paint. It is important to note that not all spot test kits provide a reliable negative screen. In other words, some kits may indicate no lead when in fact lead is present. The National Institute of Standards and Technology (NIST) conducted a laboratory evaluation for HUD of several different types and brands of spot test kits. The report is available in its entirety on the HUD website at www.hud.gov/offices/lead.



Measuring Lead in Dust

Many studies have shown that lead dust is the main path of lead exposure. Lead dust is measured by taking dust wipe samples. The inspector or risk assessor uses moist towelettes to collect dust from a surface. Samples are taken from floors, windowsills, and sometimes window wells, and then sent to a laboratory for analysis.

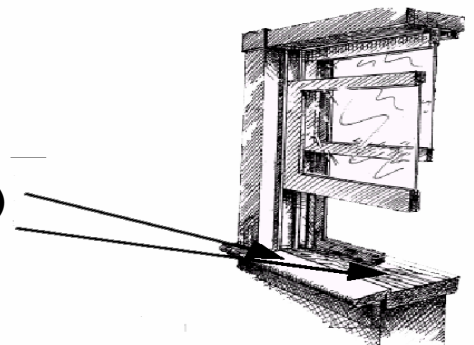
Results for dust wipe samples are reported in micrograms per square foot. A microgram (μg) is equal to one millionth of a gram. Section 403 of TSCA, published in the Federal Register on January 5, 2001, is the Lead Hazard Sampling Standard. According to EPA Title X (See Module 3 for more details), when lead dust clearance sampling is performed, Section 403 stipulates that the clearance standards that need to be met are as follows:



Surfaces

Levels

Floors	40 $\mu\text{g}/\text{ft}^2$ (25 if a lead hazard screen)
Window sills	250 $\mu\text{g}/\text{ft}^2$ (125 if a lead hazard screen)
Window wells/troughs	400 $\mu\text{g}/\text{ft}^2$ (Level for clearance)



Note: HUD and EPA have established two sets of lead levels for dust. One is for hazard identification and one is for clearance. There is no EPA/HUD hazard identification level for window troughs. The level given for window troughs is applicable to clearance testing only.

See Appendix A for more information on standards.



Measuring Lead in Soil

Lead in soil is a direct and indirect source of lead exposure. It is a *direct source* of exposure when lead from the soil gets onto the hands and then into the body through normal hand to mouth activities. It is an *indirect source* of exposure when it is brought into the home on shoes, clothing, or pets, contributing to levels of lead dust in the home.



Lead in soil is measured by collecting soil samples that are sent to a laboratory for analysis. The results are recorded in parts of lead per million parts (ppm) of soil. Lead becomes immobilized by the organic component of soil, so it is generally retained in the upper 2-5 centimeters of undisturbed soil. Urban soils and other soils that are disturbed may be contaminated to greater depths. According to the EPA, the natural level of lead in soil generally ranges from 5-50 ppm. (EPA, 1995). Soil lead levels within 25 meters of roads typically exceed natural levels by 30-2,000 ppm. Some roadside soils and soils adjacent to houses painted with exterior lead-based paints may have lead levels above 10,000 ppm (EPA, 1986). Consult Appendix A for more information.

Measuring Lead in Air

When performing weatherization work that disturbs lead-based paint, the most likely route of exposure for workers is by inhalation of lead dust. The Occupational Safety and Health Administration (OSHA) has established permissible exposure levels for numerous airborne contaminants, including lead. In order to determine worker exposures to lead, an employee exposure assessment and personal air monitoring must be conducted. This type of testing for lead requires the worker to wear a portable sampling pump that pulls air through a filter. The filter must be analyzed by a laboratory to determine lead content. Air testing requires that air pumps be calibrated and start and stop times recorded so that the volume of air pulled through the filter is known so that the laboratory results can be reported in milligrams per cubic meter of air (mg/m^3) for comparison with the OSHA standard. The National Institute of Safety and Health (NIOSH) method for measuring lead in air is included in Appendix A.



WHAT IS A LEAD-BASED PAINT HAZARD?

The presence of lead-based paint in a home is not automatically hazardous. Title X defines a lead-based paint hazard as any condition that causes exposure to lead. Since lead dust that is either inhaled or ingested is a health hazard, then a lead-based paint hazard exists wherever lead dust is present in levels that exceed the regulatory standards.

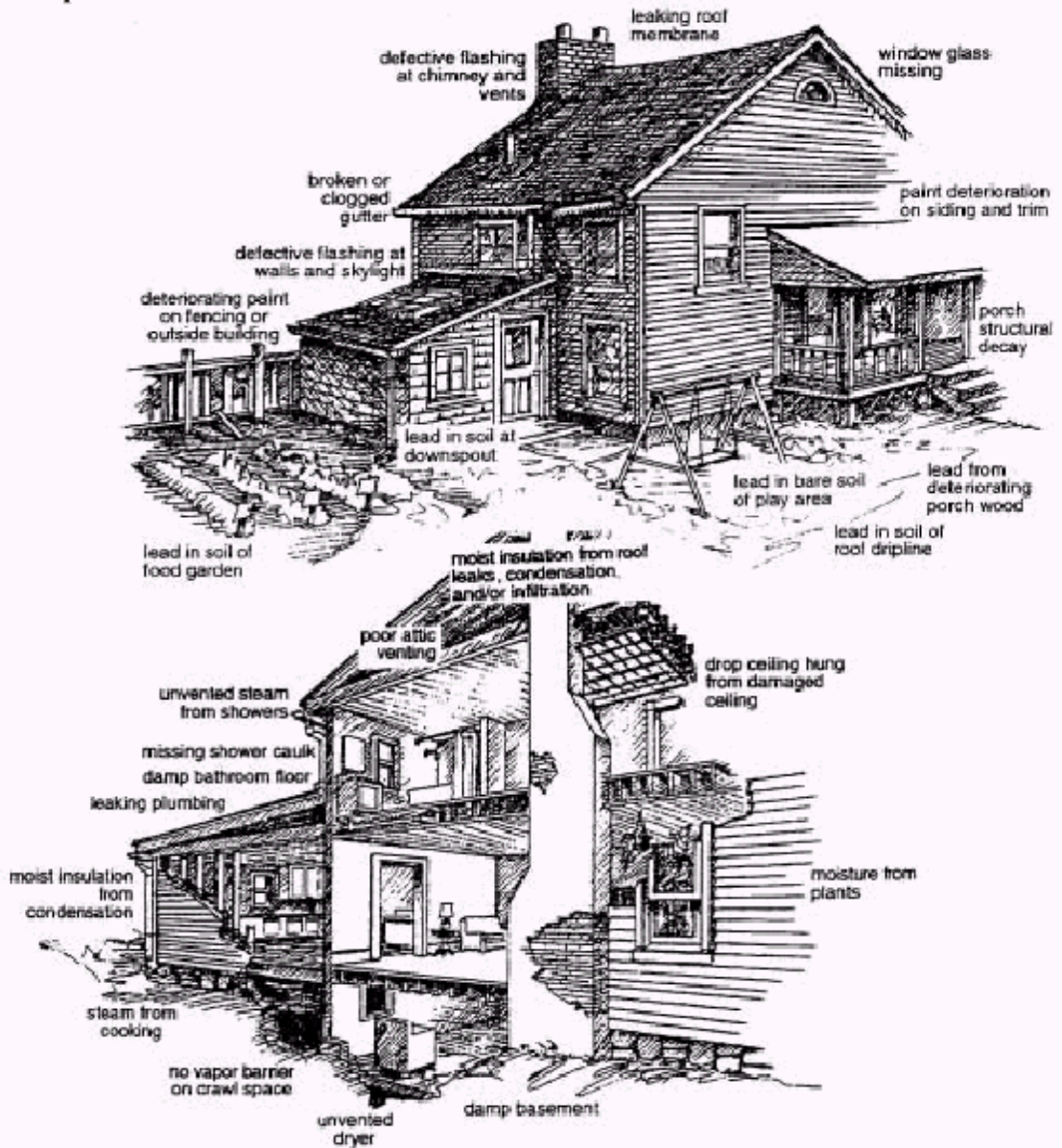
Title X lists six conditions/situations in which lead-based paint is a hazard:

1. When it is damaged. Damaged/deteriorated paint creates dust. Lead dust particles cannot be seen or felt. Aging, water damage, humidity, and other environmental conditions can cause paint to deteriorate. Damage can also be caused by mechanical means such as accidents and renovation work.
2. When lead-based paint is on a friction surface creating levels of lead dust that exceed regulatory standards. A friction surface is any surface that rubs against another. Floors and windows are friction surfaces. Even the simple act of opening and closing a window or feet shuffling across a painted floor can create dangerous lead dust levels if lead-based paint is present.
3. When lead-based paint is on an impact surface. An impact surface is any surface that has forceful contact over and over again such as a door. Friction and impact dust can come from renovation, sanding, and scraping as a few examples.
4. When dust above the federally established standards is found. Lead dust is the primary source of exposure that leads to lead poisoning. Approximately 86 percent of children with lead poisoning are poisoned by ingesting lead dust, and not paint chips as one might be lead to believe. (McElvaine, et al.1992).
5. When it is on a "chewable" surface. There are many types of chewable surfaces within a typical residential structure including windowsills, moldings, cabinet doors, support posts, shelves, etc.
6. When there is contaminated soil above established standards. Lead in soil comes from many sources, such as gasoline, industrial releases, and paint. Lead deposited in the soil does not dissipate, degrade or decay. Lead in soil can contribute to lead dust in the home because it is easily tracked into the house on shoes, clothes, toys and pets.

The EPA recommends that exposure-reduction activities be undertaken when soil lead concentrations exceed 400 ppm at areas expected or intended to be used by children. If these areas have soil lead levels over of 5,000 ppm, the EPA recommends soil abatement. Abatement includes removal and replacement of the soil or covering it with concrete or another permanent barrier. (EPA 1995)



Lead dust particles cannot be seen or felt.





EXERCISE: IDENTIFYING COMMON WEATHERIZATION PRACTICES THAT PRODUCE A LOT OF DUST AND DEBRIS

Directions: In groups of 3 to 5 take 10 minutes to answer the questions below. Assign one person to report your group’s answers to the rest of the class.

Rank the work practice descriptions according to the amount of dust and paint chips you think they make. In the table below, under the column labeled Rank, indicate which work practice makes the most dust and debris, followed by the one that makes the second most amount of dust and debris and finally the one that makes the third most amount of dust and debris.

Continue until you have ranked each work practice according to how much dust and debris you think it will make. A smaller number means that you think the work practice will create more dust or debris than a larger number.

If you think some work practices make about the same amount of dust or debris, you can give them the same rank. If you think that each practice makes different amounts of dust, rank them from 1-7.

Work Practice Description	Rank
Cutting or planing the bottom of a painted door with power tools	
Drilling holes in the side walls to install insulation	
Removing a window for replacement	
Removing old caulking or weatherstripping around windows or doors	
Re-glazing a window pane	
Conducting a blower door test	
Replacing a forced air HVAC System	



1. For the work practice(s) that you ranked #1, tell why you think it makes the most dust and debris.

3. For the work practice(s) that you ranked last, tell why you think it makes the least amount of dust and debris.

4. If you actually did any of the jobs described above, what would you do to clean up when the job was finished?

Points for Discussion

(Comments to the following discussion points are found at the end of this module.)

1. Does it make a difference if there is a lot or a little lead dust generated?

2. Why should weatherization crews be aware of the physical condition of a home before conducting an audit?

3. How does the amount of lead dust generated by weatherization activities depend upon the work practices?



MODULE 1: SUMMARY & REVIEW

What Is Lead?

- Lead is a heavy metal.
- Lead is a dangerous poison.
- Lead dust settles in about an hour.
- Lead has been used for thousands of years.
- Lead enhances color, resists mold and mildew, prevents corrosion, and makes paints more durable.

Where Can Lead Be Found?

- In paint on/in homes, schools, buildings, furniture, toys, playground equipment, cars, boats, etc.
- Any home built before 1978 may contain lead-based paint.
- The U.S. banned the use of lead in homes in 1978.
- Lead is still in paint used for industrial/commercial purposes.
- Industrial releases are another source of lead exposure.
- Lead was once routinely added to gasoline. Some of that lead remains in the soil today.
- Soil, food, and water may have lead residue or dust.
- Pottery, crystal, cans, glassware, solder and plumbing may contain lead.
- Various jobs and hobbies expose people to lead.

How Is Lead Measured?

- Lead in paint is measured by X-Ray Fluorescence Analyzer or by paint chip samples.
- Lead paint is measured in mg/cm^2 or in percent lead by weight.
- Title X defines lead paint as: any paint, varnish, shellac, or other coatings that contains 1.0 mg/cm^2 of lead or more than 0.5 percent lead by weight.
- Lead dust is measured by dust wipe samples
- Lead dust is measured in $\mu\text{g/ft}^2$

Surface

Levels

Floors	$40 \mu\text{g/ft}^2$ (25 if a lead hazard screen)
Windowsills	$250 \mu\text{g/ft}^2$ (125 if a lead hazard screen)
Window wells/troughs	$400 \mu\text{g/ft}^2$ (Level for clearance)



What Is a Lead-Based Paint Hazard?

- When lead-based paint chips, peels, becomes dust, or fumes
- When lead-based paint is on chewable surfaces
- When lead-based paint is on an impact or friction surface
- When lead is present in dust or soil above the established standards
- Lead dust is the main source of exposure that leads to lead poisoning
- Lead dust is created when
 1. Lead-based paint gets old and deteriorates
 2. Lead-based paint surfaces are broken, damaged, or disturbed
 3. Lead painted surfaces are sanded or scraped

Points for Discussion Comments

1. Does it make a difference if there is a lot or a little lead dust generated?
Without testing we don't really know how much lead is present in the dust generated by weatherization activities. In all cases, lead-safe weatherization practices must be followed since it is difficult to assess lead levels visually. Even small levels can cause health problems to children and to adults.
2. Why should weatherization crews be aware of the physical condition of a home before conducting an audit?
Air movement from a blower door or duct blaster may disturb and circulate lead dust throughout the home. If the home has noticeable paint damage (flaking) or there is an appreciable amount of dust, it might be best to defer or delay the project until the condition is corrected.
3. How does the amount of lead dust generated by weatherization activities depend upon the work practices?
 - A. *Working dry will generate a lot of dust.*
 - B. *Containing dust with plastic and using wet methods will generate less dust.*
 - C. *Containing dust with plastic and using wet methods along with HEPA attached equipment will generate even less dust.*

LEAD-SAFE WEATHERIZATION

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Lead-Safe Weatherization

MODULE 2

Health Effects of Lead



INTRODUCTION

Recognizing the hazards associated with lead-based paint is the first step in protecting oneself, workers, and others from potential poisoning. Identifying the signs and symptoms of exposure, the methods available for assessing a hazardous situation, and the procedures to follow when a hazard is encountered may minimize injury or damage. Because lead in dust cannot be seen or smelled, it is possible to ingest or inhale lead and be unaware of it. The hazards in working with lead-based paint do not stop at the work-site; workers have unknowingly carried lead dust home exposing their families, especially their children, to lead poisoning.

In order to fully understand the hazards associated with lead exposure, it is necessary to understand the effects of lead on the body. As a result of this module, you will understand the answers to these questions:

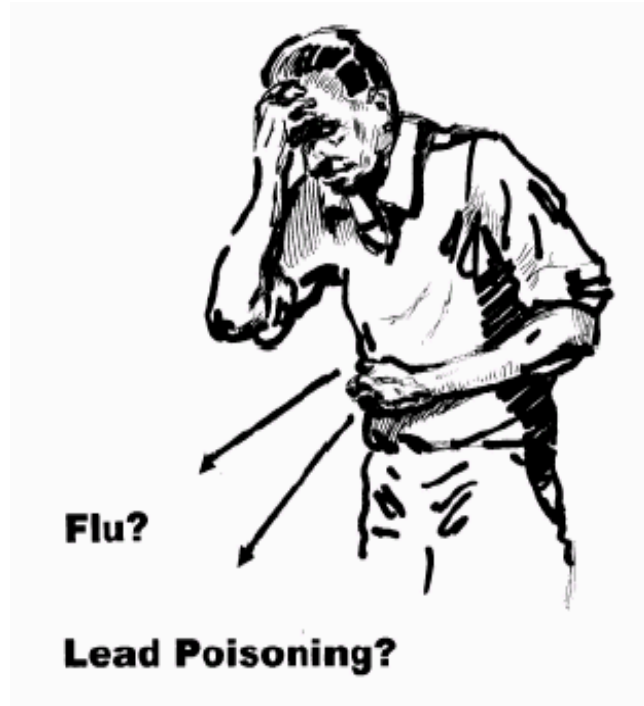
- 1. What is “lead poisoning”?**
- 2. How does lead get into the body?**
- 3. How does lead harm the body?**
- 4. How are blood lead levels measured?**
- 5. How much lead is dangerous?**



WHAT IS LEAD POISONING?

Lead poisoning refers to the health effects associated with an abnormally high level of lead in the bloodstream. Symptoms of lead poisoning may develop quickly but are often not recognized until severe damage has been done. They are frequently mistaken for the indications of a cold or flu virus. Sometimes these symptoms can come and go for several months, making it difficult for the afflicted person to recognize them as a serious health threat. A child with lead poisoning may appear healthy because the obvious symptoms often do not develop until the condition is serious and permanent damage has been done. Once the lead poisoning has been discovered, the effects of it may be difficult to identify. The following is a list of signs of lead poisoning:

- Tiredness
- Wrist or foot drop
- Sleep problems
- Weakness
- Dizziness
- Clumsiness
- Irritability
- Joint and muscle pain
- Nervousness
- Vomiting
- Headaches
- Loss of appetite
- Difficulty concentrating
- Stomach aches
- Depression
- Constipation
- Forgetfulness
- Metallic taste in mouth
- Hyperactivity
- Numbness
- Increased risk of birth defects



HOW DOES LEAD GET INTO THE BODY?

There are only two ways that inorganic lead, the type used in lead-based paint, can get into the body: lead is either inhaled or swallowed. There are compounds known as organic leads that can be absorbed through the skin; however, these are not encountered in paints. They are found in solvents, gasoline, etc. The body reads the components of lead much like it does calcium, a harmless and necessary nutrient. Therefore, it readily absorbs and retains lead. This is especially true if the body is lacking in calcium and iron. Up to 50% of the lead that children and pregnant women ingest or inhale is absorbed into their bodies. In contrast, the adult population usually absorbs only 10-15% with the balance excreted.



CHILDREN ARE AT GREAT RISK!

Children can be poisoned by lead very quickly. Since children have a much smaller body mass than adults and absorb more lead, similar exposures between adults and children relate to a much higher body burden of lead in children. Also a child's rapidly growing brain, nervous system, and body are easily damaged by lead, even by small doses. Children, especially toddlers ages 1-3, are also at a higher risk of lead poisoning because they crawl and play on the floor where lead dust settles and they put their hands and other things into their mouths, thus inhaling and ingesting the lead dust.

The major source of lead exposure for children is lead dust.

Lead Inhalation

Though not a major pathway of exposure for children, tiny lead particles can be breathed into the lungs. Once these lead particles are in the lungs, they are quickly absorbed into the blood stream.

Lead Ingestion

Lead particles can be swallowed if eating, drinking, smoking, or placing fingers into the mouth takes place without hand washing after coming into contact with lead dust. The particles of lead go through the digestive system and are slowly absorbed into the blood. Lead ingestion that occurs when hands or fingers are placed into the mouth is called *hand-to-mouth*. For children, hand-to-mouth lead ingestion is often the result of playing in lead contaminated areas such as soil or carpet adjacent to lead painted surfaces. With lead dust in these areas, lead particles may get on toys and children's fingers and then be transferred into the mouth. Ingestion is the major pathway of exposure for children.

Lead ingestion for most adults is a result of *transfer*. This occurs as a result of eating, drinking, or smoking after coming into contact with a lead contamination.

**Once lead is inhaled or ingested,
lead is deposited in the bone marrow where it reduces the
body's ability to produce blood cells.**



Lead has no benefit to the body LEAD IS A POISON!

Lead Poisoning

The National Health and Nutrition Examination Survey (NHANES III) reported a decrease in the number of children with blood lead levels at or above 10 µg/dl (the CDC level of concern) from 1.7 million children in 1988 to 890,000 children in 1994. However, The U.S. Centers for Disease Control (CDC) considers lead poisoning the foremost environmental health threat to children in the U.S. Almost one million children - 4.4% of all pre-schoolers - have enough lead in their blood to reduce intelligence and attention span, cause learning disabilities, and damage permanently a child's brain and nervous system.

Current information from HUD indicates that 38 million homes contain lead-based paint, approximately 26 million homes contain lead-based paint hazards and approximately 6 million of these units house children under the age of six. The major indicators for the presence of lead-based paint hazards in housing are the unit's age and condition including recent remodeling, rehabilitation or aggressive disturbance of painted surfaces.

Because weatherization programs serve many older homes, lead-safe weatherization practices should be implemented with all homes built prior to 1978.

HOW DOES LEAD AFFECT THE BODY?

The Heart and Blood

Lead attaches to red blood cells preventing them from carrying oxygen and causes them to die sooner than they normally would. Lead also reduces the body's ability to make new blood cells, resulting in anemia that causes fatigue. Lead poisoning also may cause high blood pressure that increases the risk of heart attack, stroke and kidney disease.

The Skeletal System

Lead is deposited in the bone tissue where it reduces the production of new blood cells And competes with calcium. Bones and teeth store 95 percent of the lead in the body. If lead is in the bones instead of calcium, it can be re-released into the blood when the body needs calcium as often occurs when the body is stressed. Once the lead returns to the blood, it causes damage once again. Lead that stays in the body is called *body burden*.

The Male Reproductive System

The direct effects of lead on the male reproductive system are decreased sex drive, erectile dysfunction, infertility and damaged sperm. Additionally, female partners of lead-poisoned workers have more miscarriages and premature births and their children have more birth defects.

***The Female Reproductive System***

As in the male, lead can cause decreased sex drive and infertility in women. In addition, it can cause abnormal menstrual cycles, premature births and miscarriages. Because it is already quickly absorbing extra nutrients for the fetus, a pregnant woman's body absorbs up to 50% of inhaled or ingested lead. The stress of pregnancy on the body can cause lead to be re-released from the bones, even if the exposure to lead was 20 years earlier. Lead not only makes the woman sick, but causes damage to the fetus as well. Lead affects children by causing birth defects, low birth weights, learning problems and behavioral problems.

The Nervous System

The nervous system is the system most affected by lead. Damage to the brain, spinal cord and nerves is permanent. Brain damage can result in depression, irritability, forgetfulness, clumsiness, and loss of intelligence. At very high doses, lead can cause hallucinations, swelling of the brain, coma and death. Lead damage to nerves usually starts at the hands and feet that may shake or, in severe cases, may become paralyzed. The nervous system of a fetus, infant, or child is affected by even small amounts of lead.

The Kidneys


The kidneys filter out some of the lead in the blood. However, as it is filtered out, the lead damages the kidneys through scarring. Such damage is often not discovered until much kidney function has been lost. Severe lead poisoning can cause kidney failure and result in death.

HOW LONG DOES LEAD REMAIN IN THE BODY AND HOW IS IT MEASURED?

Once lead gets into the body, it stays in the blood for several months, and can be stored in the bones for 30 years or more. The more lead a person is exposed to, the greater the chances for lead poisoning. Many small doses of lead over a long period of time can cause lead poisoning as can one large dose of lead in less than a day. A blood test is the only way to find out how much lead exposure has recently occurred and how much lead is in the blood stream. The amount of lead in the blood is called the blood lead level (BLL). The BLL is measured in micrograms (μg) of lead per deciliter (dl) of blood. A microgram is equal to one piece of a single grain of sugar cut into 1,000 pieces.




A deciliter, a volume measure, is equal to a little less than a half a cup. A person weighing 165 pounds has about 60 dl of blood.



One Grain of Sugar

$\div 1000 =$

One Microgram



1 Deciliter = About

$\frac{1}{2}$ cup

HOW MUCH LEAD IS DANGEROUS?

Studies show that lead can harm health at blood lead levels of 10 $\mu\text{g}/\text{dl}$ and perhaps lower. Imagine that grain of sugar cut into 1,000 pieces. Now picture 10 of those tiny pieces of the sugar grain dissolved in a half cup of liquid. That small amount of lead in the blood can cause significant health problems.

Adult Reactions to Lead

The chart below gives an estimate of an adult's reaction to different blood lead levels:

Adult Reactions to Lead

Blood Lead Level	Possible Health Affects
10 $\mu\text{g}/\text{dl}$	Increased blood pressure, harmful effects on a fetus, joint and muscle aches
25 $\mu\text{g}/\text{dl}$	Reproductive problems
40 $\mu\text{g}/\text{dl}$	Kidney damage, damage to blood formation
60 $\mu\text{g}/\text{dl}$	Anemia, nerve damage, constipation, stomach pain, irritability, fatigue, memory and concentration problems, clumsiness, drowsiness and sleep problems
80 $\mu\text{g}/\text{dl}$	Blue line on gums, uncontrollable shaking of hands, wrist and foot drop, hallucinations, brain damage, coma, and death

(STDR 1989)



The average adult typically has a blood lead level of less than 10 µg/dl. The Occupational Safety and Health Administration (OSHA) requires the medical reassignment of workers whose blood lead levels reach 50µg/dl or greater.

Child Reactions to Lead

Research suggests that lead affects a child at blood lead levels of 10 µg/dl and possibly lower. Every child could react differently. The following chart gives a rough estimate of a child's reaction to various blood lead levels.

Child Reactions to Lead

Blood Lead Levels	Possible Health Affects
10 µg/dl	Loss in IQ, hearing and growth problems. This is the Center For Disease Control, CDC, <i>Level of Concern</i>
20 µg/dl	Hyperactivity, poor attention span, difficulty learning, language and speech problems, slower reflexes
40 µg/dl	Poor bone and muscle development, clumsiness, lack of coordination, early anemia, tiredness, drowsiness
50 µg/dl	Stomach aches and cramps, anemia, brain damage
150 µg/dl	Swelling of the brain, seizures, coma, death

State Data

Critical information on lead hazards and child lead poisoning is now available on a national web site sponsored by the *Alliance to End Childhood Lead Poisoning and Environmental Defense*. The web site www.scorecard.org provides users with information to

- determine how many lead poisoned children are known in each state and rank states accordingly.
- find out how many housing units are likely to have lead hazards in a state, county or census tract.
- rank states, counties, or census track for lead poisoning risks.
- Make maps showing counties or census tracts with high risks of lead hazards.
- Understand the implications of the most recent national blood lead data.
- Determine hot spots for air lead emissions and lead concentration.
- Find local advocacy groups that are concerned about lead poisoning prevention.

More details about "scorecard" are found in Appendix H.

The scorecard web site information should be helpful to State Weatherization Programs as they develop their individual lead-Safe Weatherization State Plan. (Please see details in the DOE Lead-Based Paint Weatherization Policy in Appendix B.)



MODULE 2: SUMMARY & REVIEW

What is Lead Poisoning?

- Lead poisoning refers to the health effects associated with an abnormally high level of lead in the blood.
- The signs and symptoms are often mistaken for a cold or the flu.
- Sometimes there are no symptoms at all until the damage is significant.
- Sometimes the symptoms come and go.

How Does Lead Get Into The Body?

Lead dust particles or fumes can be inhaled.

- Lead dust can be ingested by “hand-to-mouth” contact or by transfer.
- Children are at a higher risk because they have more frequent hand-to-mouth contact.
- The major source of exposure for children is lead dust.
- Children and pregnant women absorb up to 50% of the lead they ingest or inhale.
- Adults absorb about 10-15% of the lead ingested or inhaled.

How Does Lead Harm The Body?

- Lead can cause permanent damage, even in small doses.
- Children’s developing brains and bodies are easily damaged by lead.
- Lead can affect EVERY major body system (blood, heart, kidneys, nervous system, bones, and reproductive systems).
- Lead is stored in the blood for approximately 25 days, the soft tissues for 4 days, and in the bones for more than 25 years.
- Lead can be released from the bones during times of stress.
- Lead can cause stillbirths and miscarriages.
- Lead can cause behavioral, developmental, and learning problems in children.

How Is Lead In The Body Measured?

- Blood tests determine how much lead is in the blood.
- Results of blood tests are called “Blood Lead Levels”.
- Blood Lead Levels are reported in $\mu\text{g}/\text{dl}$ (micrograms of lead per deciliter of blood).

How Much Lead In The Blood Is Dangerous?

- The CDC’s “level of concern” for children is 10 $\mu\text{g}/\text{dl}$.
- At 50 $\mu\text{g}/\text{dl}$, OSHA requires that a worker be removed from a lead-related task until Blood Lead Levels are reduced.
- Even relatively low lead levels in blood can cause serious health problems
- The website, “Scorecard”, gives critical information on lead hazards and child lead poisoning. It is broken down into state information.

LEAD-SAFE WEATHERIZATION

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Lead-Safe Weatherization

MODULE 3

Lead-Based Paint Regulations



INTRODUCTION

To limit exposure to lead federal agencies have established lead-based paint regulations. These regulations are enforceable by law and you as employees, who may be disturbing lead-based paint, need to be aware of these regulations. After completing this module, you will be able to discuss the following points:

- 1. Who is protected from lead exposure?**
- 2. Which federal agencies have rules regarding lead exposure?**
- 3. What is Title X?**
- 4. What is the DOE Policy regarding Lead Based Paint?**
- 5. What is the Lead-PRE Rule?**
- 6. What is the OSHA Lead in Construction Standard?**



WHO IS PROTECTED FROM LEAD EXPOSURE?

Current regulations to protect individuals from lead pertain to occupational exposure, residents in federally assisted housing and facilities that are defined as target housing and child occupied facilities. The regulations establish work practices and engineering controls to be used to limit exposures to lead. In some instances the regulations also require the use of personal protective equipment (PPE) to limit lead exposure; however, PPE should be used in conjunction with the use of lead-safe work practices and/or engineering controls and not instead of them.

WHAT FEDERAL AGENCIES HAVE RULES REGARDING LEAD EXPOSURE?

The purpose of this section is to provide a helpful reference indicating what weatherization agencies need to know about other Federal agencies' requirements that apply to weatherization work in situations involving lead-based paint, and when it may be necessary to get more information.

In 1992, Congress passed a law called **the Residential Lead-Based Paint Hazard Reduction Act**, also known as **Title X** (Title Ten). Title X requires federal agencies to establish rules about working with lead. The four agencies with regulations dealing with lead issues related to weatherization are

- Department of Energy (DOE)
- Department of Housing and Urban Development (HUD)
- Environmental Protection Agency (EPA)
- Occupational Safety and Health Administration (OSHA)

WHAT IS TITLE X?

Title X required various government agencies to enact regulations to reduce the amount of lead exposure and therefore lead poisoning. The enactment of Title X marked a new direction in lead-based paint legislation.

Before Title X, many agencies only required action after a child had been poisoned. Title X was designed to eliminate lead-based paint hazards **before** children are poisoned. The provisions of Title X apply to target housing which is defined as any housing constructed before 1978, except housing for the elderly or persons with disabilities (unless a child under six years of age resides in or is expected to reside in) or any dwelling without bedrooms.

The following sections summarize several important regulations enacted under Title X.

Special Training

Title X, Sections 402 (a) and 404 (d), require the EPA to issue specific requirements for how individuals engaged in lead-based paint activities (i.e. contractors, workers, supervisors, inspectors and risk assessors) will be trained and certified in managing lead-



based paint hazards. In response to this mandate, the EPA developed **Lead Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities; Final Rule (40 CFR Part 745)** in August of 1996. The regulation also contains standards for performing lead-based paint activities. The rule is intended to ensure that individuals conducting lead-based paint *inspections*, *risk assessments*, and *abatement*s in target housing and child-occupied facilities are properly trained and certified, and that training programs providing instruction in those activities are properly accredited.

Title X defines abatement as any measure or set of measures designed to permanently eliminate lead-based paint hazards. Abatement does not include weatherization, renovation, remodeling, landscaping or other activities if such activities are not designed to permanently eliminate lead-based paint hazards even though these activities may incidentally result in a reduction or elimination of lead-based paint hazards. Furthermore, abatement does not include interim controls, operations and maintenance activities, or other measures and activities designed to temporarily reduce lead-based paint hazards. Therefore, if abatement is not the purpose of the job, certification is not required as directed by this regulation. Under this rule, the EPA issued a model state certification program to help states set up their own programs. A state may choose to adopt the model program or create a program of its own for EPA authorization.

WHAT IS THE DEPARTMENT OF ENERGY POLICY REGARDING LEAD BASED PAINT?

On May 10, 2001, the DOE issued **Weatherization Program Notice 01-10** to provide guidance to Regional Offices and States in matters of health and safety associated with lead-based paint in homes in which they work. **Weatherization Program Notice 02-6** which became effective July 12, 2002 replaces WPN 01-10. The DOE has also produced guidance documents to provide information about Federal lead-based paint regulations that apply to weatherization. The DOE guidance documents apply to all grantees applying for financial assistance under the DOE's Weatherization Assistance Program.

The DOE states in its policy

Lead-based paint dust and other residues are hazards that weatherization workers are likely to encounter in older homes. ... Weatherization work may directly disturb lead-based paint, possibly creating hazardous conditions. While the authorizing legislation for DOE's Weatherization Assistance Program (WAP) does not specifically address lead-based paint hazard reduction, DOE's policy is that Weatherization workers must be aware of the hazard and conduct Weatherization activities in a safe work manner to avoid contaminating homes with lead-based paint dust and debris, and to avoid exposing themselves and their families to this hazard. It is important to remember that the WAP's legislated purpose is to install efficiency measures in Weatherization clients' homes, in order to lessen their



energy cost burden. WAP is not funded to do lead-based paint abatement work, nor to do lead-based paint hazard control or stabilization. In the process of Weatherizing a home, workers sometimes encounter and have to disturb painted surfaces that are known or presumed to contain lead-based paint. When that happens, DOE funds may be used to minimize the potential hazards associated with the specific painted surfaces that workers are directly disturbing in the course of installing an energy efficiency measure, but DOE funds may not otherwise be used for abatement, stabilization, or control of the lead-based paint hazard that is in the house.

Weatherization agencies are encouraged to apply for HUD Lead Hazard Control Grants and become certified to do lead-based paint hazard control work. Some agencies are doing this work now as an additional business line, and in at least one state some local agencies are performing Weatherization work and HUD's lead-based paint hazard control work at the same time.

[1] HUD is funded for the general control or stabilization of lead-painted surfaces in low-income homes, and HUD has programs that provide funding for lead hazard control in many communities.

Weatherization is an energy efficiency program, not a renovation or remodeling or rehabilitation program, and thus may not be subject to other agencies' rules governing renovation, remodeling, or rehabilitation work. However, there are certain instances in which particular Federal rules relating to lead-based paint hazards do apply to weatherization work.

The DOE lead-based paint policy includes eight guidance elements briefly described below. A flow chart is provided as Attachment B of Program Notice 02-6 which is found in Appendix B to assist with the determination of the appropriate actions and applicability of the various Federal rules. Both WPN 01-10 and WPN 02-6 are provided in Appendix B.

1. State Application. The WAP's Program Year 2002 Annual Grant Guidance, Weatherization Program Notice 02-1, October 29, 2001, requires states to identify and implement Lead Safe Weatherization. As a part of their health and safety plan, States must identify the procedures for local agencies to follow to address lead-based paint issues.

These procedures, at a minimum, were specified to include the following:

1. A description of the LSW practices to be followed by Weatherization crews;
2. The timetable for completing any necessary lead-based paint training for local agency Weatherization crews;
3. The proper disposal of all materials containing lead-based paint; and



4. The description of a “deferral policy” for dwellings where DOE funding or crew training/readiness is insufficient to perform the appropriate LSW practices.

2. What is LSW? Lead Safe Weatherization (LSW) is a set of protocols to be used when disturbing surfaces that may have lead-based paint that will reduce and control the amount of lead dust and paint chips that are generated. The protocols, when designed and followed properly, address compliance with applicable regulations, including state and local regulations, and may reduce the risk of liability associated with the work. The protocols require training to gain an understanding of lead-based paint hazards and their harmful effects and to acquire skills in reducing the lead dust generated when painted surfaces are disturbed in the course of installing energy efficiency measures. The protocols involve setup and cleanup practices that contain the spread of the lead dust and debris (generated from the weatherization activities) when the work is finished.

3. When is LSW Necessary? In order to be as compatible as possible with pertinent requirements imposed by other agencies' regulations, DOE recommends that states include in their health and safety plan the following set of criteria for determining when LSW would be performed by local weatherization agencies:

1. the dwelling was constructed pre-1978, and
2. the dwelling has not been determined to be lead-based paint free, and
3. when maintenance or hazard reduction activities disturb painted surfaces that total more than:
 - 20 square feet (2 square meters) on exterior surfaces;
 - 2 square feet (0.2 square meters) in any one interior room or space; or
 - 10 percent of the total surface area on an interior or exterior type of component with a small surface area. Examples include window sills, baseboards, and trim.

*Clarifying Note: The two square feet per room of interior surface is a total of all disturbed surfaces in the room; twenty square feet is the total of all disturbed surfaces over the entire exterior including soffit and fascia. Components are made up of components e.g., windows have sills, troughs, sashes, etc.

4. Testing for Lead-Based Paint and Lead-Based Paint Residues. Testing for lead-based paint is not an allowable weatherization expense; except, when it is related to the installation of energy efficiency measures. These expenditures must be within the limits set by the state in its Weatherization health and safety plan. In pre-1978 houses where the



presence or absence of lead-based paint has not been determined, testing for lead-based paint could be worthwhile as an economic step. If the anticipated weatherization/energy efficiency work involves disturbing more than a small amount of painted surfaces, then ruling out the presence of lead in the paint would save extra time and costs associated with doing LSW protocols. Testing for lead on painted surfaces in a home is limited to only those surfaces that will be disturbed.

Testing can be expensive and may take time. To have any standing in liability suits, testing requires the employment of a person who is a certified Lead Paint Inspector or Risk Assessor and has been trained and is knowledgeable in sampling techniques. The fastest test results are with a XRF (X-Ray Fluorescence) diagnostic tool. It gives an almost instantaneous result but it is expensive and requires that the operator be certified. Purchases, the cost of training and certification, and maintenance of XRF machines must be funded from other sources, they are NOT allowable expenditures of DOE Weatherization Funds.

The following considerations are offered as a guide to determining whether testing is worth the time and money on a case-by-case basis:

1. Houses built from 1978 on may be assumed to be free of lead-based paint without testing.
2. In houses built prior to 1930, it is logical to simply assume the presence of lead-based paint and save the cost of testing.
3. In homes built between 1940 and 1978, testing may not be warranted if the amount of paint to be disturbed is small, since it may be cheaper to perform LSW for a small area than to incur the expense of testing. However, where the amount of paint to be disturbed is relatively large, it may be worth the cost of testing, since a negative result would mean that the crews could dispense with having to perform the LSW protocols.

Routine testing of every house for lead paint levels before the start of work, (testing of painted surfaces to be disturbed and/or risk assessment) and at the end, (clearance testing) is a standard practice associated with lead paint hazard control or abatement work and is not an allowable use of DOE weatherization funds, except as required when weatherization work is being done on HUD homes or with HUD funds. If a state establishes a regimen of routine entrance and clearance testing for all cases where the presence of lead paint is a possibility, the state must use other sources of funding to implement such a policy.



NOTE: HUD's guidance to its properties has been to test all properties for the presence of lead-based paint, so, the HUD program housing in your area may already have been tested for lead-based paint.

5. Deferrals. States should develop a lead-based paint "deferral policy" to provide guidance to their subgrantees as to when it is prudent to defer certain weatherization work in homes that have either tested positive or are assumed to have lead-based painted surfaces. Deferral would mean postponing the work either until the weatherization agency is prepared to work with lead-based paint, or until another agency has corrected the problem such that weatherization can be safely performed. In cases where extensive LSW would be necessary, agencies are encouraged to arrange with other organizations, which are funded to do lead paint hazard control, to perform some of the more costly activities, such as entrance testing or clearance testing.

In areas where there are no organizations performing such work, weatherization agencies may choose to develop their own capabilities for lead-based paint hazard control work, but they may not use DOE weatherization funds for this purpose.

The state's lead-based paint deferral policy should not call for deferring the Weatherization work solely because there is lead-based paint in the home. In such a home, regular Weatherization work that does not disturb painted surfaces can be done. (Please see Appendix B.)

6. Funding of Lead Safe Weatherization. While the WAP Final Rule of 2000 (Federal Register, December 8, 2000) does not mandate a separate cost for LSW, it does allow states to budget health and safety costs as a separate category and, thereby, to exclude such costs from the calculation of average cost per home. States should carefully consider the approach to be taken when they draft their health and safety accounting procedures. While ease of accounting is an important consideration, states should keep in mind that activities assigned to the health and safety budget category do not have to be cost-justified by the energy audit. When the same items are assigned to incidental repair, weatherization material, or installation cost categories, they must be cost-justified.

Some Weatherization agencies have successfully applied for funding programs such as HUD's Lead Hazard Control and Healthy Homes to augment the Weatherization efforts when working in homes with lead paint. In some states, the legislatures have appropriated separate funding to cover the additional costs to train and certify workers for work in homes with lead paint. Another potential source of funding, subject to each State's approval, is the HHS Low-Income Home Energy Assistance Program (LIHEAP). LIHEAP Information Memorandum #2002-15, February 1, 2001, advises states that they may allow expenditure of LIHEAP funds, allocated for Weatherization homes, to be appropriately used for certain expenses related to LSW. (Please see Appendix B.)



7. Liability Issues. Unless an agency has specifically purchased additional insurance to cover pollution occurrences, they probably do not have sufficient insurance for their work as required by the WAP's Program Year 2002 Annual Guidance, Weatherization Program Notice 01-1. It is likely that their general liability insurance has a pollution occurrence exclusion. The WAP Annual Guidance requires that agencies have sufficient insurance coverage. When there is a gap in the coverage due to an exclusion, the agency has insufficient insurance. Therefore, WAP subgrantees are required to have Pollution Occurrence Insurance (POI). DOE strongly advises agencies to either refer or defer Weatherization work that will disturb surfaces that may contain lead-based paint, until they have insurance that will provide coverage for LSW work situations involving lead-based paint.

The cost of such insurance is an allowable DOE expense, and we urge agencies to seek ways to obtain the coverage at reasonable rates. DOE's Guidance suggests that States consider undertaking the negotiation of subgrantees' liability insurance, in order to get lower cost coverage for work in situations involving lead-based paint. Agencies do not have to have EPA certified workers to get POI at a reasonable rate. **Note: EPA certification is not a requirement for doing LSW. EPA certification is required only if the intent of the work is to do lead-based paint abatement work.**

8. Training. WE CANNOT EMPHASIZE TOO MUCH: LSW training for Weatherization workers, both in-house and contractor, is critical to the protection of Weatherization clients and the workers themselves. Also, it may be helpful or even necessary in getting reasonable Pollution Occurrence Insurance. DOE requires that when the disturbance of painted surfaces is significant (more than the de minimis levels stipulated in the EPA rule or exceeds the emissions levels under the OSHA Rule), Weatherization workers be trained in LSW. If workers have not had training, states must provide training for them before they work on homes with lead paint where painted surfaces will be disturbed in the course of doing the weatherization measures.

Other Federal Agencies With Lead Policies

The purpose of the following section is to provide a helpful reference indicating what weatherization agencies need to know about other Federal agencies' requirements that apply to weatherization work in situations involving lead-based paint, and when it may be necessary to get more information.

Department of Housing and Urban Development (HUD) - Office of Healthy Homes and Lead Hazard Control.

HUD's Lead-Based Paint Hazard Control Rule, 24 CFR35, (Part 35) - "Lead-Based Paint - Poisoning Prevention in Certain Residential Structures" went into effect September 15, 2000, although some of the provisions (the prohibited paint removal techniques) had been in effect since November 1999. The HUD rule was issued under sections 1012 and 1013



of the Residential Lead-Based Paint Hazard Act of 1992, which is Title X (Ten) of the Housing and Community Development Act of 1992.

The HUD rule normally does not pertain to weatherization work. However, in certain circumstances described below, the HUD rule does apply to weatherization work.

The HUD rule requires that weatherization agencies, when using HUD funds or working in HUD assisted housing, perform the work using "lead-based paint safe work practices," which are distinct from the "Lead Safe Weatherization" (LSW) as explained in WAP Program Notice 01-10 (briefly described above and provided in Appendix B). These practices are specified in section 35.930 of the HUD regulation for rehabilitation work. While DOE funds may be used for these measures if they are associated with the installation of energy efficiency measures, HUD funds (CDBG and/or lead hazard control programs) may also be available in certain communities.

The HUD rule sets "de minimis" levels (two square feet total per room interior surfaces and 20 square feet of the entire exterior surfaces or 10% of a small component type - e.g., window) of disturbed painted surfaces for adherence to the rule. States should note that in some homes there can be extremely high concentrations of lead present in small surface areas that could generate high exposure levels when disturbed, and endanger residents. This could result in an OSHA citation. In all cases OSHA worker safety regulations govern, and employers are obligated to observe good work practices (such as explained in the program notice as LSW) to ensure that levels of lead-based paint dust are kept below acceptable levels. See the OSHA regulations below.

When determining de minimis, it is important to note that "de minimis" simply means "the minimum" and does not release workers from the risks or liabilities associated with lead-based paint. A disturbed surface includes pieces that are removed, moved, or altered in any way. The two square feet per room measurement is the total amount of all disturbed surfaces. The twenty square feet per exterior surface is the total amount of all disturbed surfaces over the entire exterior of a home, including the soffit and fascia. Ten percent of a component piece like a window or door is again a total of the disturbed surface. Remember: a component like a window has its own components such as the sill, sash, trim, etc. and the 10% measurement applies to each of those as well.

When the HUD Regulation *Applies* to Weatherization

The HUD regulation only applies to weatherization work when all four of the following conditions are true:

1. It is pre-1978 housing, and
2. The dwelling has not been certified to be lead-based paint free, and



3. The amount of disturbed lead-based painted surfaces exceeds two square feet per room of interior surfaces or twenty square feet of exterior surface or 10% of a small component, e.g., window, and
4. Either it is Federally assisted housing (including HUD Section 8 vouchered housing) or Federally owned housing being sold, and/or HUD funds are being used to weatherize, rehabilitate, or repair the home

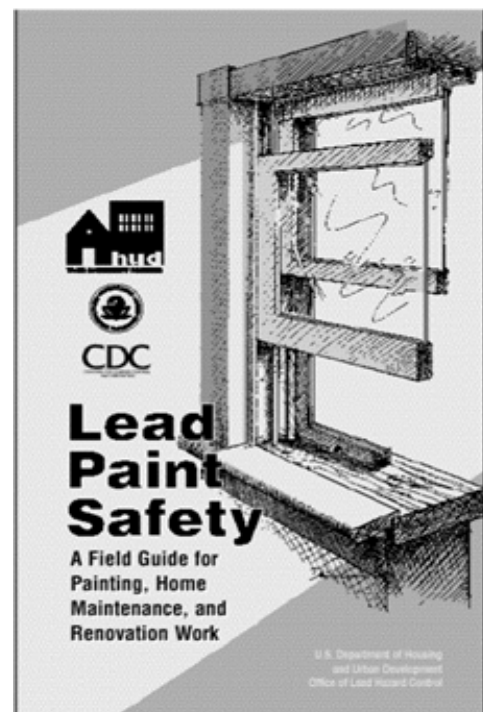
When the HUD Regulation *Does Not* Apply to Weatherization

The HUD rule does not apply to weatherization work when any one of the following five conditions is true:

1. It is post-1977 housing, or
2. The dwelling has been certified to be lead-based paint free, or
3. The amount of disturbed lead-based painted surfaces is less than two square feet per room of interior surfaces or twenty square feet of exterior surface or 10% of a small component, e.g., window, or
4. The home is neither Federally assisted housing, nor Federally owned housing being sold nor is HUD money funding the weatherization work, or related rehabilitation or repair of the home, or
5. The housing is designated exclusively for the elderly or disabled, unless a child under age 6 is expected to live there.
6. Zero-bedroom dwellings, including efficiency apartments, single-room occupancy housing, dormitories, or military barracks.
7. Property where all lead-based paint has been removed.
8. Unoccupied housing that will remain vacant until it is demolished.
9. Non-residential property.

Guidelines on Measuring and Controlling Lead-Based Paint

Under Title X, Section 1017, HUD was required to establish guidelines for lead-based paint hazard evaluation and reduction. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing **provides information on how to control lead-based paint hazards on-site.** HUD's guidelines, revised in 1997, are considered the most protective methods of lead abatement and interim controls for workers and the public. These guidelines are to be followed in federally owned and federally financed properties.





HUD website reference:

<http://www.hud.gov/offices/lead>. Also call 1-800-424-LEAD.

HUD has also developed **Lead-Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work**, a document for field use describing lead safety work practices and job set-up procedures from painting, home maintenance and renovation.

Environmental Protection Agency (EPA) - Office of Pollution Prevention and Toxics.

Section 406 of the Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X) applies to weatherization work. This is the Pre Renovation Education Rule, which became effective June 1, 1999, under EPA Final Rule, 40 CFR Part 745 titled; "Lead; Requirements for Hazard Education Before Renovation of Target Housing."

The EPA publication "**The Lead-Based Paint PreRenovation Education Rule...a handbook for contractors, property managers and maintenance personnel,**" outlines local agencies' responsibilities according to the Lead Pre Rule. (Publication number: EPA -747-B-99-004. Multiple copies of both documents can be ordered from the Government Printing Office, Phone 202-512-1800.)

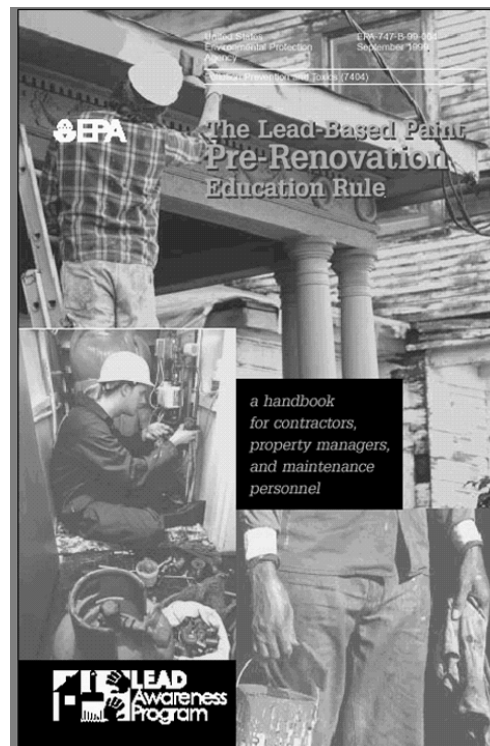
WHAT IS THE LEAD-BASED PAINT PRE-RENOVATION EDUCATION RULE (LEAD PRE)?

Notification About Lead Safety.

The Lead PRE rule is a federal regulation affecting construction contractors, property managers, and others who perform renovation and/or weatherization for compensation in residential housing that may contain lead-based paint.

Examples of activities covered by this rule include but are not limited to

- Remodeling
- Repair and maintenance
- Plumbing
- Carpentry
- Electrical work





- Painting
- Window replacement

Federal law requires (Pre-Renovation Education Rule) that owners and occupants of a house or apartment built before 1978 receive the pamphlet *Protect Your Family from Lead in Your Home* prior to the start of renovation work. The requirement applies to any work that will disturb a painted surface larger than 2 square feet when the work is done by:

- ! contractors who have been hired to do any kind of work. Among others, this can apply to painting, drywall, and electrical trades.
- ! owners of rental properties who have work performed by maintenance staff.

Contractors and owners must make sure that occupants have received the pamphlet.

- ! For owner-occupied homes, the contractor must have the homeowner sign an acknowledgment after receiving the pamphlet. Or, the contractor can send the pamphlet by certified mail.
- ! For tenants, the contractor or property owner must have an adult occupant sign an acknowledgment form receiving the pamphlet. Or, the contractor or owner can send the pamphlet by certified mail. If the contractor cannot get a signed acknowledgment, the contractor must sign a statement documenting this.
- ! For work in common areas, such the lobby, of an apartment building, the contractor must give the pamphlet to the owner and to the occupants of all affected areas and inform them of the nature, location, timing, and length of the job.

See Appendix C of this training manual for a copy of the *The Lead-Based Paint Pre-Renovation Education Rule* and the pamphlet *Protect Your Family from Lead in Your Home*. For additional information also see support reference, *A Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 11 and 67.

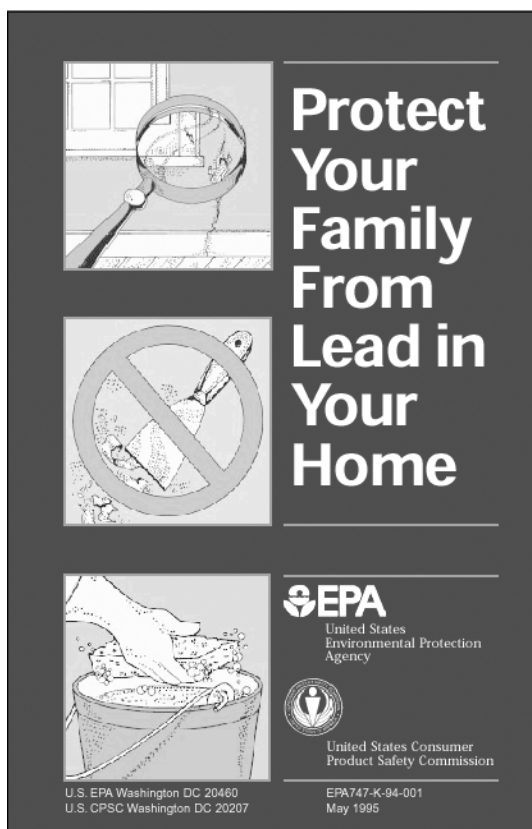
Housing and activities excluded from the rule include

- Housing built in 1978 or later
- Housing for the elderly or disabled persons (unless children will reside there)
- Dwellings without bedrooms (studio apartments, dormitories, etc.)
- Housing or components declared lead-free by a certified inspector or risk assessor
- Emergency renovations and repairs
- Minor repairs and maintenance that disturb two square feet or less of paint per component



Tips For Easy Compliance

1. Copy and use the sample forms included on the following pages.
2. Attach the forms to the back of your customer renovation, repair contracts or work orders. The completed forms can be filed with your regular paperwork.
3. If a tenant is not home or refuses to sign the form, you may use the self-certification section of the form to prove delivery. This will reduce your paperwork.
4. Plan ahead to obtain enough copies of the lead pamphlet. To get multiple copies:
 - Call the Government Printing Office (202) 512-1800 Send fax requests to (202) 512-2233
 - Request copies in writing from **Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954**
 - Obtain copies via the Internet at www.epa.gov/lead





Confirmation of Receipt of Lead Pamphlet

I have received a copy of the pamphlet, *Protect Your Family From Lead in Your Home*, informing me of the potential risk of the lead hazard exposure from renovation activity to be performed in my dwelling unit. I received this pamphlet before the work began.

Printed name of recipient

Date

Signature of recipient

Self-Certification Option (for tenant-occupied dwellings only)

If the lead pamphlet was delivered but a tenant signature was not obtainable, you may check the appropriate box below.

Refusal to sign--*I certify that I have made a good faith effort to deliver the pamphlet, Protect Your Family From Lead in Your Home, to the rental dwelling unit listed below at the date and time indicated and that the occupant refused to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit with the occupant.*

Unavailable for signature--*I certify that I have made a good faith effort to deliver the pamphlet, Protect Your Family from Lead in Your Home, to the rental dwelling unit listed below and that the occupant was unavailable to sign the confirmation of receipt. I further certify that I have left a copy of the pamphlet at the unit by sliding it under the door.*

Printed name of person certifying lead pamphlet

Attempted delivery date and time

Signature of person certifying lead pamphlet delivery

Unit Address



Note Regarding Mailing Option - As an alternative to delivery in person, you may mail the lead pamphlet to the owner and/or tenant. Pamphlet must be mailed at least seven days before renovation (Document the date with a certificate of mailing from the post office).

Special Circumstances

Is painting considered renovation, even if no surface preparation activity occurs?

No. If the surface to be painted is undisturbed by sanding, scraping, or other activities that may cause dust, the work is not considered renovation and Lead PRE does not apply.

What if I renovate my own home?

Lead PRE applies only to renovations performed for compensation; therefore, if you work on your own home, Lead PRE does not apply.

Is a renovation performed by a landlord or employees of a property management firm considered a “compensated renovation” under Lead PRE?

Yes. The receipt of rent payments or salaries derived from rent payments is considered compensation under Lead PRE. Therefore, renovation activities performed by landlords or employees of landlords are covered.

Do I have to distribute the lead pamphlet seven days before beginning renovation activities?

The seven-day advance delivery requirement applies only when you deliver the lead pamphlet by mail; otherwise, you may deliver the pamphlet anytime before the renovation begins. However, the renovation must begin within 60 days of the date the pamphlet is delivered.

When the EPA Regulations *Do* Apply to Weatherization:

The EPA regulation (section 406) only applies to weatherization work when all three of the following conditions are true:

1. It is pre-1978 housing, and
2. The dwelling has not been determined to be lead-based paint free by a certified lead-based paint inspector or risk assessor.
3. The amount of lead-based painted surfaces to be disturbed during minimum repairs or maintenance will exceed two square feet of paint per component.

When the EPA Regulations *Do Not* Apply to Weatherization:

The EPA rule does not apply to weatherization work when any one of the following is true:



1. It is post-1977 housing, or
2. It is housing for the elderly or disabled, or
3. The dwelling has been determined to be lead-based paint free by a certified lead-based paint inspector or risk assessor, or
4. The amount of lead-based painted surfaces to be disturbed during minimum repairs or maintenance does not exceed two square feet of paint per component.
(However, it is recommended that weatherization agencies do hand out the booklet in all cases involving pre-1978 housing, since it is excellent outreach material and the work may change after the job has begun, involving more disturbance of painted surfaces than originally anticipated.)

EPA website reference: <http://www.epa.gov/lead/index.html> or call 1-800-424-LEAD.

Other EPA Lead Regulations Pertaining to Weatherization

Section 402, The Lead-Based Paint Worker Certification rule does not apply if the intent of doing the work in the home is weatherization work; therefore, LSW practices utilized while installing energy efficiency measures do not require worker certification.

EPA's section 403 rule is the Lead Hazard Standard. More information about this can be found at: <http://www.epa.gov/lead/leadhaz.html> .

EPA's Office of Solid Waste memorandum to RCRA Senior Policy Advisors, EPA Regions 1 - 10, subject: Regulatory Status of Waste Generated by Contractors and Residents from Lead-Based Paint Activities Conducted in Households, from July 2000, allows disposal of everyday household hazardous materials - residue or debris containing lead-based paint like replaced windows, or discarded clothing - from homes as non-hazardous waste and thus not subject to toxic chemical disposal rules. Household lead-based paint debris, however, must be handled in a way that will not generate or discharge lead-based paint debris to the environment, either at the client's home or in transporting to a disposal site. A copy of the EPA Memorandum is provided in Appendix D.

The proposed EPA rule, referred to as the Renovation Rule, as of August 2001, has not yet been issued. DOE strongly believes that this rule will not apply to weatherization work since weatherization is limited to the installation of energy conserving measures to reduce the energy burden of low-income families. DOE does not consider weatherization work to be renovation or remodeling activities



Occupational Safety and Health Administration

OSHA is an agency of the Department of Labor which writes and enforces rules protecting workers on the job. Title X, subtitle C, sections 1031 and 1032, Worker Protection, of the Housing and Community Development Act of 1992 amended the Occupational Safety and Health Administration (OSHA) standards for occupational health and environmental controls in Subpart D of 29 CFR part 1926 by adding a new Section 1926.62 containing employee protection requirements for construction workers exposed to lead. The OSHA Construction Standard 29 CFR 1926.62 became law June 3, 1993. The complete OSHA Construction Standard is provided in Appendix E.

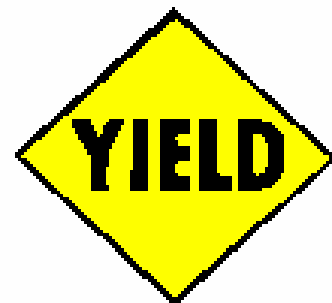
WHAT IS THE OSHA LEAD IN CONSTRUCTION STANDARD?

OSHA develops and enforces standards that protect employees from work-related hazards. To protect employees from lead hazards, the **OSHA Lead in Construction Standard (29 CFR 1926.62)** was developed. The Standard became law on June 3, 1993. **The OSHA Standard set two legal limits for the amount of lead workers are allowed to breathe.**

Action Level

The Action Level for lead is 30 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The Action Level is like a **yield sign**. It means **caution!**

The Action Level is an **average** of the amount of lead in the air over an eight-hour period. If the work area has or is expected to have airborne levels of lead at or above $30 \mu\text{g}/\text{m}^3$ of air, the employer must train the workers on the hazards of working with lead and provide special medical exams called medical surveillance.



Permissible Exposure Level

The Permissible Exposure Limit (PEL) for lead is $50 \mu\text{g}/\text{m}^3$. The PEL is like a **stop sign**. It means **go no higher!**



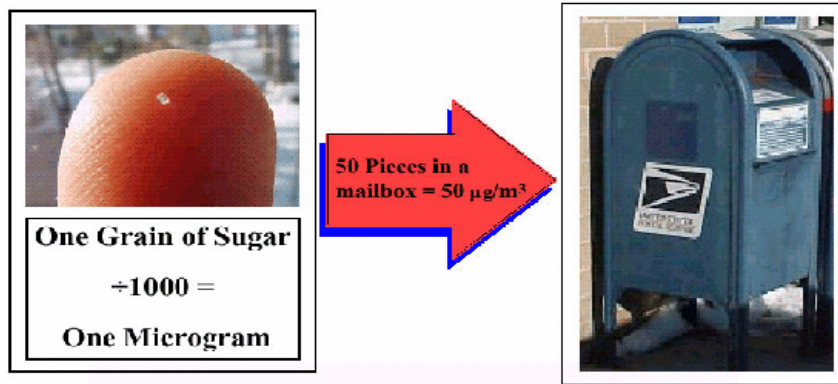
The employer is not allowed to let workers inhale lead in concentrations of more than $50 \mu\text{g}/\text{m}^3$ of air without proper protection. If the workers are in an area with more lead in the air than the PEL, the employer must reduce the exposure. The PEL is the highest average amount of lead exposure allowed for workers.



How Much Lead Can Workers Be Exposed?

The PEL ($50 \mu\text{g}/\text{m}^3$) is a very small amount of lead. If one microgram is equal to one thousandth of a grain of sugar and a mailbox has a volume of approximately one cubic meter, the PEL would equal 50 of those tiny sugar fragments (1/1000 of a sugar grain) inside of a mailbox. When performing a task with exposure to lead concentrations of $50 \mu\text{g}/\text{m}^3$ of air or more for a standard eight-hour shift, the worker is at the permissible exposure limit

One Grain of Sugar $\div 1000 =$ One Microgram



50 Pieces in a Mailbox = $50 \mu\text{g}/\text{m}^3$

The action level and PEL are based on the average level of airborne lead during an eight-hour day. If the exposure to lead is for more than eight hours a day, the action level and PEL must be adjusted.

To determine the new exposure limit, divide 400 by the hours worked that day.

$$\frac{400}{\text{Total Number of Hours Worked}}$$

What would the adjusted PEL be for a 12-hour shift?

When working a 12-hour shift with an exposure to a lead concentration of $50 \mu\text{g}/\text{m}^3$ of air, is it above or below the PEL?



Protection and Responsibility

The OSHA Lead in Construction Standard states that if exposure to airborne levels of lead is above the PEL, the employer must implement strategies to reduce the exposure. Such strategies include

- Training on lead hazards
- Work Practice and Engineering Controls
- Protective Clothing
- Change areas
- Washing facilities
- Showers (when feasible)
- Protective equipment
- Respirators
- Medical surveillance



Training

The OSHA Standard requires employers provide training to anyone

- Working with lead at or above the action level ($30 \mu\text{g}/\text{m}^3$)
- Performing any lead-related task that is presumed to expose a worker to lead levels above the action level
- Using lead compounds that cause eye or skin irritation.

The training should cover

- OSHA Lead in Construction Standard
- Jobs that expose workers to lead above the Action Level
- Information on respirators including uses, types, and the importance of a proper fit
- Medical exams required for everyone working with lead
- Strategies the employer can use to reduce lead exposure

Work Practice and Engineering Controls

Employers produce a compliance program that list in writing the various work practices and engineering controls used to reduce lead exposure. Examples of these types of controls would be

- Using materials or tools that produce less lead dust or fewer fumes
- Changing the way a job is performed to create less dust
- Rotating schedules to reduce worker exposure to lead
- Providing respirators and protective clothing

The Workplace

The OSHA Standard states that all surfaces are kept as free of lead as possible. Floors and other surfaces must be cleaned with a vacuum using a high efficiency particulate air (HEPA) filter. Shoveling, dry-sweeping, wet-sweeping, and brushing are only used on the



job site if vacuuming is proven ineffective [OSHA 1926.62 (h)(3)]. Employers must not allow workers to eat, drink, smoke, chew tobacco, or apply cosmetics in a work area where exposure to lead is above the PEL. They must provide a place where anyone exposed above the PEL can eat and drink safely away from lead.

WARNING
LEAD WORK AREA
NO SMOKING, DRINKING, OR
EATING

Whenever working with lead, employers must provide a place for washing and must require employees to wash at the end of each work-shift. The OSHA Standard requires employers to provide a place where anyone exposed above the PEL can change into and out of work clothes (and shower if feasible). If employers decide having a shower is not feasible, they must be able to

explain their reasoning to any OSHA inspector who comes to the site. Your employer must post warning signs in the work area where employees are exposed to lead levels above the PEL.

De Minimis:

Determine the total square footage or percentage of disturbed surfaces and decide if LSW practices should be followed for the following circumstances (answers at end of section):

1. Cutting an attic access which measures 16"X16".
2. Installing a wall thermostat which measures 4"X5".
3. Installing a door shoe on a door measuring 3'X1.5"X7'



4. Installing insulation by drilling 2" access holes through the exterior of a single, 2X4 framed, one-story home measuring 50'X30' with 8' ceilings.

5. Installing insulation by lifting the 4" lap siding of a single, 2'4 framed, one story home measuring 50'X30' with 8' ceilings.

MODULE 3: SUMMARY & REVIEW

DOE Weatherization Program Notice

- Applies to all grantees applying for financial assistance under the Weatherization Assistance Program
- States must identify and implement "lead-based paint safe work practices" referred to as "Lead Safe Weatherization" (LSW)
- LSW is a set of protocols that include lead-based paint training, proper disposal of materials containing lead-based paint, and a deferral policy.
- LSW protocols also involve setup and cleanup practices that contain the spread of lead dust during weatherization activities.
- States should develop a deferral policy so that subgrantees can decide when to postpone weatherization activities until the crew is prepared to work with lead-based paint or until another agency has corrected the problem and when to arrange for other agencies to perform the more costly activities.
- LSW is to be used:
 - If the dwelling was constructed pre-1978 as that is when the Consumer Product Safety Commission (CPSC) banned the use of lead paint for residences and
 - the dwelling has not been determined to be lead-based paint free, and either
 - the amount of disturbed surface (any surface that is cut, moved, removed or altered in any way) exceeds a total of 2 square feet per room of interior surface or
 - a total of 20 square feet of the entire exterior surface including soffit, fascia, etc., or



- 10% of a component type keeping in mind that each piece or section is a component or
- the lead-based paint dust will exceed the OSHA defined airborne levels for lead.

Testing for lead-based paint is performed on a case-by-case basis with the following considerations:

- Post-1978 dwelling may be assumed to be lead-based paint free
- Pre-1930 dwelling may be assumed to have lead-based paint
- For dwellings built between 1940 and 1978, testing is based upon the amount of paint to be disturbed and the cost of performing the tests.
- Agencies should ensure that their liability insurance has no exclusion clause for weatherization in a home with lead-based paint.

The OSHA Lead in Construction Standard

- Protects workers from exposure to lead-hazards.
- AL = “Action Level” $30/\mu\text{g}/\text{m}^3$; “Caution” = training and medical exams must be provided.
- PEL = “Permissible Exposure Limit”; “STOP” = employer must reduce exposure.
- To adjust the PEL, divide 400 by the number of hours of exposure in one workday.
- Employers must provide training to anyone who may be or who has been shown to have been exposed at or above the action level.
- Employers must develop a compliance program that lists in writing all ways they are trying to reduce employee exposure to lead.

Federal Regulations

- OSHA created the *Lead in Construction Standard*.
- *Title X* required EPA to produce regulations for training and certification, and a definition for various lead-based paint hazards (paint, dust, soil).
- *Title X*, Section 1017, required HUD to create guidelines for working with lead and inspecting potentially lead-containing paint. It also required testing and control of lead-based paint hazards in federally assisted housing.
- *Title X* is also known as, “*The Lead-Based Paint Hazard Reduction Act of 1992*”.
- *Title X*, Section 406(b), Lead-PRE, requires any individual doing repair or renovation for compensation to provide the EPA brochure, *Protect Your Family From Lead in Your Home*, to the owner/occupant of the dwelling before beginning work that will disturb more than 2 square feet of interior



- surface area per room, or 20 square feet of the entire exterior surface or 10% of any component.
- A letter acknowledging receipt of the publication is required.
 - *Title X*, Sections 402 (a) and 404(b) require training of workers, supervisors, inspectors, and risk assessors. This training course does not meet any of the certification requirements for the training outlined in *Title X*.

De Minimis Exercise: Answers and Discussion

1. Cutting an attic access measuring 16" X 16".

Formula: L X W = Area

Divide Area by 1 square foot to determine square feet of disturbed surface.

$$16" \times 16" = 256 \text{ square inches}$$

Convert to square feet: (12" X 12" = 144 square inches)

$$256 \text{ square inches} / 144 \text{ square inches} = 1.77 \text{ square feet}$$

The total disturbed surface, 1.77 square feet, does not exceed de minimis.

Lead-safe weatherization practices now depend upon the amount of dust that will be generated by the activity. If monitoring is not ongoing, it would be the best practice to utilize lead-safe weatherization.

2. Installing a wall thermostat that measures 4" X 5".

Formula: L X W = Area 4" X 5" = 20 square inches

Convert to square feet: (12" X 12" = 144 square inches)

$$20 \text{ square inches} / 144 \text{ square inches} = .138 \text{ square feet}$$

The total disturbed surface, .138 square feet, does not exceed de minimis.

Lead-safe weatherization practices now depend upon the amount of dust that will be generated by the activity. If monitoring is not ongoing, it would be the best practice to utilize lead-safe weatherization.

3. Installing a door shoe or door sweep on a door measuring 3' X 1.5" X 7'.



Option 1 - To install a door shoe – weatherstripping on the bottom of the door – the door will likely have to be removed to cut or plane the door bottom. By removing the door the entire door area must be considered as part of the de minimis calculation - 3' X 7' = 21 square feet.

This method clearly exceeds de minimis and lead-safe weatherization practices must be followed.

Option 2 – Without removing the door, a door sweep is added as a component of the door. As a component of the door measuring 1" X 36" = .25 square feet, it is less than 10% of the total door area (3' X 7' = 21 square feet).

This method does not exceed de minimis. Lead-safe weatherization practices now depend upon the amount of dust that will be generated by the activity. If monitoring is not ongoing, it would be the best practice to utilize lead-safe weatherization.

- 4. Installing insulation by drilling 2" access holes through the exterior of a single, 2X4 framed, one-story home measuring 50' X 30' with an 8' ceiling.
30' + 50' + 30' + 50' = 160 linear feet of house perimeter

Convert to inches: 160' X 12" = 1920 linear inches 1920 inches (perimeter of house) / 16 inches between studs = 120 access holes - minimum _____
2" X 2" X .7854 (correction multiplier for computing the area of a circle) = 3.14 3.14 (square inches per hole drilled) X 120 access holes = 377 square inches

Convert to feet: 377 square inches / 144 square inches = 2.6 square feet

The de minimis of 20 square feet per total outside surface was not exceeded.

- 5. Installing insulation by lifting 4" lap siding on the exterior of a single, 2"X4" framed, one-story home measuring 50' X 30' with an 8' ceiling.
30' + 50' + 30' + 50' = 160 linear feet of house perimeter

Convert to inches: 160' X 12" = 1920 linear inches
1920 linear inches X 4 inches (size of siding) = 7680 inches²

Convert to feet: 7680 square inches / 144 square inches = 53.3 square feet

The de minimis of 20 square feet per total outside surface was exceeded. Lead-safe weatherization practices must be followed.



Lead-Safe Weatherization

MODULE 4

Lead Poisoning Prevention and Lead-Safe Weatherization Practices

Part A – Preventing Lead Poisoning

Part B – Assessment Before Weatherization Work

Part C – House Preparation

Part D – Techniques, Tools & Personal Protective Clothing

Part E – Lead-Safe Weatherization Measures

Part F – Cleanup and Disposal



INTRODUCTION

The intent of weatherization is to save energy. It is not renovation or abatement; therefore, although weatherization will not involve any work that is considered renovation or lead-based paint abatement, you may still be disturbing lead-based paint.

As a result of completing this module, you will understand how to perform lead-safe weatherization including:

- **How lead poisoning is prevented**
- **Occupant and Resident Safety**
- **Preparation of work areas**
- **How to keep lead dust to a minimum**
- **How to confine lead dust and paint chips**
- **How to perform proper clean-up**

Specifically we will discuss how to do lead-safe weatherization for the following:

- **Drilling holes in interior walls**
- **Drilling holes in exterior walls**
- **Cutting attic access into ceiling**
- **Removing caulk or window putty (interior)**
- **Removing caulk or window putty (exterior)**
- **Removing weather stripping**
- **Door modifications**
- **Planing a door in place**
- **Installing door shoes**
- **Replacing door jambs & thresholds**
- **Replacing windows**
- **Furnace filter replacement**
- **Furnace and thermostat replacements**
- **Replacing HEPA filters and cleaning HEPA vacuums**

Minimizing dust, confining dust produced and proper cleanup are all necessary elements of lead-safe work practices. Any time weatherization work is done in a home built prior to 1978, lead-safe work practices must be used to protect residents of the home, the workers, and the workers' families and colleagues.



PART A

HOW CAN LEAD POISONING BE PREVENTED?

Today, the government estimates that 64 million U.S. homes contain lead-based paint. HUD estimates that 90 percent of privately owned homes built before 1940 contain some lead-based paint. The older the dwelling, the more likely it is to contain lead-based paint. Despite the prevalence of lead-based paint, lead poisoning can be prevented.

Assume Lead Is Present

When working in pre-1978 housing, always assume that lead-based paint is present unless it has been thoroughly tested.

Control Lead-Based Paint Hazards

It is important to minimize exposure to lead dust by reducing the creation of dust. When a lead hazard is identified, the source of the problem must be addressed. For example, if paint is chipping off a ceiling due to moisture from a leaking pipe, the pipe should be fixed before repairing the damaged paint. In the process of fixing the pipe, the workers need to be aware that lead could be present on the pipe if it is painted or if lead dust has settled there. Lead-safe work practices that reduce the creation of lead dust should be followed. Such practices include using “wet methods,” and frequent, thorough and proper cleaning. Lead-safe work practices are discussed in more detail in the following chapters.

Education

Increasing public awareness of lead hazards and the negative health effects from lead exposure and publicizing ways that lead exposure can be minimized are important steps in reducing the occurrence of lead poisoning.

Practice Good Housekeeping

When performing jobs that disturb lead-based paint, it is important to keep the area clean. That means cleaning up as the job progresses. If paint chips and debris left on the floor can be walked on, more lead dust will be produced and clean areas could be contaminated.

Practice Good Nutrition

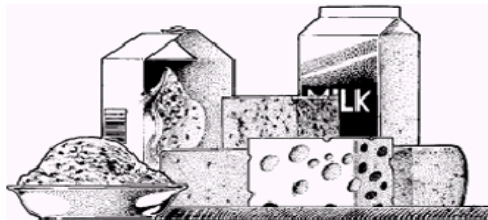
A diet with plenty of iron and calcium will reduce the amount of lead your body absorbs if and when exposure occurs. Not eating a well-balanced diet increases lead absorption. Foods high in iron, calcium, vitamin C, zinc, and protein reduce absorption; foods high in fat tend to increase absorption.



FOODS HIGH IN IRON



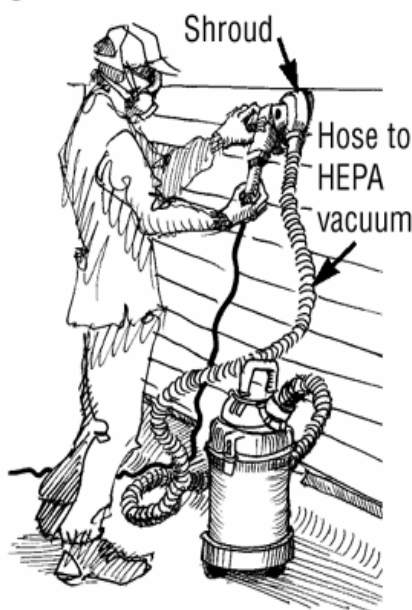
FOODS HIGH IN CALCIUM



Protection

Lead-based paint can pose a threat to workers by causing damage to their brains, nervous and reproductive systems. By adopting basic safety precautions, workers can protect themselves and their families as well as the residents from lead exposure. Use lead safe weatherization practices and the following safety precautions:

- Make sure the employer provides workers with information on how to create a lead-Safe workplace and know your rights as a worker.
- Wear personal protective gear specifically suited for the particular LSWx measure. Use NIOSH approved respirators at least ½ face with HEPA filters.
- Use disposable overalls, gloves (cloth, plastic or rubber as appropriate), goggles and disposable shoe/boot covers. Wear painter's hat.
- Keep dust to a minimum and confine dust and paint chips to the work area
- Clean-up during and after work - always using special clean-up procedures
- During weatherization wash your hands and face frequently, especially before eating, drinking, or smoking outside the work area.
- Change your shoes and clothing before leaving the job site to avoid exposing others to lead dust.*
- Get routine medical exams to check Blood Lead Levels. Do non-lead related work if your Blood Lead Level gets too high.



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- Inform your employer if you develop signs of lead poisoning. Because of the difficulty in self-assessment of lead poisoning, good communication between employers/employees is a must.
- Eat a balanced diet, especially foods high in iron & calcium.

* If disposable overalls are worn, they should be disposed of with other lead contaminated debris. If reusable overalls are worn, they should be laundered by a commercial laundry equipped to handle contaminated clothing. They must be laundered separately from other clothing and fabrics so the launderer must be informed that the clothing is contaminated.

Chelation

Chelation is the medical treatment used for severe lead poisoning. If the Chelation process is prescribed, that means that damage has already occurred. Chelating agents (drugs) are capable of binding with lead to form non-toxic substances that are excreted from the body. It is a risky treatment. Chelation can remove some of the lead in your body, but it can also be harmful to your health. As the lead stored in the bones binds with the Chelating agents, the lead is once again being circulated throughout the body.

Prophylactic Chelation means giving chelating drugs to someone to prevent lead poisoning. Chelating drugs will only help remove lead from your body **after** you have been poisoned. Chelation will not protect anyone from lead poisoning and it is illegal for your employer or anyone employed by your employer to give you prophylactic (preventative) chelation.

PART B ASSESSMENT PRIOR TO WEATHERIZATION WORK

For any weatherization project, a site visit is conducted to provide an opportunity to visit with the client and to look for health and safety items that may disqualify the residence or delay work from being completed. Some of these might be Hanta Virus concerns, asbestos, structural integrity and possible lead-based paint.

Evaluating the House for Lead-Based Paint

There are a number of reasons why it should be determined if the job will create lead dust prior to starting work. These include:

- Ensuring the activities will not create additional hazards or potential liabilities from lead dust.
- This is an opportunity to indicate specific lead dust control activities in your work schedule and the use of appropriate lead-safe weatherization practices.
- Having materials and equipment on hand to safely manage lead dust, minimize the amount of dust created, and reduce the potential for spreading dust to other parts of the dwelling or surrounding area.



- Accurately estimating the costs of the additional time, labor, and supplies to perform lead-safe weatherization.
- Making sure that workers are qualified for the job.
- Developing a list of any specific issues and preparing to discuss them with owners and occupants prior to the inception of work .

Was the Home Constructed Prior to 1978?

Many houses constructed before 1978, especially those constructed prior to 1960, contain some lead-based paint. Unless otherwise documented, always assume that painted surfaces from pre-1978 houses contain lead-based paint and that all dust generated from these surfaces may contain lead. Although the amount of lead-based paint found in homes varies, older dwellings typically contain higher concentrations of lead paint.

What is the age of the property?

If the property was constructed **after** 1978, there is no need to perform lead-safe weatherization practices. The resident should be your first source for this information. They can get information on the age of the property from tax records or property deeds.

What is the physical condition of painted surfaces?

Blower Door and Duct Blaster Caution: If it is visibly apparent that lead dust and/or debris from paint degradation is in the environment, workers should be aware that blower doors and duct blasting can worsen the situation by spreading lead dust throughout the house. A 1997 EPA study showed that worker exposure during maintenance and repair on central heating systems to have a Time Lead Average of greater than $49\mu\text{g}/\text{m}^3$ which is only one point below the OSHA Permissible Exposure Level (PEL). If lead dust and debris is apparent in the home, assume it is in duct work.

Has any prior renovation work been done?

If all of the work will be conducted in a dwelling or portion of a dwelling renovated after 1978, you do not need to utilize lead-safe weatherization practices, even if the property you will not be working on was built earlier. Keep in mind that you do need to practice lead-safe work practices if work occurs in a dwelling or portion of a dwelling that was constructed prior to 1978 or that was not renovated after 1978. Ask the owner for this information. If the owner does not know if or when renovation work was conducted, and the property was constructed prior to 1978, assume all paint surfaces contain lead-based paint.

***Has a lead evaluation been conducted (applicable for federally funded properties)?***

Lead evaluations cover a range of activities that test for lead-based paint. If the owner has documentation that an EPA or state certified inspector or risk assessor performed a lead evaluation and found that no lead-based paint is present in the work area, workers do not have to utilize lead-safe weatherization practices, regardless of the age of the property.

Will the work disturb painted surfaces, or create/disturb dust that may contain lead?

All weatherization activities that disturb painted areas, including scraping paint, removing siding, drilling, and replacing windows, will create some dust. Additionally, some areas such as window troughs and loose areas near a building's foundation typically accumulate dust and paint chips. Consider these factors when approaching the job and develop an appropriate plan to deal with the potential lead dust. If the work will not disturb any painted surfaces or areas where lead dust can accumulate, lead-safe weatherization practices do not have to be used.

What precautions are needed?

The amount of dust created is directly related to the size of the work area, condition of the structure, tools, materials and dust control methods used. Later in this module, descriptions of the necessary precautions that should be taken while setting up the work areas, performing weatherization activities, and cleaning-up will be discussed.

If the job will disturb paint surfaces, will it create high dust levels that will cause you to take extra precautions?

Certain projects such as removing siding, windows, or doors, can create high dust levels. Additionally, surfaces with deteriorated or chipped paint are more likely to generate high levels of dust than intact surfaces. The level of dust a job will create directly affects other parts of the job, including the materials and equipment required, precautions taken during set up, and the control methods used.

Client Communication About Lead

In addition to any generic communication with residents during a weatherization job, they must be informed that the work has the potential to create lead dust. The EPA pamphlet, *The Lead-Based Paint Pre-Renovation Rule*, provides good pointers for discussions with clients. The following topics should be discussed with the homeowner before beginning any weatherization job that has a potential to create lead dust.



Year of Construction and prevalence of lead-based paint

Many homes built before 1978 contain some lead-based paint. It is important to note that lead-based paint is more common and was used more extensively in homes built before 1940. As seen in the following chart, homes built before 1940 also used paint that had a higher concentration of lead.

		Year of Construction				
	Component Type	All Years	1978-1998	1960-1977	1940-1959	Before 1940
Interior	Walls, Floors, Ceilings	2%	0%	1%	2%	7%
	Windows	9%	1%	2%	6%	21%
	Doors	7%	0%	1%	7%	22%
	Trim	5%	0%	2%	4%	15%
	Other	4%	0%	1%	2%	12%
Exterior	Walls	14%	0%	9%	18%	34%
	Windows	25%	0%	12%	30%	41%
	Doors	15%	2%	5%	29%	33%
	Trim	11%	3%	8%	16%	24%
	Porch	15%	1%	7%	25%	28%
	Other	18%	0%	8%	37%	37%

Changing common work practices can protect workers and children.

In addition to discussing the hazards associated with lead-based paint and lead dust, the plan for lead-safe weatherization practices should be reviewed with the residents. This plan should include:

- Describing how residents' possessions will be protected from further lead dust contamination.
- Identifying the activities residents are expected to perform before the work begins.

It is much easier to prevent possible problems during set-up than to do extra cleaning afterward. Residents may be asked to move some items before work begins. This includes moving any furniture and fixtures out of the work area and storing them away from any work that may create dust. Seal over remaining items with polyethylene protective sheeting where possible. Moving items such as draperies, area rugs, and plants will reduce the potential for contaminating them with lead dust. If the paint in the work area is already deteriorated, suggest that the residents clean these items prior to moving them to other areas of the house to minimize the amount of lead dust that is distributed to other areas of the house. Additionally, if the residents move and clean these items before the weatherization work begins, there is less worry about being held responsible for damaged or lost items.



DOE DEFERRAL POLICY

When dealing with homes proven or assumed to have lead, states should develop a lead-based “deferral policy” to provide guidance to their subgrantees as to when it is prudent to defer certain weatherization work in homes that have either tested positive or are assumed to have lead-based painted surfaces. The following steps are recommended:

First, the subgrantee should assess the following factors:

1. Is the agency prepared to work with lead-based paint? (i.e., have workers received training in LSW work practices; is the necessary equipment such as HEPA vacuum cleaners available; and does the agency’s liability insurance policy allow work with lead-based paint);
2. What is the condition of the painted surfaces in the house? (i.e., is it so seriously deteriorated that a workman’s presence just walking around the house is enough to stir up lead-based paint laden dust residues and thus pose a threat to the clients and to the workers themselves);
3. What is the extent to which the specific energy efficiency measures determined by the audit will disturb painted surfaces? (i.e., will the disturbance generate dust in excess of OSHA minimums); and,
4. Will the cost of doing LSW represent a large portion of the total cost, such as to exceed the amount allowed by the state’s health and safety plan? (which could be the case if large amounts of lead based paint surfaces will be disturbed)

Second, based on consideration of the above factors, determine whether to:

1. Proceed with all the weatherization work, following LSW work practices, or
2. Do some of the weatherization tasks, defer others, or
3. Defer all of the weatherization work.

Deferral would mean postponing the work either until the Weatherization agency is prepared to work with lead-based paint, or until another agency has corrected the problem such that weatherization can be safely performed. In cases where extensive LSW would be necessary, agencies are encouraged to arrange with other organizations, which are funded to do lead paint hazard control, to perform some of the more costly activities, such as entrance testing or clearance testing. In areas where there are no organizations performing such work, weatherization agencies may choose to develop their own capabilities for lead-based paint hazard control work, but they may not use DOE Weatherization funds for this purpose.

The state’s lead-based paint deferral policy should not call for deferring the weatherization work solely because there is lead-based paint in the home. Even in such a home, regular weatherization work that does not disturb painted surfaces and does not stir up lead-based paint laden dust residues can be done.



PART C HOUSE PREPARATION

Any activity that disturbs painted surfaces on residential structures built before 1978 may cause lead hazards. Certain steps should be taken whenever surfaces with lead-based paint or presumed lead-based paint are disturbed. These steps are known as “lead-safe weatherization” (LSW) work practices. Designed to protect clients and workers, LSW practices should always be used when working on residences built before 1978.

Remember These Principles Before Starting Work:

1. **ASSUME:** Paint in homes built **before 1978** contains lead (unless a lead-based paint inspection shows it doesn't) exposing anyone to dust, especially children, is bad.
2. **CHECK:** Federal, state, and local regulations.
 - OSHA has rules for worker safety as discussed in Module 3
 - States and local communities may have rules for waste disposal
 - States may have clearance standards more stringent than federal standards
3. **AVOID:** Creating and spreading dust.
 - Use low dust work practices (i.e., mist surfaces with water before sanding or scraping, use a shroud on power tools)
 - Cover area under work with 6mil poly or two sheets of 4-mil poly.
 - Keep dust contained to the immediate work area. Do not track dust out of the prepared work area
 - The area will need to be thoroughly cleaned after the work is completed. This requires the use of HEPA vacuums followed by washing hard surfaces. In the past it has been recommended that a tri-sodium phosphate (TSP) detergent be used for cleaning-up lead dust. However, according to EPA document 747-R-97-002, dated March 1997, a laboratory study comparing lead dust cleaning efficiency of phosphate and non-phosphate containing detergents showed that non-phosphate detergents were just as effective at removing lead dust from a variety of surfaces as phosphate containing detergents. Therefore, the Department of Energy recommends that non-phosphate detergents be used to clean after weatherization. In fact due to environmental concerns some states and counties have restricted the use TSP. (EPA document 747-R-97-002 is presented in Appendix F)



4. **PROTECTION:** Occupants, particularly children.
- Contractors must take steps to protect occupants from lead-based paint hazards while the work is in progress.
 - Occupants, especially young children, may not enter the work site. Occupants are allowed to return only after the work is done and the home has passed a visual inspection or in some cases a clearance examination (See Module 6) that checks for deteriorated lead-based paint and harmful levels of lead-contaminated dust.
 - Occupants= belongings must be protected from lead contamination. This can be done by removing them from the work area or covering them with protective sheeting and sealing it to prevent dust from getting on the items.
 - The work site must be set up to prevent the spread of leaded dust and debris – sealing duct work and using containment plastic are examples.
 - Warning signs must be posted at entrances to the worksite when occupants are present; at the main and secondary entrances to the building; and at exterior work sites. The signs must be readable from 20 feet from the edge of the worksite. Signs must be in the occupants= primary language when practical.
 - It may be necessary to temporarily move occupants out of the unit if work will take several days and it involves kitchens, bathrooms, or bedrooms. This is responsibility of the dwelling=s owner.
 - For additional information see *Why Should I Follow This Guide@* and *Poor Maintenance Endangers Children@* - pages 1-2 of the support reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work@*.
 - Clean the
work site before occupants return. Cleanup is particularly important if painted surfaces were involved.
 - If painted surfaces were disturbed, a very careful visual assessment needs to be performed when the work is complete.

Lead-Safe Setup and Restricted Work Area

Decide if the task will create leaded dust or paint chips. Dust will be generated by sawing, scraping, planing, or drilling lead-painted materials. Removing lead-painted building components (window and door trim) or caulks and putty will also generate leaded dust. Some weatherization activities, such as insulating attics, installing water conservation measures, and applying caulks or sealants if paint is not disturbed in the preparation stage, should not create leaded dust hazards.



To contain and control lead dust and debris, lead-safe weatherization requires the establishment of "containment". For the purposes of this training, "containment" is anything that stops lead-contaminated dust from spreading beyond the work area to non-work areas.

In general, there are many degrees of containment, ranging from simple plastic sheeting on the floor surrounding a small work area to a fully sealed dust room. Some types of containment are more effective than others. A reusable drop cloth is not effective because it can trap and hold dust and paint chips, and can transport lead-contaminated dust from one job site to another. **Therefore, it is not an effective form of containment for working in homes with lead-based paint.**

Benefits of Containment

Reduces the risk to workers and the residents: Following lead-safe weatherization practices while performing weatherization activities will protect workers, co-workers, and residents from the negative health effects of lead. Reduced risk to workers and co-workers is also dependent upon wearing proper personal protection equipment.

Easier cleanup: The pre-work setup process is essential to keeping lead contaminated dust within the work area where it can be easily cleaned. Proper containment of the work area helps to limit the area you need to clean after the job is complete. This saves time and money.

To minimize the spread of lead dust, these lead safe work practices are required PRIOR to starting work:

- ! place protective sheeting on floor extending 5 feet from interior work area
- ! place protective sheeting on the ground 10 feet from exterior work area
- ! use protective sheeting create a debris curb or trough around the exterior work perimeter
- ! close or seal off all windows and doors within 20 of the exterior work area.
- ! do not track existing soil-lead hazards to interior spaces
- ! taping protective sheeting to wall or baseboard to keep dust from drifting behind the sheeting
- ! move or cover furnishings within 5 feet of work area
- ! minimize spread of dust by draping protective sheeting to reduce size of work area
- ! seal off doorways and duct work
- ! stock all necessary tools in contained area BEFORE work begins
- ! avoid tracking dust off the protective sheeting
- ! use HEPA attached tool shrouds



Typical Items for Work Area Setup to Contain Lead-Contaminated Dust

Barriers

- Rope or other barrier
- Brightly colored tape
- Saw horses
- Orange cones or other similar marker

Setup

- Covering for unmovable furniture, fixtures, plants or outdoor play area
- Duct tape, painters tape, or masking tape
- Stapler
- 4 or 6 mil plastic sheeting and heavy-duty bags (no specific regulations govern the thickness of plastic sheeting or bags – the specific thickness of sheeting required is based on the performance characteristics and the purpose of the plastic in each situation. Experience indicates that one layer of 6 mil (or two layers of 4 mil) is an appropriate choice for most applications. Although there is no specific guidance, 6 mil bags are preferred and in any case the thickness should be sufficient to contain the contents in transport and disposal).
- Utility knife or scissors
- Tack pad (sticky pad for walking on to remove dust from soles of shoes)
- Disposable towels or wipes
- Misting bottle

For specific interior and exterior dust containment set-up, materials and procedures refer to support publication, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*,

! See *Interior Set-up* pages 13 and 14

! See *Exterior Set-up* pages 15-16)

! See *High Dust Jobs* - pages 45-46



Dos and Don'ts

The DOs When Dealing With Lead-Based Paint

- Always use lead-safe work practices when disturbing lead-based paint or presumed lead-based paint.
- Restrict access and ask residents to stay away while working. Place a physical barrier across entrances to work area.
- Move furniture and other objects to at least 5 feet from the work area. If they cannot be moved, cover them with protective sheeting and secure sheeting with tape.
- Use wet sanding, scraping, or planing methods or use HEPA attachments on tools that generate dust. If you are doing production work such as drilling walls, a HEPA vacuum attached to the tool with a suitable shroud is very effective and will result in increased production as opposed to wet methods. Keep in mind that additional containment will be required to minimize the spread of dust not collected by the HEPA vacuum. This means sealing the work area from the rest of the residence with 4-mil poly walls to prevent the spread of dust should the HEPA attachment fail.
- Confine dust and debris in as small an area as possible by containing it. Use disposable 6-mil or two layers of 4-mil polyethylene (poly) sheeting under all work areas where you might generate dust and debris.
- Wear protective clothing, preferably disposable overalls with a hood or other disposable head covering. Wear shoe/boot covers in the work area. When moving from a work area to a non-work area, remove the covers and wipe the tops and bottoms of shoes/boots off before stepping off the poly sheeting.
- Clean the work area as often as needed to maintain the work area as free as possible from dust and debris. Dispose of leaded material in heavy-duty trash bags.
- When cleaning, vacuum all work areas with a HEPA vacuum, then wash or wipe down the work area with a detergent solution.



- Practice good hygiene by washing your hands and face before eating, drinking, or doing anything that will bring your hands into contact with your mouth.
- Change your work clothes and shoes; clean your tools; wash exposed areas of your body thoroughly, including your hair, before going home. Please see note regarding safe disposal and cleaning of clothing on page 4-4 of this module.

The DON'Ts When Dealing With Lead-Based Paint

- Do not turn leaded paint into leaded dust by dry scraping, sanding, grinding, abrasive blasting or planing lead-based paint or presumed lead-based paint (unless needed around electrical outlets).
- Do not use a torch (open-flame burning) or a high-temperature heat gun (above 1100 F) to remove paint, coatings, or glazing compound.
- Do not smoke, eat, drink, chew tobacco or gum, nor apply cosmetics while working with leaded or presumed leaded materials.
- Do not allow children or pets in the work area until you have finished and the area is thoroughly cleaned.
- Do not cut lead-painted or presumed lead-painted materials (doors, jambs, windows, etc.) inside a house or apartment.
- Do not track leaded dust from the work area to the other areas.
- Do not use reusable painters tarps or drop cloths.
- Do not leave anything (including construction debris) for the occupants to clean up.
- Do not use the occupant's broom, dustpan, or vacuum cleaner to clean up.
- Do not change vacuum HEPA filters in a residence you are working in. Precautions to minimize dust similar to those outlined for changing furnace filters should be used to change vacuum HEPA filters when changing at your workplace. If HEPA filters must be changed while at a job site a lead-safe area must be set up outdoors (see HEPA vacuum filter replacement - part D of this Module).



- Do not take lead home on yourself, your clothes, shoes, tools, or vehicle. Doing so can poison your family with dust you generate at the job if you bring it home.

The following practices are considered to be ineffective:

- 1. A reusable drop cloth** can carry dust from one job site to other job sites, and contaminate vehicles and storage areas. When it is used again it may contaminate the new (clean) job site with lead-contaminated dust.
- 2. Allowing furniture to remain in the work area** while the work is being performed. Lead contaminated dust may fall and remain on these furnishings after the job is completed. Residents could easily come into contact with the lead-contaminated dust on the furnishings and get poisoned.
- 3. Allowing residents access to work area** while the work is underway. The residents are then exposed to the lead-contaminated dust and can track the dust to other parts of the building where it could linger causing exposure and poisoning.
- 4. Open windows and doors** allow lead dust to float into other parts of the building or over onto neighboring property.
- 5. Brooms and shop vacuums used to clean-up.** Both clean-up methods capture some dust, but shop vacuums especially can put more dust into the air than they clean up if the filters are dirty or inadequate. Vigorous sweeping may also put a lot of dust into the air. To be effective, containment must be practiced even when cleaning up after the job.



For additional references on Interior Lead-Safe Dust Control/Containment Methods, please refer to *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*:

- See Interior Surface Prep - pages 19-21
- See Paint Removal - pages 23-24
- See Damaged Interior Wall or Ceiling - pages 25-26
- See Sticking Window - pages 29-30
- See Loose Window - pages 31-32
- See Window Won't Stay Open - pages 33-34
- See Deteriorated Window Trough - pages 35-36
- See Door Needs Adjustment - pages 37-38
- See Door Rubs or Sticks - page 39
- See Chipping Paint on Stairs or Floor - pages 41-42
- See Chipped or Damaged Impact Surfaces - page 43
- See High Dust Jobs - pages 45-46
- See Check Your Work - pages 51-52

Restrict Access by Residents in the Work Area

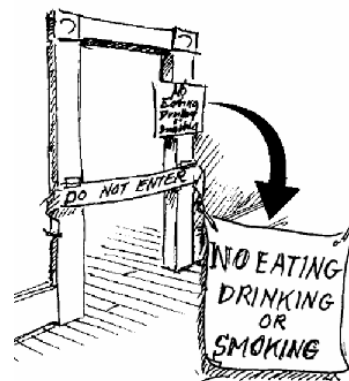
Restricting access to the work area will avoid unnecessary exposure of residents, especially children, to lead dust and minimize its spread to non-work-areas. Tell the residents to stay away from the area as much as possible. Residents and pets coming and going can easily track lead-contaminated dust throughout the home and into areas that are not being worked on the therefore to areas that are unlikely to be cleaned up promptly.

This is especially true for small children under 6 years old. Be sure to explain to residents that this is for their own protection and that small children are most at risk of health problems from exposure to lead.

You may need to provide an indication of how long you will be working in a particular area so that residents can plan ahead to obtain items that they may need before you begin working.

Place a Barrier Across Entrances

A physical barrier, such as a cone or masking tape, should be placed across doorways to remind residents to stay away, especially in buildings where more than one family lives. The barrier serves as a reminder to residents that they should not enter the work area, and also signals that the area has not yet been cleaned up.





Do Not Allow Eating, Drinking or Smoking in the Work Area

This is primarily a protection for workers, but is also important if residents are living in or near the work area. Post signs to indicate that eating, drinking, or smoking in the work area is prohibited. Dust in the air can land on food or be inhaled when smoking. If food is set on an unwashed surface, it can easily pick up lead-contaminated dust, which is swallowed when eating the food.



Interior Setup

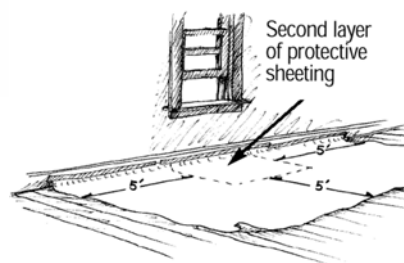
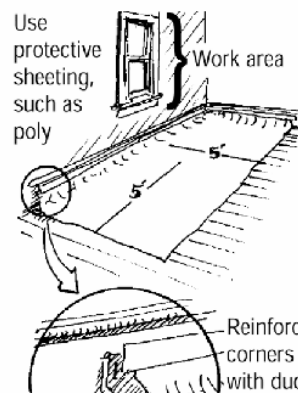
Remove or cover furniture and other objects in the room with protective sheeting

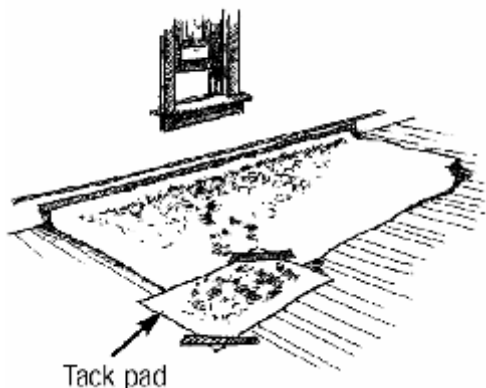
Remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet of the work area, completely cover them with poly sheeting. Secure the sheeting to the floor with tape so that no dust can get onto the covered items.

Cover Floors

Use 6-mil plastic or 2 layers of 4-mil poly as a protective sheeting to cover the floor. The sheeting should extend at least five feet to the left, right and front—and in some cases to the back—of the work area. It should be tightly secured to the baseboard or flooring using duct tape, painters' tape, or masking tape. The corner edge of the protective sheeting should be reinforced using duct tape or a staple.

- ***If 6-mil plastic is not available, use two layers of 4-mil plastic.*** This second layer should be taped to the top of the first layer. This layer will capture any waste and aid in cleaning up.
- Use of a catch bag will assist in keeping dust and debris off the floor and increase efficiency of cleanup.
- Tools that are used frequently should be left within the work area throughout the job to avoid tracking dust to non-covered areas.
- Consider covering shoes/boots with removable booties, wiping off the tops and soles of them with a damp paper towel each time it is necessary to step off the sheeting, or using a tack pad that removes dust from the soles of shoes. Immediately place used paper towels in a covered garbage bin and follow instructions under cleanup and disposal.





- A tack pad can be found at most hardware stores or bought through a supply catalog. The tack pad can be taped to an outer corner of the sheeting. Note: If tack pads are not readily available, contact the National Lead Assessment and Abatement Council (NLAAC) at (800) 590-NLAC for information on where to get them.

Close and cover windows and doors

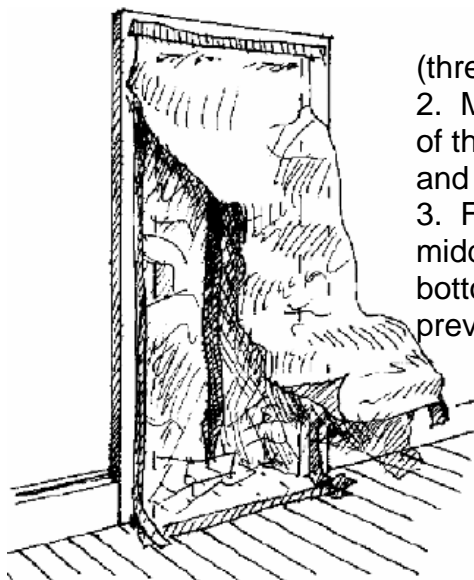
Close and seal windows in the work area with protective sheeting to prevent dust from getting into trough or on sill (if no work is being done on the window). Doors, including closet and cabinet doors, in the work area need to be closed.

Close and seal HVAC vents

- Heating ventilating and air conditioning (HVAC) systems distribute air throughout the building and thus can allow dust to move to other rooms.
- Close and cover the HVAC vents in the work area to prevent air from blowing the dust out of the contained work area and to prevent dust from getting into the HVAC system.
- Turn off the HVAC system for the work area. The vents should then be closed and covered with cardboard and protective plastic sheeting. After the work is complete the vent covers should be removed and washed.

Cover door openings with 2 layers of protective sheeting

Covering the door with this two-layer system will contain the dust within the work area. Follow the steps below:



1. Cut the first plastic sheeting layer slightly wider and longer (three inches) than the door frame.
2. Make a small "s" fold at the top of the sheeting and tape it to the top of the door frame. Make a similar "s" fold at the bottom of the sheeting and tape it to the flooring. This will ensure that the plastic is not taut.
3. For exiting and entering the room, cut a long vertical slit in the middle of the protective sheeting leaving six inches at the top and bottom uncut. Reinforce the top and bottom of the slit with tape to prevent the plastic tearing.
4. Tape a second layer of protective sheeting to the top of the doorframe. This layer is cut slightly shorter than the doorframe so that it will hang down flat against the first sheet of plastic.



5. Tape and staple the top corners of the second layer to the doorframe and first layer. Leave it hanging over the first layer.

Special Considerations for High Dust Jobs

A working definition of a **high dust job** is one with activities that creates dust and debris that will spread beyond five feet from the area that you are working on. Conversely, a **low dust job** is one in which dust and debris will not spread beyond five feet from the work area.

In general, jobs that involve only a small work area create less dust than jobs that involve a larger work area. However, in addition to the size of the job, the work practices (e.g., sanding), and equipment (e.g., power sander) used will affect how much dust is created. So, for example, using a power sander without a HEPA filter vacuum attachment on a two square foot area could be considered a high dust job. Using power tools equipped with HEPA filtered vacuum attachments will create less dust than using power tools without these attachments.

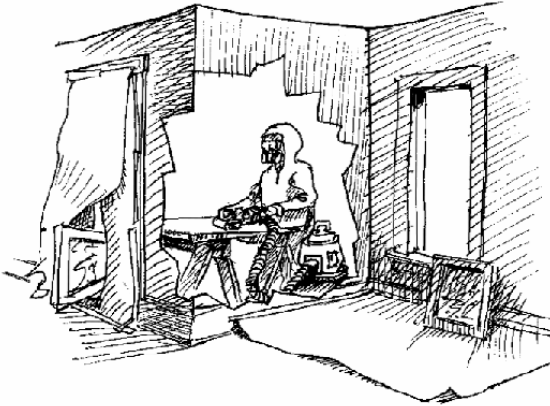
Examples of high dust activities include:

- § Hand scraping large areas - interior and exterior
- § Demolishing painted surfaces
- § Using circular or reciprocating saw*
- § Removing dry residue and paint after using chemical strippers*

Allowed by HUD Rule **only if done with lead safe work practices*

It is always the best practice to perform weatherization activities outside if possible. However, when wind, snow, rain, etc., impede those efforts, consider setting up a work room (“dust room”) for high dust-generating work on components that can be moved out of their original room and into the dust room

- A dust room prevents the spread of lead-contaminated paint and dust to non-work areas and also makes clean-up easier.
- Use this technique for high dust activities, for example, planning and scraping doors or window sashes where original windows will be maintained.
- Set up a dust room if work is being done on components in a room that residents must have access to, such as the kitchen. Rather than keeping the residents out of the kitchen, remove the components to the separate dust room and complete surface preparation there. After preparation is complete, the components can be returned to the kitchen.



A dust room can easily be set up to handle high dust weatherization activities to further protect residents from lead inhalation or ingestion.

Select a room that can be easily closed off from the rest of the home to use as a dust room, or work off-site

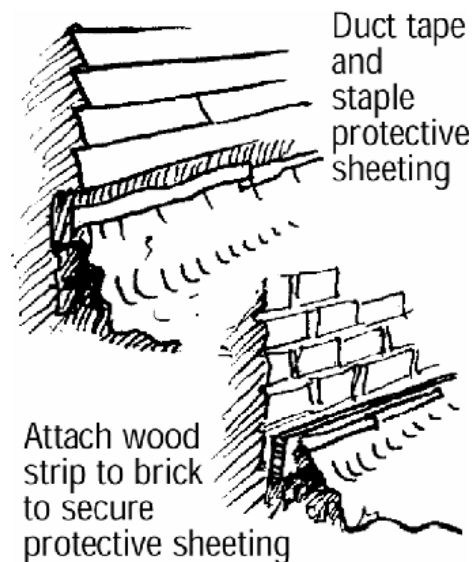
- A dust room can be any room that can be closed off. Residents should not have to enter this space for the duration of the job. For example, a spare bedroom or

other unused room that residents do not need to access during the time that the work is being performed.

- The dust room should be close to the work area, if possible.
- Follow the four setup stages for all work with minor modification or additions:
 - 1) limit access
 - 2) remove furnishings
 - 3) cover the floor
 - 4) seal windows, doors, and HVAC vents
- Workers should wear protective clothing, NIOSH approved ½ face respirators and safety goggles
- Plan your work so that necessary supplies and equipment are in the room to minimize the number of trips outside the room while work is being performed.

Exterior Setup

- Remove toys and other items from the work area and cover all play areas
- Cover the ground with protective sheeting. If space permits, lay protective sheeting on the ground below the work area to at least 10 feet in each direction of the work area. This creates a visible work area and helps remind residents and passers-by that they should not enter the work area unless they





have a compelling need. *Note: Black plastic can harm plants. An option for covering grass shrubs, and gardens is a disposable mesh material such as landscape fabric. Landscape fabric is an inexpensive plastic mesh that is often used by landscapers. It can be found in many plant nurseries or hardware stores. This covering will protect the soil and plants from lead contamination. Remember children often play in the dirt and may put their hands in their mouths while playing. Any dirt on their hands will go into their mouths and may be swallowed.* House pets can directly or indirectly transfer lead contaminated soil to residents. The dirt can be on their fur and transferred when petted or they can track it onto household furnishings and carpets.

- Staple or tape the protective sheeting to the wall of the building, or use a 2X4 to hold the material next to the wall. Use heavy objects (e.g., rock) to weight other edges of the protective sheeting to the ground so that it won't blow in the wind.
- When using ladders on plastic sheeting, consider placing a sturdy piece of plywood on the plastic and then setting the ladder on the plywood. This will prevent the ladder from puncturing the plastic and also will provide a stable surface for the ladder.
- Limit access to the work area by placing orange cones, saw horses, or tape around a 20 foot perimeter of the work area. This will help to discourage residents and passers-by from entering the work area.
- All windows and doors within 20 feet of the work area should be closed to prevent dust from entering the home. Consider requesting that the neighbors also close their windows and doors.

PART D WORK PRACTICES, TECHNIQUES, TOOLS, AND PERSONAL PROTECTIVE CLOTHING

There are innumerable benefits to following Lead-Safe work practices and to employing correct techniques, tools and personal protection:

- **Protect your family by not bringing dust home with you**
- **Enhance reputation for knowledge and professionalism**
- **Reduce resident exposure to lead**
- **Simplify daily and final cleanup**
- **Help protect workers from inhaling dust**
- **Protect children**



Advantages for contractors. In addition to being safer for residents, safe work practices have advantages for contractors and workers.

By effectively using safe work practices, you can:

§ Foster your reputation as an informed and professional contractor who recognizes the risks of lead-based paint and takes steps to help ensure resident and worker safety.

§ Gain a reputation for leaving the job site cleaner than when you arrived.

§ Help your customers feel safe and reduce their anxiety about the risks of renovation, remodeling, and rehabilitation work.

§ Have less dust and debris to clean up at the end of the job.

§ Reduce risk of taking leaded dust home to your family.

Work Practices

Any discussion of Lead-Safe work practices should include a list of procedures that are not recommended and/or that are prohibited. A key to minimizing the spread of dust and paint chips is to avoid certain traditional work practices known to create large amounts of dust and debris.

The following work practices are specifically prohibited by the HUD Lead Safe Housing Rule* and are consistent with DOE recommendations of procedures to avoid.

1. **Open flame/high heat methods to remove paint** (including heat guns over 1100 degrees Fahrenheit as well as torches) create fumes that are dangerous for workers to breathe. Small lead particles created by burning and heating also settle on surrounding surfaces and are very hard to clean up. (Reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 9).
2. **Machine/power sanders or grinders without HEPA vacuum attachments** (shroud) even on a small surface, create a large amount of leaded dust that floats in the air and then settles on surfaces inside and outside the work area. (Reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 9).
3. **Abrasive blasting or sandblasting without HEPA vacuum attachments** (shroud) even on a small surface, creates a large amount of leaded dust that floats in the air and



then settles on surfaces inside and outside the work area. (Reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 10).

4. **Extensive dry scraping or dry sanding** can also create large amounts of dust and paint chips. (Reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 10).

5. **Hazardous volatile paint strippers (including methylene chloride)** in an inadequately ventilated space is not a common work practice during most types of renovation and remodeling activities. (Reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*, page 10).

* For additional details on these prohibited work practices review the HUD/EPA/CDC document, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*. This document can be downloaded from the HUD Office of Healthy Homes and Lead Hazard Control's web site at <http://www.hud.gov/offices/lead>.

Note Regarding Chemical Strippers. Chemical strippers can be dangerous and should be used with great caution. Some can cause burns. Methylene chloride is suspected to cause cancer. Types of strippers range from citrus-based (safer) to more dangerous caustic strippers. Use of chemical strippers may trigger additional training, notification, and record keeping requirements under the OSHA Hazard Communication Standard. Follow the manufacturer's directions when using any chemical stripper. If building components to be stripped can be removed, such as doors, consider having them stripped off-site at a paint stripping facility. Half-face negative-pressure respirators do not provide sufficient breathing protection when using methylene chloride strippers. See pages 9-10 in the *Lead Paint Safety Field Guide* for more information.

Safe Work Practice Alternatives to Prohibited Practices

For both large and small paint removal jobs, there are safe work practice alternatives. Some possible alternatives are listed here. With experience, you will determine which safe work practices work best for different tasks.

1. **Wet sanding.** Wet/dry sandpaper, sanding grit, and sanding blocks can be used with light misting.

2. **Heat gun on low.** When working with lead-based surfaces use a low heat setting on the heat gun. It is better to use a heat gun that does not go above 1,100°F.



3. Power tools with HEPA exhaust filter. These tools are attached to a HEPA vacuum by a hose. Note: HEPA stands for **H**igh efficiency particulate air **F**ilter. By definition, a HEPA filter capture 99.97% of particles that are 0.3 microns or larger in diameter.

Basic Work Techniques

Lead-safe weatherization practices include three basic work techniques:



1. Containment: Lead dust should be contained in the direct work area using plastic barriers and working clean. (See Part C of this module for containment guidance.)

Work Wet: Mist surrounding surfaces with water before and during drilling and cutting to reduce dust creation and keep dust from becoming airborne and spreading beyond the work area. You might also consider placing foam (such as shaving cream) on the surface when cutting or drilling. When employing wet methods, employees must be extremely careful to avoid electrical shock and electrocution hazards. Using power tools on heavily misted surfaces can be dangerous since blades can slip and water can cause electric shock. Therefore, battery-powered equipment is recommended. Avoid the wet method when working within one foot of an electrical outlet. Ground fault circuit interrupters (GFCIs) must be used when working around sources of electricity to prevent possible electric shock injuries.

Experience indicates that working wet is most useful when dealing with limited areas and small tasks. One problem is that water and foams act as cleaners and can mark walls and other surfaces with unsightly smears and drips. HEPA vacuums attached to power equipment is more appropriate than wet methods in many cases and especially in situations where high production is needed.

3. Work Clean:

- Scoring paint before separating components helps prevent paint from chipping when a paint seal is broken.
- If power tools are to be used they should have HEPA attached equipment.
- Prying and pulling apart components is a cleaner work practice. Pulling nails instead of pounding creates less dust and fewer paint chips. Vise grips may be useful when pulling nails.
- On-going clean-up during the work using HEPA vacuum and wet cleaning methods helps keep lead dust from spreading. The proper disposal of lead debris keeps lead dust from being brought back into the home.
- Wash hands and face often.



Lead-Safe Weatherization Tools

There are some basic low-cost tools that will be needed for lead-safe weatherization. Most of these tools and supplies are widely available from suppliers and home improvement stores. These following basic tools are used to help reduce dust and for cleaning while working to keep dust under control:

- Wet/dry sandpaper, sanding sponge and blocks
- Mist bottle, pump sprayer
- Tape (painter's, duct, masking)
- Heavy duty plastic sheeting, such as 4 to 6-mil polyethylene
- Heavy duty (such as 6-mil) garbage bags and duct tape
- Utility knife
- Heat gun
- HEPA vacuum*
- HEPA attached equipment

Several basic supplies will be necessary to protect floor and ground surfaces, and bag, wrap, and clean dust as work is performed. If dust and debris are contained in plastic right after they are created, there is less chance that they will be spread beyond the work site. * HEPA (high efficiency particulate air) filters are able to filter very small particles -- to be considered a HEPA filter; it must be able to filter 99.97 percent of microscopic particles.

HEPA Equipment for Power Tools

Because wet methods have obvious practical limitations, adapters and HEPA vacuums are necessary for power tools. These tools use HEPA vacuums and adapters that help contain dust and debris as they are created. A shroud helps to contain the dust and paint chips as they are created. They are carried to a HEPA vacuum by a hose attached to the shroud. Use of these tools increases productivity but if not used correctly, with the HEPA vacuum, can create and spread lead dust. HEPA attachments DO NOT ELIMINATE the possibility that work will spread dust. To assure effective performance use HEPA attached tools in accordance with manufacturer's recommendations in conjunction to lead-safe weatherization measures.

Joe Hall, a weatherization worker in Colorado, was concerned about bringing lead dust home to his wife and children so he designed a HEPA attached tool specifically for weatherization drilling. The shroud is made of inexpensive and readily available materials. Direction for the Joe Hall Shroud is found in Appendix K.

Lead-Safe Weatherization Protective Clothing

When working in lead paint environments workers should take steps to protect themselves. Minimum steps that workers can take to protect themselves include:



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Disposable
suit &
shoe
covers



Painter's hats are an inexpensive way to keep dust and paintchips out of workers' hair. Painter's hats can be easily disposed of at the end of the day or job.

Disposable overalls (Tyveks® or polyspun suits) are a good way to keep dust off of workers' clothes and reduce the chances for carrying dust to other areas of the residence as workers come and go. The overalls can be removed when workers leave the work site and stored in a plastic bag overnight. To keep costs down, consider buying extra large size overalls in bulk and sizing to fit workers with duct tape. Protective coverings should have as few loose openings as possible. It is recommended that they have elastic bands around the ankles and wrists and they should have attached hoods or a tight fitting collar. Overalls with hoods will help keep contaminated dust out of workers' hair.

Washable jumpsuits and uniforms may be more comfortable and cost-effective than disposable ones. Make sure that your work clothes are thoroughly vacuumed with a HEPA vacuum each time you leave the work area. These should be laundered at a facility equipped to wash contaminated clothing.

Heat Stress

Please be aware that workers in hot weather may be prone to heat stress including heat exhaustion and heat stroke. These and other heat related health issues may be exacerbated by the wearing of protective clothing. Workers should be provided with adequate breaks, constant availability of water and other re-hydrating liquids and should be trained to take precautions and avoid heat related illness. Heat stress can be life threatening and in all cases local, state and Federal regulations should be followed including OSHA guidance.

Unless covered with protective overalls do not wear the clothes you worked in home. If there is nowhere to change on the job, thoroughly vacuum clothes with a HEPA vacuum before leaving the job site. Upon arriving home, remove clothes in the shower (without the water running) or in the garage where the floor can be washed down easily. Don't mix work clothes with other household wash items -- wash them separately. Wearing disposable shoe/boot covers is a good way to keep





from tracking dust to other parts of the house, but remember to remove, clean, or replace them before you step off of the poly sheeting onto a non-contaminated area. If possible, change out of work shoes/boots before returning home.

Respiratory protection: Workers should wear respiratory protection, such as a ½ face NIOSH approved respirator with HEPA filters, to prevent them from breathing leaded dust. OSHA requires different types of respirators rated for use around lead if exposures are high. (See Appendix G for OSHA details)

Workers should wash their hands and faces periodically during the workday to avoid ingesting leaded dust. It is especially important to wash well before eating, drinking or smoking and to not do any of these at the work site. Some of the dust that settles on the face around the mouth invariably finds its way into the mouth. Workers should also wash at the end of the day before getting in their car and going home. They can take leaded dust home to their families.

Disposable hand towels (such as paper towels) and pre-moistened wipes have multiple uses on the job. They can be used to quickly clean surfaces, to wipe off dust before leaving the work site and washing before eating, smoking, or drinking.

NOTES:

OSHA rules require employees to take further steps to protect the health of workers on the job based on their exposure to lead. See Appendix E for OSHA Lead Construction Rules. For more details on PPE, please see Module 5.

PART E LEAD-SAFE WEATHERIZATION MEASURES

The following activities apply lead-safe practices to typical weatherization measures.

- Drilling holes in interior walls
- Drilling holes in exterior walls
- Cutting attic access into ceiling
- Removing caulk or window putty (interior)
- Removing caulk or window putty (exterior)
- Removing weather stripping
- Door modifications
- Planing a door in place
- Installing door shoes
- Replacing door jambs & thresholds
- Replacing windows



- Furnace filter replacement
- Furnace and thermostat replacements
- Replacing HEPA filters and cleaning HEPA vacuums

These procedures follow the list of lead-safe “DOs” and “DON'Ts” work practices outlined in part C of this module. The following items are not a complete list of weatherization activities that may create lead hazards, so always remember to follow the lead-safe weatherization measures whenever you disturb painted surfaces on pre-1978 buildings.

The following sections contain instructions on how to set-up work areas for individual job tasks. It also includes suggested personal protective equipment, such as respirators, overalls, head coverings and foot coverings. It DOES NOT include instructions for air monitoring. If air monitoring is to be done it must be conducted by personnel with knowledge in calibration, as well as pump and sampling train set-up. See the weatherization supervisor for details.

Information about personal air sampling for OSHA compliance is included in Appendix G. Included in the information, is NIOSH Method 7300 and information from the OSHA Technical Manual on sample calibration, sample collection and shipping protocol for sample cassettes.

Set Up For Drilling Holes in Interior Walls

Drilling holes into walls can generate high levels of leaded dust and debris. If the hole is to be drilled through painted surfaces in buildings constructed prior to 1978 the following set-up and clean-up are recommended:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access; place “DO NOT ENTER” or similar caution tape across doorway or post signs.
- Turn off the HVAC system and close and seal all vents in the work area with poly sheeting.
- Close and seal all doors and windows in the work area. Use protective sheeting on windows.
- Protect furnishings: remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area.



- Protect the floor: tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn't work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall from and on each side of the hole to be drilled. Of course there will be instances where the floor below the hole to be drilled will be smaller than 5 feet by 10 feet, in those cases cover the entire area. In smaller areas it may be necessary to tape the sides up to the baseboard to insure no dust from the drilling is getting down between the poly and the wall.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean; use disposable overalls with hoods. If the overalls do not have hoods, separate disposable head coverings will be used to keep lead dust from the head and hair. Use disposable foot coverings. When stepping off the poly floor covering for any reason, the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas. If foot coverings were not worn, shoes must be wiped off.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- When drilling, the worker has the choice of drilling with HEPA attached equipment (see page 4-21) or working wet.
- When working wet, have one person wet mist the drill bit while the other person drills the hole. Make sure that the drill is plugged into a GFCI or a battery-powered drill is used and that water is not sprayed onto the drill motor.

Option: Apply shaving cream to the location to be drilled. Shaving cream will usually adhere to the wall and traps dust particles generated from the substrate below. If drilling large holes or the substrate is quite thick you may need to stop and re-apply more shaving cream to prevent the release of any dust.

- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.



- Place all debris, including disposable overalls, in heavy duty disposal bags. Do not leave any debris on site.

Set Up For Drilling Holes or Lifting Siding on Exterior Walls

Drilling holes into walls or lifting siding can generate high levels of leaded dust and debris. If the hole is to be drilled through painted surfaces on the exterior of buildings constructed prior to 1978, the following practices for set-up, removal and clean-up are recommended:

- Restrict access; place “DO NOT ENTER” or similar caution tape at least 20 feet out from work area.
- Cover the ground below the work area, tape protective sheeting to the wall or foundation under work area using masking tape (or durable tapes where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the ground should extend 10 feet out from the wall and on each side of the work area. Build a curb around the work area perimeter to lay the edge of the poly over to help prevent paint chips and dust from blowing off the ground cover. Option: In addition to the poly sheeting, make a catch bag by taping a heavy-duty trash bag under the location the hole(s) is to be drilled to collect the debris. Place the bottom of the bag in a container such as a 5-gallon bucket to keep the bag from being ripped by sharp debris. Tape the backside of the bag to the wall with a tape that will not damage or peel paint.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean; use disposable overalls. Also use disposable foot coverings. If you need to step off the poly covering for any reason, the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas. If foot coverings were not worn, shoes must be wiped off.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- If lifting siding, it is better to pry and pull components apart. Pulling nails instead of pounding creates less dust and fewer paint chips.



- When drilling, the worker has the choice between using HEPA attached equipment (see page 4-21) or working wet.
 - If working wet, have one person wet mist the drill bit while the other person drills the hole. Make sure that the drill is plugged into a GFCI or a battery-powered drill is used and that water is not sprayed onto the drill motor. Option: Apply shaving cream to the location to be drilled. Shaving cream will usually adhere to the wall and traps dust particles generated from the substrate below. If drilling large holes or the substrate is quite thick you may need to stop and re-apply more shaving cream to prevent the release of any dust.
- Place debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Cutting Attic Access into Ceiling

Precaution: Always look for signs of vermiculite before beginning work. This could be a sign of asbestos indicating that the work would need to be deferred.

Cutting attic access holes generates dust and debris. Accessing the attic from the exterior should be a consideration. If the hole is to be cut through painted surfaces in buildings constructed prior to 1978 the following set-up and clean-up procedures are recommended:

- If possible, cut the access from a hallway or closet.
- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access: place “DO NOT ENTER” tape across doorway or post signs.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all doors and windows in the work area. Use protective sheeting on windows.
- If cutting the access from a hallway or closet, consider hanging the poly sheeting from tension rods to create a tight containment area.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of the work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly



sheeting. Remember: it is always in the occupants' best interest to move the furniture out of the work area.

- Protect the floor: tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn't work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall and on each side of the hole to be cut. Often times the attic access will be cut into the ceiling inside closets. Where the floor below the hole to be cut is smaller than 10 feet by 10 feet, it may be necessary to tape the sides up to the baseboard to insure no dust from the cutting is deposited between the poly and the wall.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean; use disposable overalls with hoods. If the overalls do not have hoods, separate disposable head coverings should be used to keep lead dust from the head and hair. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason, the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters and eye protection.
- Use a hand saw to cut the opening. Have one person wet mist the cut while the other person cuts the hole or use HEPA attached equipment.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Removing Caulk Or Window Putty – Interior

If caulk is not painted and not applied to painted surfaces, then lead-safe work practices do not apply. Although the removal of painted caulk or putty is not likely to create significant levels of leaded dust, precautions still need to be taken to protect the worker and building occupants. If the caulk or putty is painted or is applied to



painted surfaces in buildings constructed prior to 1978, the following set-up, removal and clean-up are recommended:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access; place “DO NOT ENTER” tape across doorway or post sign.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all doors and other windows in the work area. Use protective sheeting on windows.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area
- Protect the floor, tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall and from each edge of the hole to be drilled. If removing window putty; lay out 6-mil poly sheeting on the floor and ground on either side of the window to be worked on so that there is at least 5 feet of poly spread out around the window on both sides. Tape it securely to the floor on the inside, and weigh it down outside to keep it from being blown by the wind.

Option: In addition to the poly sheeting, make a catch bag by taping a 6-mil poly trash bag under the caulk to be removed to collect the debris. Place the bottom of the bag in a container such as a 5-gallon bucket to keep the bag from being ripped by sharp debris. As with the poly be certain that the tape used will not peel paint from the surface adhered to.

- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings may not necessary with caulk removal. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly



vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.

- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Mist the caulk or putty to be removed, with water, while scraping the caulk to remove it.
- If removing window putty, HEPA vacuum window channels before replacing the glass and/or glazing compound.
- Do not heat the old glazing compound with an open-flame torch to soften it. A low-temperature heat gun (less than 1100 °F) can be used if the glazing compound is hardened. If a heat gun is available but you are not certain that it maintains a temperature of less than 1100 °F - **DO NOT** use it.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Removing Caulk or Window Putty – Exterior

- Restrict access; place “DO NOT ENTER” tape at least 20 feet from work area.
- Remove all outdoor furniture and toys from work area.
- Cover the ground below the work area, tape protective sheeting to the wall or foundation under work area using masking tape (or durable tapes where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the ground should extend 10 feet out from the wall and on each side of the work area. Build a curb around the work area perimeter to lay the edge of the poly over to help prevent paint chips and dust from blowing off the ground cover. *Option: In addition to the poly sheeting, make a catch bag by taping a heavy-duty trash bag under the caulk to be removed to collect the debris. Place the bottom of the bag in a container such as a 5-gallon bucket to keep the bag from being ripped by sharp debris. As with the poly be certain that the tape used will not peel paint from the surface adhered to.*



- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings may not be necessary with caulk removal. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Mist the caulk or putty to be removed, with water, while scraping the caulk to remove it.
- If removing window putty, HEPA vacuum window channels before replacing the glass and/or glazing compound.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Weatherstripping

Installing and/or removing unpainted weatherstripping is a low lead hazard activity that does not require a containment setup. Make sure that the areas around the door are HEPA vacuumed thoroughly and wet-cleaned when the job is finished. If the weatherstripping to be removed is in a building constructed prior to 1978 and has been painted over, the following set-up removal and cleanup is recommended:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access; place “DO NOT ENTER” tape across doorway or post sign.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all other doors and windows in the work area. Use protective sheeting on windows.



- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants' best interest to move the furniture out of the work area.
- Protect the floor, tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn't work). Be certain that the tape used will not peel paint from the surface adhered to. Extend the poly through the doorway. The protective sheeting on the floor should extend about 5 feet out from the doorway and from each side of the doorway.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary with caulk removal. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Mist the painted weather stripping to be removed, with water, while scraping or pull the weatherstripping to remove it.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Door Modification

A tight-fitting door is required for weatherstripping to work properly; however, if the door fits too tightly, the resulting friction can cause the paint to rub off and potentially create leaded dust hazards.

Check the door to see if there are any friction or impact areas on the door and jamb. Friction and impact areas will rub leaded paint off and turn it into fine dust. Make sure that



there is the proper gap between the door and the jamb all around the door. Check for loose hinges and tighten and reset if needed. If it is still rubbing, remove the door and take it outside to the lead-safe work area. Remove the door and set-up the lead-safe work area as follows:

- Restrict access; place “DO NOT ENTER” tape at least 20 feet from work area.
- Cover the ground below the work area, the protective sheeting on the ground should be a minimum of 10 foot by 10-foot sheet of 6-mil poly. Build a curb around the work area perimeter to lay the edge of the poly over to help prevent paint chips and dust from blowing off the ground cover. Weigh the edges of the poly down to prevent it from blowing away. Place sawhorses on poly, to place door on.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting.
- Use a utility knife to score the paint around the edge of the hinge. Remove the hinge screws and remove the door.
- HEPA vacuum the threshold and floor below the door opening to remove any paint chips or dust created when removing the door.
- Place door on saw horses in work area.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary if using a hand planer. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been completed for the job task(s) or there has been a positive initial determination; workers should wear at least a NIOSH-approved respirator for lead work that provide a minimum protection factor of ten times the permissible exposure limit.
- Plane the door edge where it rubs.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.



Planing a Door In Place

If the door can't be removed, it can be planed in place. Set up the work area as follows:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access; place “DO NOT ENTER” tape across doorway or post sign.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all other doors and windows in the work area. Use protective sheeting on windows.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area.
- Protect the floor, tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall from and on each side of the door opening.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary if using a hand planer. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.



Door Shoe Installation

Cutting door bottoms to install door shoes can produce high levels of leaded dust, especially when using a power saw.

Reminder: Never cut a painted door inside of a residence.

Take the door outside and cut the door in a lead-safe work area. Remove the door and set-up the lead-safe work area as follows:

- Restrict access; place “DO NOT ENTER” tape at least 20 feet from work area.
- Cover the ground below the work area, the protective sheeting on the ground should be a minimum of 10 foot by 10-foot sheet of 6-mil poly. Set it up over a 10 foot by 10 foot sheet of 6-mil poly sheeting so that at least 5 feet of poly is all the way around the end to be cut. Build a curb around the work area perimeter to lay the edge of the poly over to help prevent paint chips and dust from blowing off the ground cover. Weigh the edges of the poly down to prevent it from blowing away. Place sawhorses on poly, to place door on.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting.
- Use a utility knife to score the paint around the edge of the hinge. Remove the hinge screws and remove the door.
- HEPA vacuum the threshold and floor below the door opening to remove any paint chips or dust created when removing the door.
- Place door on saw horses in work area. Consider using a hand saw; it generates less dust than a power saw. Note: Running a piece of masking tape on the outline will not reduce the amount of leaded dust created and should not be relied upon as a way to eliminate dust.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary if using a hand planer. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters and eye protection.



- Plane the door edge where it rubs.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Jambs & Thresholds

Replacing jambs and thresholds may generate moderate to high levels of leaded dust. Set up the work area as follows:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access, place “DO NOT ENTER” tape at least 5 feet out from door way on both sides.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all other doors and windows in the work area. Use protective sheeting on windows.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area.
- Protect the floor, tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall from and on each side of the door opening.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary if using a hand planer. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.



- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Cut the paint bead between the trim and wall with a utility knife. Pry off the trim and remove jambs carefully so as not to disturb the paint. Lightly mist it with water while removing it. Unless the trim is of a size or design that is not replaceable, it is not recommended that it be reused since any sanding of it after replacement will require further set-up to contain the dust.
- If the trim breaks during removal, in sizes that will fit into a disposal bag, place the trim pieces and debris in 6-mil poly disposal bags. If the trim comes off in full-length pieces then roll the trim in a piece of six-mil poly and tape the edges shut for disposal.
- If the installation of the new door and trim will not disturb any more paint proceed with the cleanup described below. If the installation may disturb additional paint install the new door and trim and then proceed with the cleanup described below.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Replacing Windows

Replacing windows may generate moderate to high levels of leaded dust and debris. (Windows and associated trim were typically painted with leaded paint inside and out). Set up the work area as follows:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access, place “DO NOT ENTER” tape across doorway or post sign.
- Turn off the HVAC system and close and seal all vents in the work area
- Close and seal all doors and other windows in the work area. Use protective sheeting on windows.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area



- Protect the floor, tape protective sheeting to the baseboard under work area using masking tape (or durable tape where masking tape doesn't work). Be certain that the tape used will not peel paint from the surface adhered to. Lay out 6-mil poly sheeting on the floor and ground on either side of the window to be worked on so that there is at least 5 feet of poly spread out around the window on both sides. The protective sheeting on the floor should extend about 5 feet out from the wall and from each side of the window opening. Whether working from the inside or out, it is important

to keep both sides of the window unit as free from dust and chips as possible. Tape it securely to the floor on the inside, and weigh it down outside to keep it from being blown by the wind.

- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Head coverings are not necessary if using a hand planer. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Cut the paint bead between the trim and wall with a utility knife. Pry off the trim and remove windows carefully so as not to disturb the paint. Lightly mist the trim with water while you are removing it. Unless the trim is of a size or design that is not replaceable it is not recommended that it be reused since any sanding of it after replacement will require further set-up to contain the dust.
- If the trim breaks during removal, in sizes that will fit into a disposal bag, place the trim pieces and debris in 6-mil poly disposal bags. If the trim comes off in full-length pieces then roll the trim in a piece of six-mil poly and tape the edges closed for disposal.
- HEPA vacuum the window frame before installing a new window.
- If the installation of the new window and trim will not disturb any more paint, proceed with the cleanup described below. If the installation may disturb additional paint, install the new window and trim and then proceed with the cleanup described below.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.



- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Furnace Filter Replacement

The simple act of replacing a furnace filter can disperse lead dust. If lead-safe weatherization activities that could have generated lead dust have occurred in the home since the filter was last changed, it is quite possible that some of the dust was trapped in the furnace filter if the furnace had been running. As a precaution before leaving the weatherized house the filter should be changed taking these simple steps:

- Mist the filter(s) on each side as it is slid out of the furnace to minimize release of trapped dust.
- Place filter(s) in 6 mil poly disposal bags.
- HEPA vacuum the horizontal surfaces accessible from the filter opening. Start at the highest point and work downward.
- Install new filter(s) and close or replace filter access cover.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Replacing Thermostats

Replacing thermostats generates dust and debris. If the hole is to be cut through painted surfaces in buildings constructed prior to 1978 the following set-up and clean-up procedures are recommended:

- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access: place “DO NOT ENTER” tape across doorway or post signs.
- Turn off the HVAC system and close and seal all vents in the work area.
- Close and seal all doors and windows in the work area. Use protective sheeting on windows.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area.



- Protect the floor: tape protective sheeting to the baseboard under work area using masking tape (or durable tapes where masking tape doesn't work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from the wall and on each side of the hole to be cut.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean; use disposable overalls with hoods. If the overalls do not have hoods, separate disposable head coverings should be used to keep lead dust from the head and hair. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason, the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Use a hand saw to cut the opening. Have one person wet mist the cut while the other person cuts the hole or use HEPA attached equipment.
- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable overalls, in heavy-duty disposal bags. Do not leave any debris on site.

Furnace Replacements

If the furnace is to be replaced and the ductwork is to remain in place it should be noted that the process of disconnecting the old furnace from the duct work and reconnecting the new furnace may disturb lead paint surfaces or loosen lead dust settled in the ducts. Since there can be an appreciable amount of surface area inside the duct work, considerable amounts of lead dust may have accumulated since the furnace was installed. Lead dust may not only get deposited from the air circulating through the ducts, but it may also accumulate below vent openings in the form of paint chips.

If the building was constructed prior to 1978 the following set-up and cleanup procedures are recommended for removal and installation of a new furnace:



- Ask occupants to leave the room where work will be done. Have them stay out until final cleanup.
- Restrict access, place “DO NOT ENTER” tape across doorway or post sign.
- Protect furnishings; remove drapes, curtains, furniture, and rugs within 5 feet of work area. If items cannot be moved beyond 5 feet, cover them with a 6-mil poly sheeting. Remember: it is always in the occupants’ best interest to move the furniture out of the work area
- Protect the floor with 6-mil poly. Furnaces are often located in very small closets and therefore getting poly on the floor around the furnace is not always possible. However, if there is any open floor space around the furnace or outside the furnace closet below possible areas where ductwork will be detached, place protective sheeting below the work areas. If possible, tape the poly to the baseboard in the work area using masking tape (or durable tape where masking tape doesn’t work). Be certain that the tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend at least 5 feet out from the furnace and/or areas where ductwork will be detached.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean, use disposable overalls. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When work creates dust or paint chips, and exposure assessments have not been performed for the job task(s) or there has been a positive initial determination workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Be sure that gas lines are shut-off and electrical power is shut-off, prior to starting any disassembly work.
- Detach the ductwork as carefully as possible. Use HEPA vacuum to clean-up dust that falls from the ducts or furnace, as soon as possible, to prevent tracking or spreading the dust as work continues.
- Once the old furnace is detached from the ductwork, use 6-mil poly and durable tape to seal ALL the openings on the furnace PRIOR to moving the furnace out of the area.
- HEPA vacuum the accessible portions of the duct work to minimize the disturbance of dust while installing the new furnace.



- Frequently HEPA vacuum and wet-wipe surfaces to help minimize the spread of dust.
- Place all debris, including disposable clothing, in heavy-duty disposal bags. Do not leave any debris on site.

Replacing HEPA Filters and Cleaning HEPA Vacuums At Weatherization Facility

HEPA filters and vacuums will hold the highest concentration of lead dust so special care when replacing filters or cleaning vacuums needs to be taken to prevent the dispersal of lead dust. If possible change filters at weatherization shop facilities. To change the filter at the contractor's facility the following set-up and clean-up is recommended:

- Restrict access; place "DO NOT ENTER" tape across doorway or post signs.
- Move equipment or other items within 5 feet of area where vacuum is placed for filter change. If items cannot be moved beyond 5 feet, cover them with 6-mil poly sheeting. Remember: it is always in the occupants' best interest to move the furniture out of the work area
- Protect the floor, tape protective sheeting to the floor using masking tape (or durable tapes where masking tape doesn't work). Be certain that tape used will not peel paint from the surface adhered to. The protective sheeting on the floor should extend about 5 feet out from vacuum on each side.
- Stock the work area; put all necessary tools and supplies on protective sheeting before beginning work to avoid stepping off the protective sheeting. Reinforce corners with duct tape and a staple.
- Keep clothes clean; use disposable overalls with hoods. If the overalls do not have hoods, separate disposable head coverings should be used to keep lead dust from the head and hair. Also use disposable foot coverings. If it is necessary to step off the poly floor covering for any reason, the protective clothing should be thoroughly vacuumed with a HEPA vacuum and removed before stepping off to prevent the tracking of lead to the unprotected areas.
- When replacing a HEPA filter or cleaning a HEPA vacuum, workers should wear at least a NIOSH-approved half face respirator with HEPA filters.
- Follow the manufacturer's instructions for filter replacement and cleaning.
- As the filter is exposed mist the surface of the filter to minimize dust release as the filter is released.
- Place dirty filter and vacuum debris in heavy-duty disposal bags. Seal the disposal bag using a gooseneck and label bag.



Replacement of HEPA Filter and Cleaning HEPA Vacuum at Work Site

HEPA filters and vacuums will hold the highest concentration of lead dust so special care when replacing filters or cleaning vacuums needs to be taken to prevent the dispersal of lead dust. If the HEPA filter in a vacuum must be changed at a job site the filter replacement must be completed outdoors. However, do not attempt to conduct the procedure during windy periods. To change the filter at the work site follow the same set-up as described above for “vacuums at weatherization facilities” with the following modifications:

- On a calm day move the vacuum outdoors away from the house and away from walkways and pathways. If it is a windy day and the filter must be changed, it is recommended that it be replaced at a weatherization facility.
- Restrict access; place “DO NOT ENTER” tape at least 20 feet from work area.
- Cover the ground below the work area. The protective sheeting on the ground should be a minimum of 10 foot by 10-foot sheet of 6-mil poly. Set it up over a 10 foot by 10 foot sheet of 6-mil poly sheeting so that at least 5 feet of poly is all the way around the end to be cut. Build a curb around the work area perimeter to lay the edge of the poly over to help prevent dust from blowing off the ground cover. Weigh the edges of the poly down to prevent it from blowing away. Place vacuum on poly and follow the manufacturer’s direction for filter replacement.
- Place dirty filter and debris in heavy-duty disposal bags. Seal the disposal bag using a gooseneck and label bag.

PART F CLEANUP AND DEBRIS DISPOSAL

A critical element of lead-safe weatherization is the continuous process of job-site cleanup. Lead-safe weatherization involves these five elements:

Clean-up Element 1. Containment. Effective cleaning begins with proper preparation and containment. Clean-up will be much easier and efficient if proper containment has kept all dust and debris confined to the work area. Also, containing dust to the area that is being cleaned is important.

Clean-up Element 2. Proper cleaning techniques. You should be careful not to spread dust and contaminate other areas while cleaning. Using the techniques outlined in this module and following the proper sequence will help ensure that you do not contaminate other areas while cleaning.



Clean-up Element 3. Cleaning all surfaces. All surfaces includes vertical surfaces such as walls and windows and horizontal surfaces such as floors, door tops, window troughs, and windowsills. Cleaning should proceed from high to low (i.e., from top of wall to window to floor).

Clean-up Element 4. Checking your work. Always conduct a visual inspection after any job. Look for any visible paint chips, dust or debris. In the case of work performed under HUD guidelines ***A trained individual sampling/clearance technician, LBP inspector or risk assessor) who did not do the work will perform a clearance examination.*** Check state requirements for acceptability of sampling technicians performing this activity.

Clean-up Element 5. Safe and secure disposal. Bag and gooseneck seal all waste in heavy duty plastic bags such as 4-6 mil poly-bags. Safely dispose of all waste in accordance with state and federal regulations.

The most effective cleaning will follow this sequence:

1. Pick up all visible paint chips and debris during and after the work..
2. HEPA vacuum and Wet Clean and dispose of protective sheeting.
3. Slowly HEPA vacuum the work area, working from high to low.
4. Thoroughly wet clean, working from high to low.
5. If necessary repeat HEPA vacuuming or wet cleaning.
6. Visually inspect your work.
7. Bag all waste in heavy duty plastic bags (such as 4-6 mil poly-bags), gooseneck seal and dispose according to Federal, state and local regulations.

Why is this clean up sequence effective?

1. **Picking up all visible debris and paint chips** prepares a work area for the first HEPA vacuum.
2. **Clean and dispose of protective sheeting.** This step should come before HEPA vacuuming in order to collect any dust that may escape from the protective sheeting.
3. **HEPA vacuum the area from high to low.** This first HEPA vacuum will collect dust and debris not visible to the naked eye.
4. **Wet cleaning** the area will further dislodge any lead contaminated dust or debris not collected by the first HEPA vacuum. Wet cleaning also gets dust and debris that is stuck to surfaces.



5. If necessary, a final pass with the **HEPA vacuum** or wet clean will capture any remaining dust or debris left after the wet cleaning.
6. The last step should be to **check your work** and make sure that visual clearance is achieved and all waste is bagged, sealed and disposed of in accordance with federal, state and local laws. Remember that HUD's Lead Safe Housing Rule for all renovation, remodeling, and rehabilitation activities above the de minimis levels requires clearance testing (See Module 6). ***The individual performing dust testing must be independent from those doing the work.*** Check State requirements for acceptability of sampling technicians performing this activity.

Clean-Up Toolkit

- **Vacuum with HEPA filter**
- **Misting bottle and pump sprayer**
- **Mop with disposable heads**
- **Detergent**
- **Two buckets or two-sided bucket**
- **Disposable hand towels**
- **Heavy duty garbage bags**
- **Duct tape**
- **Shovel and rake**

Above is list of cleaning tools that you should always keep in your truck. The tools listed are for cleaning interior and exterior jobs. Some tools, such as the pump sprayer, shovel, and rake are used primarily for exterior clean-up. Other tools, such as the buckets (you need either a two-sided bucket or two single buckets to keep your wash and rinse water separate) and mops are used primarily for interior clean-up. Be sure to change mop heads when necessary. A dirty, used mop head could spread dust into other areas.

Clean the Work Site Frequently

Cleaning the work site frequently as the job progresses will reduce the spread of dust and paint chips. The cleaning need not be as thorough as the final cleanup. It should, however, keep debris, dust, and paint chips from piling up and spreading beyond the immediate work site. Cleanup during the job includes:

- ***Removing debris frequently.*** During weatherization jobs, cleanup and bag debris as it is created.
- ***Vacuuming horizontal surfaces frequently.*** HEPA vacuum dust and paint chips that settle on surfaces, including protective sheeting. As workers come and go



during the workday, this debris is easily spread. Periodic cleaning throughout the workday will help to minimize workers tracking dust. Do not use non-HEPA filtered vacuums or dry sweeping for cleanup.

- **Collect paint chips as they are created.** When removing paint, paint chips can also spread outside the immediate work areas as workers come and go from the work site. To keep paint chips from spreading beyond the work site, make sure that they are collected as they are created. Also, periodically HEPA vacuum or wet sweep and bag paint chips.
- **Wrapping and disposing of removed components.** When removing painted components such as windows, trim, and cabinets, wrap them in plastic sheeting and dispose of them in stages. This will prevent the spread of debris and keep residents, especially children, from coming into contact with leaded dust created by work.

To keep work area as clean as possible during weatherization and keep from spreading lead dust to other parts of the home precautions should be taken when leaving the work site:

- Every time workers leave the work area, shoes should be wiped or vacuumed before stepping off the plastic sheeting. A large tack pad on the floor can help to clean the soles of shoes. Remove booties if they are being used.
- At the end of the day, change your clothes and wash yourself to reduce the risk of contaminating your car and taking leaded dust home to your family.
- Before leaving the worksite -- remove any protective clothing, HEPA vacuum dust from non-protective clothing, and thoroughly wash hands and face. Throw away disposable clothing with other lead debris or place clothing in a plastic bag to stop dust from getting on other clothes at home.
- At home -- as soon as arriving home, take a shower and be sure to thoroughly wash the hair, especially before playing with children. Wash work clothes separately from regular household laundry to stop lead particles from getting on other clothes.

Final Cleanup at the Completion of Weatherization Work

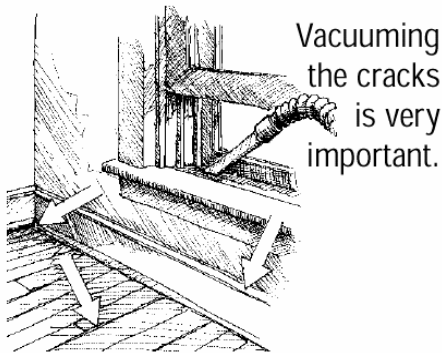
Interior Cleanup

Interior lead-safe cleaning requires the use of a HEPA vacuum and wet cleaning methods. Simply cleaning an area with a broom and dustpan is not adequate to protect your workers or clients and may actually spread the leaded dust around. Standard "shopvacs" and regular vacuums cannot control fine dust particles and should not be used.



The following lead-safe cleaning techniques should be used after the interior work task(s) have been completed:

- Clean up all paint chips and large debris
- HEPA vacuum the contained work area from high to low



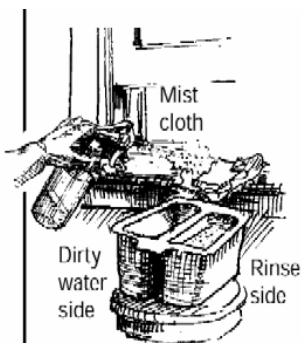
- Start with the walls, tops of doors, and window troughs (high) and work your way down to the floor
- Clean walls with a HEPA vacuum or by lightly wiping with a damp disposable cloth
- Vacuum the protective floor sheeting last
- Be thorough -- don't rush!

- When cleaning wet, you can either mist the surface with cleaning solution

or use a wet disposable cloth.

- Work from high surfaces to low. If a surface is very dirty use a moist paper towel before beginning to scrub with a wet cloth.
- Replace cloths and change rinse water often.

- Perform a first visual inspection with a focus on child access areas such as floors, window troughs and window sills. Look for paint chips, dust debris and deteriorated paint. Be sure to inspect beyond the work area and repeat any clean up steps as needed.
- Protective sheeting may be used again within the same work area if it has not already been folded. When the weatherization job is complete, clean sheeting using a HEPA vacuum. Mist poly to help "stick" dust that is not picked up by HEPA vacuum to the poly floor sheeting
- Remove the 6-mil poly sheeting by folding it in on itself so that the top or work side is on the inside. Tape the bundled poly sheeting up so that it does not unroll, then place poly in disposal bag. "Gooseneck-seal" the bag.
- HEPA vacuum the area that was under the poly sheeting and at least 2 feet beyond it.



If the surface is washable (carpet is not), spray/mist the detergent solution on the surface and wipe it clean. As the wipe gets dirty, fold it with the dirty side on the inside. This will keep a clean wipe surface available. If using a detergent that requires a rinse, mist the area with clean water after the detergent washing and wipe it



dry. Always work toward the exit door and clean at least two feet beyond the contained area.

- Carpeted surfaces should be thoroughly vacuumed with the HEPA vacuum.
- Repeat HEPA Vac work from high to low
- Repeat wet clean from high to low
- Perform second visual inspection and repeat cleanup if needed.
- Wet wipe all tools.
- Dispose of the rags/towels in a heavy-duty trash bag.
- Seal disposal bag using a gooseneck and label bag.
- Remove all materials, tools, old furnace and bagged debris from the residence.
- Properly dispose of bagged debris immediately after completing the job.
- Accumulation of waste from several jobs may create a disposal issue that will require testing prior to disposal. Contact local municipalities or county solid waste offices to determine where and how lead-based paint debris can be disposed.
- Visually inspect the work area to be sure all visible dust is cleaned. There should be no visible dust. This may mean that the area is cleaner after work is completed than it was before work was started. If the paint was kept wet while being disturbed and the lead-safe cleanup procedure was followed, according to DOE there should not be a need for lead-dust wipe sampling.
- Clearance Testing (HUD Weatherization Only). Following the end of work (when clean-up is finished) there is a one hour waiting time before clearance testing can be performed. Clearance is required when work is above de minimis levels in federally-assisted housing. ***If area fails clearance, re-clean and retest.***

Note: Laboratories may have standard turn-around times ranging between one to two days. If you need a faster turn-around time, you need to communicate this to your EPA recognized Laboratory for scheduling purposes. Be aware that this may affect your schedule.

Exterior Cleanup

The main point of cleaning after an exterior job is not to let dust spread beyond the work area and to focus specifically on the areas that children could have access to such as bare



soil, play areas, exterior porches and exterior window sills. Always inspect beyond the work area. Collect and dispose of all paint chips, dust and debris.

A thorough visual inspection is the main part of checking your clean-up after an exterior job. You should collect and dispose of any visible paint chips, wood chips and debris found during the visual inspection. You may notice that the processes of cleanup and checking your work are similar for exterior jobs. A visual inspection is conducted once while cleaning and **again** after completing cleanup to check your work. Both visual inspections should be thorough and focus on collecting and disposing all visible paint chips, dust and debris.

Focus the visual inspection on areas where children may play or may be exposed to lead contaminated dust or debris. Such areas include exterior porches, outside play areas, bare soil and ground, and window sills.

Protective Sheeting

If protective sheeting will be disposed at the end of the job, it should be cleaned and disposed of with the rest of the waste.

Specific Exterior Jobs

If work takes place on an exterior porch or stairwell, HEPA vacuuming, wet cleaning and mopping, in addition to a thorough visual inspection, should be used to clean the work area. For such jobs, the cleanup can be similar to cleanup after interior jobs. Collect and dispose of any dust or debris with the rest of your waste.

Lead-Base Paint Debris Disposal

Following completion of this module section you will be able to describe procedure for disposing of lead paint debris from the work.

For additional disposal information see Appendix D in this manual for EPA policy statement on regulatory status of waste generated by contractors and residents from lead-based paint activities conducted in households. Also see *Disposal of Waste* - page 49 of the support reference, *Lead Paint Safety: A Field Guide for Painting, Home Maintenance and Renovation Work*.

Supervisors must be aware of the components of the waste produced at the job site and the proper method of disposal. Again, always be aware of federal, state and local waste disposal regulations.

What should I do with my waste at the work site?

- \$ Place waste in heavy duty plastic bags such as 4-6 mil poly-bag**
- \$ AGooseneck Seal@ the bag with duct tape**



- § **Carefully dispose of waste in accordance with state and federal regulations**
- § **Store waste in a secure area.**

At the work site. All waste should be handled carefully and sealed in heavy duty plastic bags such as 4-6 mil poly bags. Always collect, bag and seal your waste at the work site and in the work area. Do not carry your waste to another room or another area before bagging and sealing the waste. Store all waste in a secure container or dumpster until disposal. Limit on-site storage time. Avoid transporting waste in an open truck. Some examples of waste include:

- § Protective sheeting
- § HEPA filters
- § All paint chips, dust and dirty water
- § Used cloths, wipes and mop heads
- § Any debris
- § Protective clothing, respirators, gloves
- § Architectural components

Wastewater. Always be aware of state and local regulations regarding wastewater disposal.

Wastewater used for clean-up should be poured down the toilet if local regulations allow for such disposal. Before disposal, wastewater should be filtered. If LSW has been practiced, there should very little waste water as rags, etc. should never be rinsed and reused. Never dump this water down a sink, storm drain, on the ground, or in a tub.

Remember . If needed, **double-bag** your waste to help prevent the waste from escaping if the bag is cut or ripped.

Disposal - Local and Federal Information

Waste disposal is regulated under the Resource Conservation and Recovery Act (RCRA) and various associated state laws and regulations. Some waste generated from lead work may meet the definition of **hazardous waste** because of its toxicity, corrosivity, etc. Therefore it is important for contractors to segregate waste into categories that are likely to be hazardous and non-hazardous. Examples of hazardous waste may include: paint chips, vacuum debris, sludge or chemical waste from stripper and HEPA filters. Some **possible** examples of **non-hazardous waste** may include: disposable clothing; respirator filters; rugs and carpets; protective sheeting; and solid components with no peeling paint.

You should determine whether you generate more than 220 pounds of hazardous waste per job site per month. If you have less than 220 pounds per location per month then manage this waste as solid, non-hazardous waste. (Generators of less than 220 pounds of waste per job site per month are exempt from Federal waste disposal regulations and most



State regulations.) If you generate more than 220 pounds of hazardous waste you should contact your state and local regulators to find out how to dispose of this waste properly.

EPA considers renovation and remodeling as a routine residential maintenance and allows waste to be taken to a solid waste landfill. In a memorandum to RCRA Senior Policy Advisors and EPA Regions 1-10, dated July 31, 2000, EPA's Office of Solid Waste stated that lead-based paint waste from households may be disposed of as household garbage subject to applicable state regulations. Some states may continue to regulate lead-based paint waste as potentially hazardous if generated in large enough quantities as indicated on the slide. (U.S. EPA Regulatory Status of Work Generated by Contractors and Residents from Lead-based Paint Activities Conducted in Households Memorandum from Elizabeth A. Cotsworth, Director, Office of Solid Waste, to RCRA Senior Policy Advisors and EPA.

All waste should be handled carefully and sealed in heavy duty plastic bags such as 4-6 mil poly-bags. Large architectural components from residential housing should be wrapped and sealed in plastic sheeting and disposed along with your waste. At the work site always collect, bag and seal all waste at the work site and in the work area. Do not carry the waste to another room or another area before bagging and sealing the waste. Store all waste in a secure container or dumpster until disposal. Avoid collecting bags of debris in work vehicles or in shops. Also, avoid transporting waste in an open truck or personal vehicle. If it must be transported in an open truck bed, cover the bed tightly with a tarp.

Some examples of waste include:

- Protective sheeting
- HEPA filters
- All paint chips, dust and dirty water
- clothes, wipes and mop heads
- Any debris
- Protective clothing, respirators, booties, gloves
- Window trim, siding and other building materials

Used

FINAL DISPOSAL

When transporting the lead contaminated debris, make sure that it is not exposed in an open truck bed. If it must be transported in an open vehicle, cover it tightly with a tarp or other heavy covering to prevent any debris from blowing out.

Since 1980, EPA has excluded household waste from the Resource Conservation and Recovery Act (RCRA) under CFR 261.4 (b)(1). Therefore, waste generated from weatherization is not subject the RCRA testing and disposal regulations. A letter clarifying the household waste exemption is included in Appendix D.



Remember:

Some states have enacted more stringent waste management and disposal regulations. Weatherization crews must be aware of state and local regulations concerning hazardous and solid waste management and disposal.

Example checklist for cleaning procedures

The list below is an example checklist for cleaning procedures. You may wish to add to or modify it to fit your needs.

- G Was the work completed?
- G Have all visible paint chips, dust and debris been removed and disposed?
- G Was the protective sheeting folded, sealed, and disposed?
- G Was the interior work area HEPA vacuumed?
- G Were all surfaces wet cleaned? Was the floor cleaned last?
- G Was the interior work area HEPA vacuumed again?
- G Was all waste placed safely in heavy-duty plastic bags such as 4-6 mil poly-bags?
- G Were all bags properly sealed?
- G Was all waste disposed in accordance with state and federal regulations?
- G Was a visual inspection completed?
- G Were dust samples taken? (For Federally Assisted Housing Only)
- G Is the property owner satisfied?



MODULE 4 EXERCISE

Lead Dust Containment

The following exercise illustrates how important it is for weatherization crews to carefully clean up all areas of the house after weatherization. Careful attention must be given to the clean-up process making sure that the crew ends up with surfaces that can be thoroughly cleaned and that cleaning is performed routinely

Objective: Review set-up measures to contain lead dust and allow for easier cleanup.

Length: 30 minutes

Directions: In groups of three or four, take 20 minutes to review the three following illustrations. Then ...

- Identify set-up methods that would *encourage the spread* of lead-contaminated dust and debris beyond the work area
- Identify three techniques that could be used to *reduce the spread* of lead-contaminated dust and debris to non-work areas
- Assign one person to report your group's answers to the rest of the group.



Illustration 1

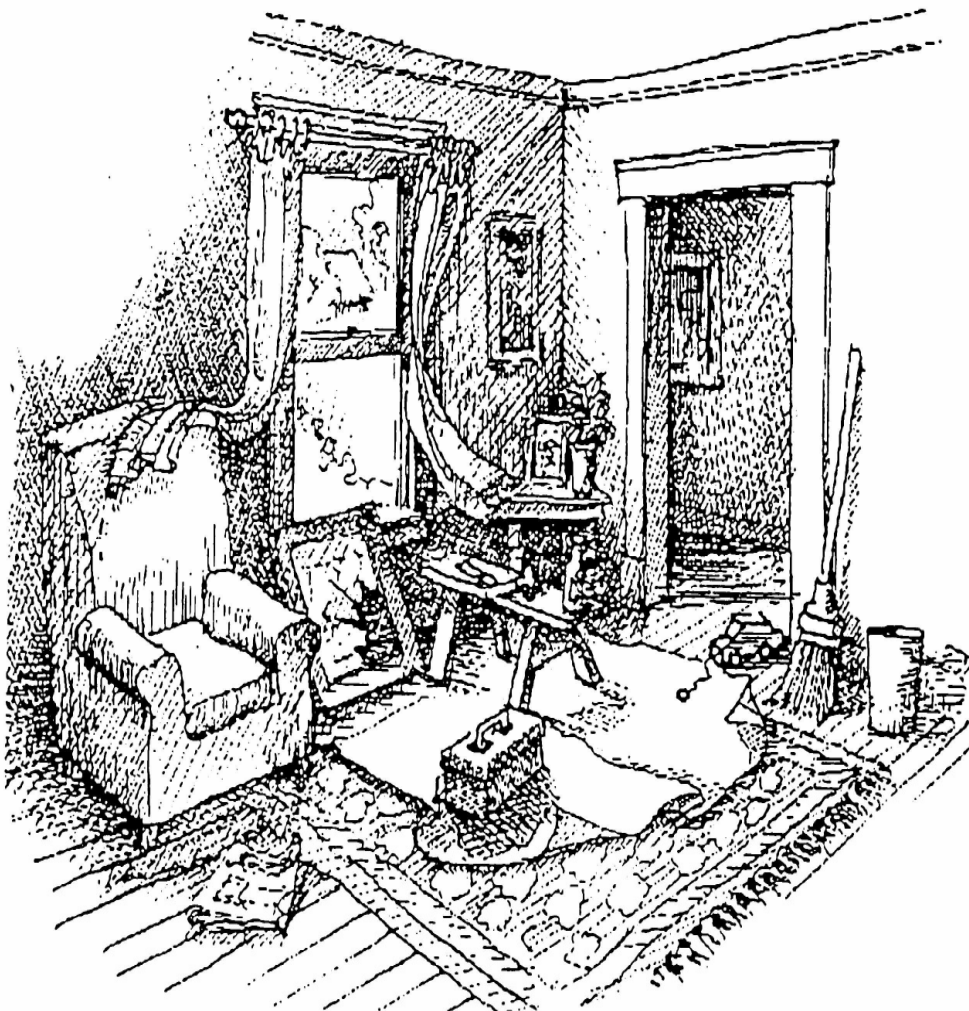




Illustration 2





Illustration 3





LEAD-SAFE WEATHERIZATION FREQUENTLY ASKED QUESTIONS

1Q: Why should I be concerned about lead as a weatherization worker?

1A. Lead is toxic to humans, especially children. It can cause a wide variety of health problems even with very low levels of exposure. Paints for residential use manufactured before 1978 contained various amounts of lead. If you are disturbing lead-based paint while performing weatherization work you may be exposing your self and others to lead.

2Q. Does all paint contain lead?

2A. No. Paints manufactured prior to 1978 may have been manufactured with lead or had lead added by the painters. In 1978 the Consumer Product Safety Commission banned the use of lead in residential paints. Therefore any paint produced prior to 1978 should be considered to contain lead until it is tested and the amount of lead determined.

3Q. Where can lead-based paint be found?

3A. Typically it is only found in homes built prior to 1978, the year CPSC banned its use in residential paint. Be aware however, that it can still be found in paints intended for industrial use, such as for steel bridges, heavy equipment and highway paint.

4Q: Do I have to take lead samples before I start to weatherize a home?

4A. No. If you are working in a home built prior to 1978 and do not have the paint tested then you must assume it contains lead and use *lead-safe* weatherization techniques.

5Q. What are *Lead-Safe* weatherization techniques?

5A. Lead-safe weatherization techniques minimize the production of dust, prevent the spread of dust generated and include thorough cleaning of the work area once the work is completed.

6Q. What does "work-wet" refer to? (cleaning and dust-reduction products and cleaning products)

6A. Work wet refers to the use of water or some other material such as shaving cream to trap dust and suppress dust as it is made. Any time an area of paint is to be disturbed it should be kept wet.

7Q. What does HEPA filter mean?

7A. HEPA filter means High Efficiency Particulate Air filter. A HEPA filter has a particle removal efficiency of no less than 99.97% for particulate as small as 0.3 micrometers in diameter.

8Q. How does lead get into the body?

8A. Lead is usually inhaled as dust or ingested (swallowed) as dust or paint chips.



9Q. What personal protective equipment and clothing should I wear when conducting Lead-Safe Weatherization?

9A. You should at least be wearing a properly fit tested and approved respirator with HEPA filters. It is also highly recommended that you wear disposable overalls with head and foot coverings to prevent contaminating your clothes with lead dust. Using disposable protective clothing also can prevent the spread of lead dust by taking them off in the work area and bagging them for disposal there.

10Q. What is an approved respirator for working with lead-based paint?

10A. Any respirator and filter cartridges used for protection from lead must be approved by the National Institute of Occupational Safety and Health (NIOSH).

11Q. Are there regulations for doing weatherization if lead-based paint is present.

11A. Yes. The Occupational Safety and Health Administration has specific regulations to protect employees from lead exposure. The Environmental Protection Agency and the U.S. Department of Housing and Urban Development also have regulations for work done in housing and child occupied facilities identified in the *Residential Lead-Based Paint Hazard Reduction Act of 1992*, also known as Title X (ten).

12Q. How do I know that I am not being exposed to unacceptable levels of lead dust when I am conducting Lead-Safe Weatherization?

12A. The only way to determine what exposure levels are is to do personal monitoring using sampling pumps and filter cassettes. The filter cassettes will require laboratory analysis to determine the concentration of lead you were exposed to, therefore you will not know until after you are done with the work. For this reason it is highly recommended that you always use respiratory protection when disturbing known or suspected lead-based paint.

13Q. Can anybody do personal air monitoring?

13A. Yes, as long as they are performing the sampling according to a NIOSH or OSHA approved sampling method.

14Q. Can occupants be in the house when I am conducting Lead-Safe Weatherization?

14A. Yes, but they must be prohibited from entering the work area. The work area usually includes an area of at least five (5) feet out in each direction from the painted area being disturbed.

15Q. What are the advantages and disadvantages of the "work-wet" method versus using HEPA-connected equipment?

15A. Cost associated with HEPA equipment engineering controls are a primary advantage. In many instances, time is also saved in labor associated with staging and use of shrouded



equipment. There is also the potential for equipment failure or accidental contamination of adjacent areas when utilizing HEPA-connected equipment.

16Q. What work-safe method is recommended for cleaning a HEPA vacuum?

16A. HEPA vacuum equipment may be decontaminated before leaving the site utilizing another vacuum or wet wiping the canister. Remember to always tape shut hoses prior to shutting the machine off and removing the equipment from the job site.

17Q. Upon completion of the weatherization project how should I dispose of lead-containing debris?

17A. See EPA Clarification Regarding Household Waste Exemption for RCRA in Appendix D of this manual.

18Q. How do I assure the home is Lead-Safe when the weatherization project is completed?

18A. Each Weatherization department may have different policies for releasing residential improvement spaces by to the resident. These may include visual inspection criteria only and reliance on distribution of the EPA Booklet "Protect Your Family from Lead in Your Home." Other policies may exist or be adopted that require clearance wipe sample requirements be met.

19Q. When do I know to walk-away or "Defer" from a Weatherization project due to lead-based paint?

19A. Each Weatherization program should consider the DOE Lead-Based Paint Weatherization Policy presented in Appendix B for pre-1978 housing stock and consider the level of training and equipment Weatherization crews have at their disposal for addressing and controlling lead in the form of dust or paint chips.