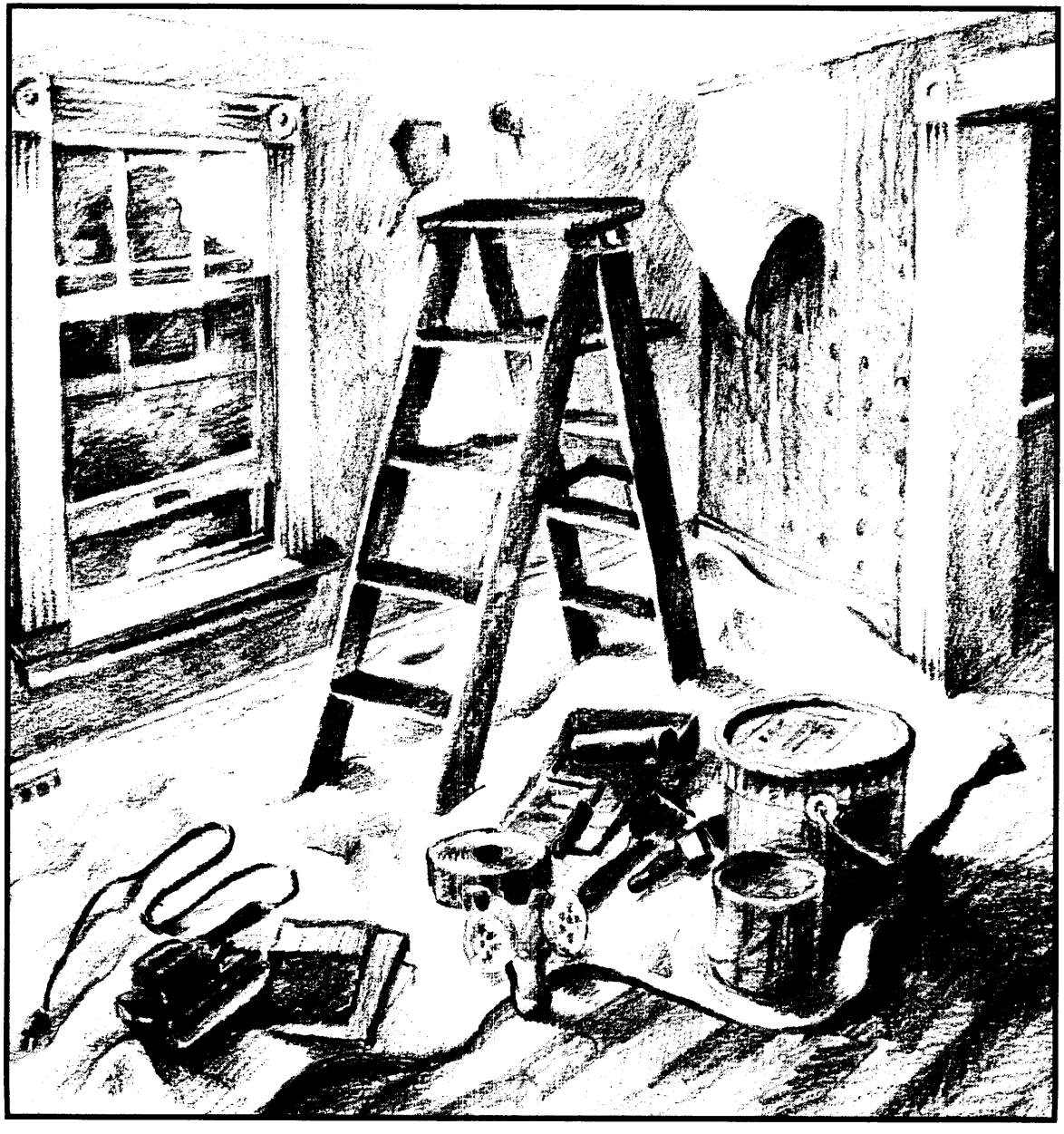
United States Environmental Protection Agency
Office of Pollution Prevention and Toxics

EPA 747-R-94-002
April 1994

EPA

Reducing Lead Hazards When Remodeling Your Home



The U.S. Environmental Protection Agency is concerned about homeowners and building professionals who may be exposed to lead as a result of remodeling or renovation projects.

The purpose of this pamphlet is to help reduce lead exposure when conducting home renovation and remodeling activities. This pamphlet will be updated as new information about lead hazards becomes available.

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Who should read this pamphlet

Is it lead-based paint?

To be sure that you're not dealing with lead-based paint you must have the paint tested by a qualified professional. Use a trained inspector to test your home. The results of using "do-it-yourself" testing kits are not recommended. To find an inspector, contact your state agency listed on page 22 or call the National Lead Information Center Clearinghouse at (800) 424-LEAD. A trained inspector will test the surfaces of your home by using a portable X-ray fluorescence (XRF) machine which measures the amount of lead in the paint or by sending paint samples to a laboratory equipped to measure lead in paint.

This pamphlet is for anyone involved in a home improvement project--whether you are actually doing the work yourself or overseeing the work of renovation and remodeling professionals. Using the described practices will help keep lead dust levels lower during the project. They also will keep you from breathing lead dust and show you how to clean up lead dust once the project is completed.

This pamphlet can help homeowners and contractors do remodeling or renovation work safely. It will alert you to the hazards involved in handling lead-based painted surfaces and will provide useful methods you can use to reduce or eliminate exposures to lead. If you are uncertain how to properly perform any of these methods or where to be properly fitted for a respirator, you may want to call on a trained contractor or call your State lead program contact (see page 22).

This pamphlet is not intended for use as a guide for safe lead-based paint abatement procedures. Unlike remodeling and renovation activities, "abatement" is a process used only to address lead-based paint hazards. Contractors involved in lead-based paint abatement should consult the U.S. Department of Housing and Urban Development's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. EPA is developing regulations for certification and training for people engaged in lead abatement. You should check with your State lead program contact for further information on these regulations.

Lead hazards

Lead-based paint is poisonous. The dust and chips from lead-based paint are dangerous when swallowed or inhaled. The smallest lead dust particles cannot be seen but they can get into the body. They are especially dangerous to small children and pregnant women. Lead can affect children's developing nervous systems, causing reduced IQ and learning disabilities.

Lead poisoning affects adults, too. High lead levels can cause health problems including high blood pressure, headaches, digestive problems, memory and concentration problems, kidney damage, mood changes, nerve disorders, sleep disturbances, and muscle or joint pain. A single, very high exposure to lead can cause lead poisoning. Lead can also affect the ability of both women and men to have healthy children.

A home built before 1978 is likely to have surfaces painted with lead-based paint. When you work on these surfaces you can be exposed to lead. Dry-sanding lead-based paint can produce dust and chips. Scraping, brushing, or blasting lead-based paint can produce poisonous paint chips or dust. Burning lead-based paint with open flame torches to make it easier to strip is especially dangerous. The fumes from the hot paint contain lead and volatile chemicals that are poisonous when inhaled.

EPA has proposed regulations that would require renovation and remodeling contractors to provide the EPA pamphlet, *Lead-Based Paint: Protect Your Family*, to homeowners and occupants of most pre-1978 homes before they begin work. You should call the National Lead Information Clearinghouse (800-424-LEAD) to get further information on the availability of the pamphlet.

Is my family okay?

Renovation and remodeling activities can make a lot of dust that contains lead in and around your home. If you are concerned that your family has been exposed to lead-based paint, call your doctor or local health department to arrange for a blood test.

Will the job create lead hazards?

Can I do the work safely?

It is extremely important that you properly use all the methods in this pamphlet in order to protect you and your family from lead dust, both during and after the project. Unless you can follow all of the work practices and safety precautions in this pamphlet, you should hire professionals to do your renovation or remodeling work. If you decide to hire remodeling professionals, make sure they have training and experience in dealing with the hazards of remodeling or renovating homes with lead-based paint.

Age of house

- **If your home was built before 1978, you should be concerned about lead-based paint hazards.** The older your house is, the more likely it is to contain lead-based paint. Even if the original paint has been covered with new paint or another covering, cracked or chipped painted surfaces can expose the older, lead-based paint layers, possibly creating a lead hazard.

Type of remodeling work

- **If you are removing paint or breaking through painted surfaces, you should be concerned about lead-based paint hazards.** If your job involves removing paint, sanding, patching, scraping or tearing down walls, you should be concerned about exposure to Lead-based paint hazards. If you are doing other work, such as removing or replacing windows, baseboards, doors, plumbing fixtures, heating and ventilation duct work, or electrical systems, you should be concerned about lead-based paint hazards, since you may be breaking through painted surfaces to do these jobs.

Places where lead-based paint is found

- **If you are working on any painted surface, you should be concerned about lead-based paint hazards.** You may find lead-based paint on any surface in your home including walls, interior trim, window sashes and frames, floors, radiators, doors, stairways, railings, porches, and exterior siding. Lead-based paint was frequently used in kitchens, bathrooms and laundry rooms.

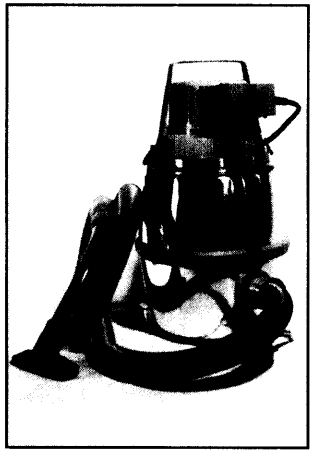
Useful equipment and where to get it

Getting the right equipment and knowing how to use it are essential steps in protecting yourself during remodeling or renovating.

- **A high-efficiency particulate air (HEPA) filter-equipped vacuum cleaner** is a special type of vacuum cleaner that can remove very small lead particles from floors, window sills, and carpets and keeps them inside the vacuum cleaner. Regular household or shop vacuum cleaners are not effective in removing lead dust. They blow the lead dust out through their exhausts and spread the dust throughout the home HEPA vacuum cleaners are available through laboratory safety and supply catalogs and vendors. They can sometimes be rented at stores that carry remodeling tools.

- **You need to use a properly fitted respirator* with HEPA filters** to filter lead dust particles out of the air you breathe. Make sure you buy specific HEPA filters -- they're always purple. Dust filters and dust masks are not effective in preventing you from breathing in lead particles. Follow the directions that come with the respirator to make sure it fits. A respirator that does not fit right will not work. Respirators are available through laboratory safety and supply catalogs and vendors, and are sometimes carried by paint and hardware stores.

- **Protective clothes**, such as coveralls, shoe covers, hats, goggles, and gloves should be used to help keep lead dust from being tracked into areas outside of the work site. These items are available through laboratory safety equipment supply catalogs and vendors. Inexpensive disposable suits can sometimes be purchased at paint stores.



Use a HEPA filter-equipped vacuum cleaner. Standard household and shop vacuum cleaners are not effective at removing lead dust.

* NIOSH certified

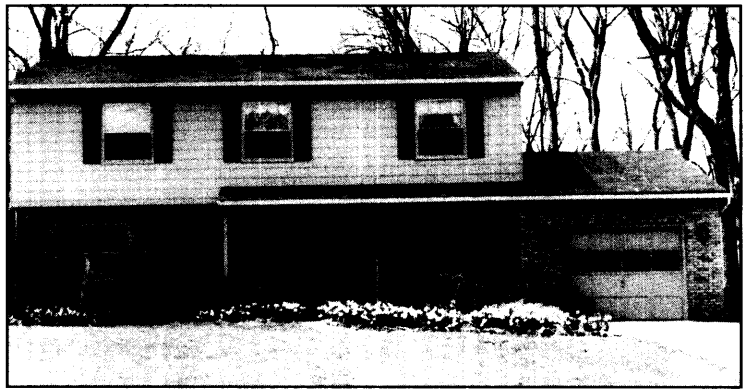
- **Heavy duty polyethylene plastic sheeting** for covering areas exposed to lead dust can be purchased at hardware stores or lumber yards. The label should say that the plastic is made of polyethylene and is 6 mils thick.

- **Duct tape** to hold the plastic in place, and completely seal "air tight" the work areas, can be purchased at hardware stores and lumber yards.

- **Wet-sanding equipment, wet/dry abrasive paper, and wet-sanding sponges** can be purchased at hardware stores.

- **Spray bottles for wetting surfaces to keep dust from spreading,** can be purchased at general retail and garden supply stores.

- **The only household detergent that can remove lead is powdered, high phosphate automatic dishwasher detergent.** This dishwasher detergent can be purchased at grocery stores. If available, trisodium phosphate detergent or lead-specific cleaning products can be used and purchased at some paint and hardware stores.



Be concerned if your home was built before 1978-- it may have lead-based paint hazards.

Safe work practices

You must protect yourself and your family from breathing lead dust created by renovation and remodeling projects.

- **Keep all non-workers, especially children, pregnant women and pets outside of the work area** while doing remodeling or renovation work until cleanup is completed.
- **Break large projects into several small projects** so that you can control the amount of lead dust made. Clean up after each phase of the project.
- **Wear a properly fitted respirator** equipped with HEPA filters.
- **Wear protective clothing** such as coveralls, shoe covers, goggles, and gloves to keep dust off your skin. Launder these items separately.
- **Change your clothes and shoes before leaving the work area** to avoid carrying lead dust throughout the house.
- **Machine wash your work clothes separately from other family laundry.**
- **Shower and wash hair** right after finishing work to reduce dust contamination.
- **Do not eat, smoke or drink in the work area** to avoid accidentally swallowing lead dust. Wash your hands and face before eating, smoking, or drinking.
- **Dispose of used wash water down a toilet.*** Never pour wash water on soil.

* Check with your State lead program (see page 22) to make sure there are no regulations in your state that prohibit this.

Do wear a respirator so you don't breathe in lead.

Don't wear dust masks-- they won't protect you from lead.

Setting up to work outside

Exterior work often produces dust, paint chips, larger pieces of material, and liquids that contain lead. It is easy to track dust containing lead inside your home, where it can pose a hazard. Trash that contains lead also can contaminate the soil surrounding the house if you don't handle it correctly. To keep this trash from contaminating the areas surrounding your house, take the following precautions:

- **Cover the ground and any flowers or plants** with 6 mil polyethylene plastic sheeting to catch dust and trash. Extend the plastic sheeting beyond the work area far enough to catch all waste materials. The plastic should extend at least 5 feet from the base of the house and an additional 3 feet for each story.

- **Use bricks or rocks to hold the edges of the plastic sheeting in place.** Place wood studs under the edges of the sheeting to block liquid from escaping as pictured on page 8.

- **Avoid working in windy conditions.** Strong winds can blow lead dust to areas that are not covered, and contaminate the soil. If the winds are more than 15 m.p.h. or the chips and dust are blowing off the plastic sheeting, set up a barrier to block the wind or do the work another day.

- **Cover sandboxes with 6 mil polyethylene plastic sheeting.** If possible, move play equipment at least 20 feet away from the work area.

- **Close all windows and doors.**
- **Remove personal belongings** from the area before starting work.

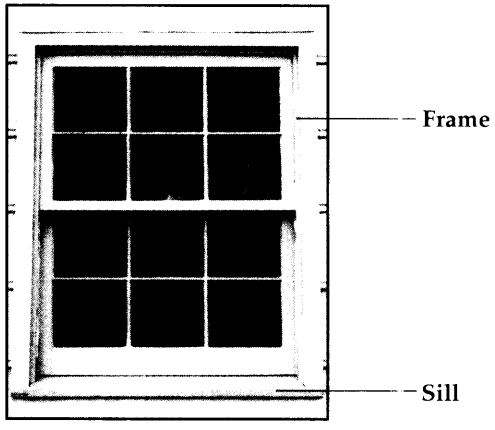
Plastic sheeting should extend at least 6 feet from the foundation of a two-story house.

Replacing or working on windows

Window sills and frames on homes built before 1978 can have high amounts of lead-based paint. Since these items are seldom replaced, paint tends to build up on them. Follow these basic safety precautions for removing a window unit safely:

- **Seal off the work area** by covering entryways with 6 mil polyethylene plastic sheeting, if you are working on the window from the inside.

- **Tape 6 mil plastic over the entire inside window opening,** if you are working on the window from the outside.



Remove window unit from the outside, if possible.

- **Cover the floor** inside under the window with 6 mil polyethylene plastic sheeting to catch any falling dust. Also cover the ground outside the window.

- **Spray the window sill and frame** with water to reduce the dust.

- **Remove the window unit from the outside,** if possible. Collect all of the dust and paint chips. Dispose of them in a sealed plastic bag.

Setting up to work inside

Dust, paint chips, and lead-contaminated trash are the main concerns of remodeling and renovation work. While all three can be a hazard, dust is the hardest to control. Dust contaminated with lead can cling to your clothes and skin, to walls and floors, and to furniture and floor coverings. Forced-air heating and air conditioning systems also can spread dust throughout your home.

To keep dust from spreading throughout your home, take the following safeguards:

- **Close off the work area** by covering entryways with 6 mil polyethylene plastic sheeting and taping it in place with duct tape. Be sure to leave windows open for proper ventilation, if necessary.

- **Remove furniture**, area rugs, curtains, food, clothing, and other household items until cleanup is complete. Items that cannot be removed from the home should be tightly wrapped in 6 mil polyethylene plastic and sealed with duct tape until all work and cleanup is complete. If you are removing wall-to-wall carpet as part of your remodeling job, see page 13.

- **Turn off forced-air heating and air conditioning** systems during remodeling or renovation. Then, cover heating and air conditioning vents with a layer of 6 mil polyethylene plastic sheeting. Tape the sheeting in place with duct tape.

- **Cover openings**, such as gaps around pipes and between floorboards, with plastic or duct tape to prevent lead dust from sifting down to lower floors and rising to upper floors.

- **Cover exposed surfaces that cannot be removed,** such as floors, carpeting, counter-tops, and shelves with 6 mil polyethylene plastic sheeting.

- **Tape around the door seals of refrigerators** to prevent dust from contaminating the food inside.

Preparing surfaces for new paint or wallpaper

Preparing walls and other surfaces for painting, staining, or wallpapering can create lead exposure risks. With good work practices, you can reduce the risk of exposure to lead.

Sanding and stripping

- **Cover the floor and furniture** with 6 mil polyethylene plastic sheeting.
- **Avoid sanding lead-based painted surfaces** whenever possible. If you must sand, use a sander with a vacuum attachment connected to a HEPA filter-equipped vacuum cleaner, or use a wet-sanding sponge.
- **Wipe the area you are sanding often and rinse** the sponge in a bucket of water. Strain out any chips of paint and dispose of them in heavy-duty plastic bags. Dispose of the used wash water down the toilet. Wash the walls with automatic dishwasher detergent or a lead-specific cleaning agent, rinse, and let dry before painting or wallpapering. Be careful while wet sanding because wet plastic can be very slippery.
- **Exercise caution when using paint strippers** since they contain toxic chemicals.

Blasting and power washing

Do not blast or power wash lead-based painted surfaces. Blasting and power washing creates large amounts of dust and waste water that contain lead and can contaminate large areas.

Cutting, scraping, drilling, or sawing painted surfaces

- **Cover everything near or inside the work area** with 6 mil polyethylene plastic.
- **Spray the work area surface** with water to reduce the amount of dust.

Use plastic sheeting to seal off entryways to work area. Cover floors, furniture, and heating vents with plastic.

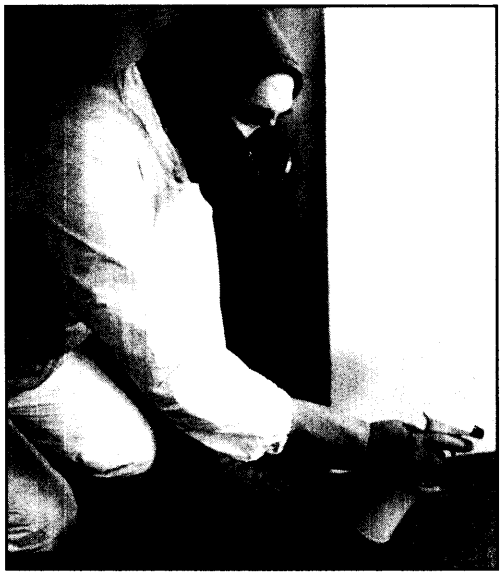
Using heat guns

If you suspect the paint you are removing contains lead, do not use a high-temperature (above 1100° F) heat gun to loosen the paint. Heating or burning lead-based paint makes dangerous fumes and vapors. Never use high-temperature heat guns or open flame torches to loosen lead-based paint.

Carpet Removal

If you plan to remove or replace your carpet as part of a remodeling job, take the following steps to avoid spreading lead dust:

- **Mist the entire surface of the carpet** with water to keep dust down.
- **Roll carpet inward** to avoid spreading dust to other areas.
- **Wrap carpet and pad** in 6 mil polyethylene plastic sheeting. Tape seams closed with duct tape.
- **Vacuum floor** with a HEPA filter-equipped vacuum cleaner after the carpet is wrapped -- but before you remove it.
- **HEPA vacuum the floor again** after you remove the carpet.

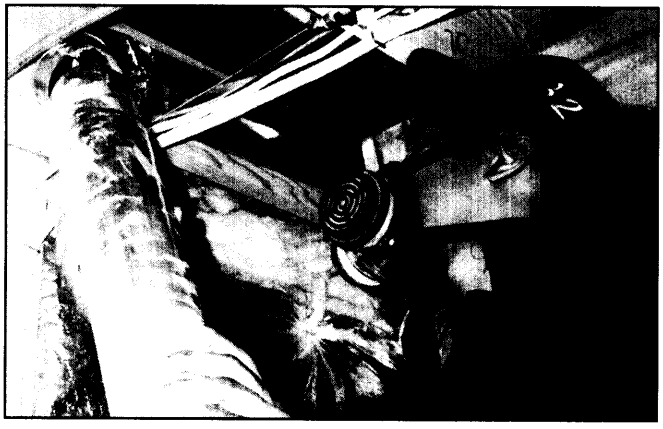


Mist carpet surfaces with water to reduce amounts of dust.

HVAC Duct work

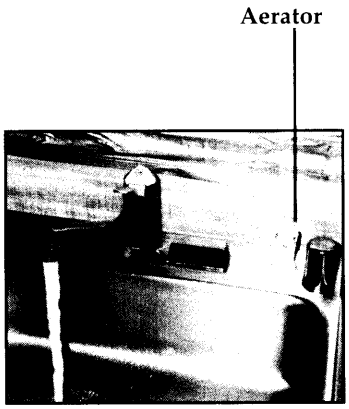
Heating, ventilation, and air conditioning system ducts can accumulate dust for many years. If you suspect that the dust contains lead, follow these steps when replacing or cleaning the ducts:

- **Cover the floor** under the ducts with 6 mil polyethylene plastic sheeting to catch any falling dust.
- **Use a HEPA filter-equipped vacuum cleaner** to remove dust from the inside of the ducts before beginning work.
- **Rinse the duct pieces** in an area well away from the house before reinstalling them. If you are disposing of old duct pieces, first wrap them in 6 mil polyethylene plastic and seal with duct tape.



Heating and air conditioning ducts can accumulate dust that contains lead.

Plumbing work



Remove faucet aerators and clean out any debris.

If you are working on older pipes that contain lead solder, you should be concerned about lead hazards in plumbing. Disturbing lead-soldered pipes can dislodge pieces of lead solder that can get into your drinking water or come to rest in aerators or the bottom of pipes or joints. Follow these precautions to reduce lead hazards in plumbing:

During work

- **Follow the practices** outlined in the section on preparing surfaces (pages 11 and 12) when you break through walls or floors to reach pipes.
- **Use adequate ventilation** to avoid inhaling dangerous fumes from soldering.
- **Promptly discard solder pieces** when you finish plumbing work, using the safeguards listed on page 18.
- **Use lead-free solder** when working on drinking water plumbing.

After work is completed

- **Remove faucet aerators and clean** out any debris before re-installing them. Look carefully for grit or pieces of solder and remove them.
- **Flush the supply pipes** you have been working on by letting them run for several minutes, with the aerators removed. The water flowing through the pipes removes small pieces of loose solder.

Removal of large structures

When you demolish and remove large structures painted with lead-based paint, such as walls, door frames, floor coverings, and ceilings, you are likely to be left with large amounts of dust and trash that contain lead.

To reduce exposure to large amounts of lead dust:

- **Seal off the work area** by covering entryways with 6 mil polyethylene plastic sheeting.
- **Cover nearby windows** with 6 mil polyethylene plastic sheeting.
- **Turn off forced-air** heating and air conditioning systems. Then cover heating and air conditioning vents with a layer of 6 mil polyethylene plastic sheeting.
- **Remove rugs and furniture** from the work area, if possible.
- **Cover the floors and the furniture** in the work area and adjoining areas with 6 mil polyethylene plastic sheeting.
- **Wet the surface** and debris as you demolish it to keep dust levels down.
- **Remove and dispose of trash properly**. Allowing debris to accumulate in the work area increases the risk of spreading dust through the house.

Wear protective clothing and a respirator when removing walls that may contain lead.

Cleaning up lead waste

Pay special attention to cleanup activities to prevent contaminating other areas or exposing people to lead. Everyone working on your job should take the precautions below to help prevent lead contamination.

If you are doing remodeling work, it may be necessary for you to use a hazardous waste facility for lead trash disposal. Call your State lead program contact (see page 22) to see how you should dispose of lead trash in your area.

Personal cleanup:

- **Do not take off your respirator** until after you have removed your outer protective clothing.
- **Vacuum dust from clothing** using a HEPA filter-equipped vacuum cleaner.
- **Wash your hands and face** whenever you leave the work site.
- **Change your clothes and shoes before leaving the worksite** to prevent contaminating areas outside the work site. After removing your clothes, machine wash them separately from other family laundry.
- **Shower and wash your hair** right after finishing work to prevent spreading lead dust.

Vacuum dust from clothing.

Wash hands thoroughly to remove lead dust.

Daily site cleanup

- **Dispose of construction trash in a heavy-duty plastic bag.*** Carefully remove the dust and trash from the plastic sheeting to avoid contaminating other areas. If possible, pass the trash out a window to avoid carrying it through the house.

- **Strain out paint chips from liquid waste** and dispose of them in a heavy-duty plastic bag. Dispose of the remaining water down a toilet.*

- **Mop the floors** (with a detergent recommended on page 5) in areas where there is little dust, or vacuum with a HEPA filter-equipped vacuum cleaner. When mopping, use a disposable mop, since the mop used for cleaning lead dust can spread the dust when it is used for regular cleaning. A wet/dry HEPA filter-equipped vacuum cleaner is most useful since it will pick up dust as well as water that contains dust. Change wash water frequently. Rinse with clean water. Dispose of used water down a toilet.*

- **Vacuum the plastic sheeting covering wall-to-wall carpeting** with a HEPA filter-equipped vacuum cleaner.

- **Wet-sweep** outside areas with lots of dust and trash by using a garden hose to spray these areas with water. Avoid dry sweeping since it spreads lead dust. Shovel the trash into heavy-duty plastic bags placed in cardboard boxes for support.

- **Clean your tools** with detergent (see page 5).

- **Seal off the entryways with 6 mil polyethylene plastic** if you have to leave a work site unattended.

* Check with your State lead program (see page 22) to make sure there are no regulations in your state that prohibit this.

Am I done?

Consider hiring a professional to test areas for lead dust contamination after your final cleanup. Call your local health department or the National Lead Information Center Clearinghouse at (800) 424-LEAD for a referral to a lead-testing professional.

Final cleanup

- **Start your cleanup work** from the dirtiest part of the work area and work toward the clean area of the house.
- **Work from the top of the room** toward the bottom, cleaning ceilings first, then walls, counters and floors.
- **Carefully remove any plastic sheeting** used to protect surfaces by rolling or folding inward.
- **Wash floors and walls** with powdered automatic dishwasher detergent or other lead-specific cleaning product. Dispose of used wash water down a toilet.*
- **Vacuum floors, walls, and wall-to-wall carpeting** with a HEPA filter-equipped vacuum cleaner.
- **Vacuum baseboards, chair rails, window sills, casings, shelves and counter-tops again**, once they are dry.

* Check with your State lead program (see page 22) to make sure there are no regulations in your state that prohibit this.

Smart Remodeling Checklist

Before the work begins

- ☐ Have your paint tested for lead by a qualified professional.
- ☐ Cover interior and exterior exposed areas with plastic sheeting.
- ☐ Turn off forced-air heating and air conditioning systems.

During work

- ☐ Keep all non-workers outside of the work area.
- ☐ Wear protective clothing and shoes while doing the work.
- ☐ Use a properly fitted respirator equipped with HEPA filters.
- ☐ Exercise caution when using paint strippers since they contain toxic chemicals.
- ☐ Do not eat, drink or smoke in the work area.
- ☐ Do not dry-sand, blast, or power-wash to remove lead-based paint.
- ☐ Do not use high temperature heat guns or open flames on lead-based paint.

After work is completed

- ☐ Remove plastic sheeting by rolling or folding inward.
- ☐ Wrap construction debris with plastic.
- ☐ Vacuum exposed areas with a HEPA vacuum cleaner.
- ☐ Wash exposed areas with a powdered, automatic dishwashing detergent, tri-sodium phosphate detergent or lead-specific cleaning product.
- ☐ Change clothes and shoes before leaving the work area. Machine wash separately.
- ☐ Shower and wash your hair right after finishing work.
- ☐ Test areas for lead dust contamination after final cleanup.

Helpful contacts

You may need additional information on how to protect yourself while remodeling or renovating. To get more information about lead and ways to protect yourself and others from the hazards of lead-based paint:

- **Call your State lead-poisoning prevention contact** and your State Department of Environmental Protection to find out what other information is available about lead hazards and what assistance is available to you. Phone numbers of State lead poisoning prevention contacts are listed in the back of this pamphlet.

- **Call your local building code officials** to find out what regulations apply to the renovation and remodeling work that you are planning.

- **Call your local health department** to find out what other information is available about lead hazards and what assistance is available to you.

- **Call the National Lead Information Center** at (800) LEAD-FYI to get the pamphlet, *Lead Poisoning and Your Children,* and other important lead hazard information.

- **Call the Occupational Safety and Health Administration** (OSHA), Department of Job Safety and Health at (202) 219-8151 to get information on respirators and protective clothing.

- **Call the National Conference of State Legislatures** at (303) 830-2200 to get information about the current state regulations for disposing of lead waste in your area.

- **Call the National Lead Information Center Clearinghouse** at (800) 424-LEAD to get a list of laboratories that can analyze paint and dust samples for lead.

State Lead Program Contacts

Alabama	(205) 613-5373
Alaska	(907) 269-4940
Arizona	(602) 542-1770
Arkansas	(501) 562-7444
California	(510) 450-2453
Colorado	(303) 692-3185
Connecticut	(203) 566-5808
Delaware	(302) 739-4735
District of Columbia	(202) 767-7370
Florida	(904) 487-2945
Georgia	(404)657-6514
Hawaii	(808) 586-4254
Idaho	(208) 334-4963
Illinois	(217) 782-5830
Indiana	(317) 281-3606
Iowa	(515) 242-6340
Kansas	(913)296-1547
Kentucky	(502) 564-4830
Louisiana	(504) 765-0902
Maine	(207) 287-4311
Maryland	(410) 631-3859
Massachusetts	(800) 532-9571
Michigan	(517) 335-8246
Minnesota	(612) 627-5017
Mississippi	(601) 960-7463
Missouri	(314) 526-4911
Montana	(406) 723-0041
Nebraska	(402) 471-0197
Nevada	(702) 687-5240
New Hampshire	(603) 271-4507
New Jersey	(609) 633-2043
New Mexico	(505) 827-0006
New York	(800) 458-1158
North Carolina	(919) 733-9933
North Dakota	(701) 221-5150
Ohio	(614) 466-1450
Oklahoma	(405) 271-5220
Oregon	(503) 731-4015
Pennsylvania	(717) 783-8451
Puerto Rico	(809) 766-2817
Rhode Island	(401) 277-2808
South Carolina	(803) 737-4061
South Dakota	(605) 773-3364
Tennessee	(615) 741-5683
Texas	(512) 834-6600
Utah	(801) 538-6129
Vermont	(802) 863-7231
Virginia	(804) 371-7160
Washington	(206) 753-2556
West Virginia	(304) 558-3530
Wisconsin	(608) 266-5817
Wyoming	(307) 777-7957

Notes