

LEAD DUST

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Why Is Lead-Contaminated Dust a Health Hazard?

Lead poisoning can damage children's brains, making it hard for them to learn and causing behavior problems. These effects and others can last a lifetime. Most children in America with harmful amounts of lead in their bodies come into contact with lead in and around their homes.

- Peeling, flaking, chipping lead-based paint can be a serious health hazard.
- Peeling lead paint produces small lead paint chips and lead in dust that are serious health hazards.

However, children do not need to eat lead paint chips to become poisoned. Most young children are poisoned by getting lead dust on their hands and toys, which then gets into their mouths through normal hand-to-mouth behavior.

- Lead-based paint that is peeling or chipping is a major source of lead-contaminated dust.
- Painting or remodeling projects that disturb lead-based paint can also release lead dust.
- Lead dust can be tracked in from lead in soil outside.



Windowsill

- Lead dust settles quickly on floors, indoor windowsills (also known as “stools”) and other surfaces. Regular vacuuming or broom sweeping does not clean up lead-contaminated dust.
- Lead dust is no more visible than other dust.

Reasons to Test for Lead Dust Hazards

Lead dust sampling is a tool that can be used in different situations, but CEHRC focuses mainly on up-front dust wipe testing to check for existing hazards. There are a variety of reasons to perform dust testing to identify current hazards, including the following:

- To determine if lead dust hazards are present in a family’s home;
 - To characterize lead hazards in homes throughout a community;
 - To document that lead hazards exist in multiple properties owned by the same landlord;
 - To put a landlord on notice that hazards exist, which forces the them to correct the problem and/or to disclose the hazard to future tenants or buyers under the federal disclosure law;
 - To document failures by health, housing, or code enforcement agencies; and
 - To provide hard evidence to strengthen efforts to win needed policy changes or funding increases.
- Dust testing was originally developed as a tool for “clearance testing” to ensure that lead dust hazards are not left behind after lead abatement, paint repair, or rehab. More information on clearance is found near the end of this guide.

Testing for Lead in Dust

You cannot know if lead dust is present simply by looking. The only way to know is to collect a dust sample and send it to a laboratory for analysis. (Some devices called “XRF analyzers” can measure lead in dust and give immediate results, but they cost about \$10,000 - \$18,000 and can only be operated by a certified lead inspector or risk assessor.)

SUPPLIES:

The following supplies and equipment are used for sampling lead in dust. Many of these supplies are typically provided by a laboratory. You can buy the rest of the supplies at a hardware store.

The supplies are listed below in the order in which they are usually used.

- Tape measure or ruler:** It is easiest to use a ruler with decimal points.
- Masking or painters' tape:** This is the tan or blue tape available in the painting section of hardware stores.
- Sampling area templates:** These are optional and may be provided by the lab. If you do not use a template, you will mark out your sampling space with tape. Template size is usually one square foot (ft²), but you should always double check this.

1. **How many?** You only need one floor template. However, if you use only one you must take special care to wipe it off in between sampling to remove any lead dust. Some programs find it helpful to have 4 templates and use one in each of the four rooms sampled and then clean them off after completing sampling.

2. **How much?** Templates are generally not commercially available. Some labs may supply them or you can have them created using plexiglass. The costs vary, but may be as low as a few dollars per template.

3. **What features?** It is best to use templates that are durable and can be cleaned easily. Plastic or plexiglass work well. Cardboard templates typically only last for one sample and are disposable.

Wet wipes

1. **How many?** You will use one wipe per sample and one for the blank sample. Wipes are also used to clean up supplies (such as templates) in between sampling. Be sure to have at least 3 wipes per sample. This allows extras if you rip or misplace wipes or use them for cleaning.

2. **What features?** Use individually wrapped wipes or wipes provided by the lab. If the lab does not provide wipes, we recommend that you use a wipe that is recommended by a national standards and testing organization (**ASTM**). If you use wipes from a larger container, use a

container that helps the wipes stay moist, such as the type where you pull a wipe through a slot in the top of the container. Be sure the wipe is wet before sampling; throw out dry wipes.

3. How much? Wipes cost a few dollars for a package of hundreds if you use the wipes in containers. Individually wrapped wipes are slightly more expensive. The lab may provide them to you as well.

- Tubes to hold the wipes** (lab may provide)
- Disposable gloves** (lab may provide)
- Labels for tubes** (lab may provide)
- Pen, permanent marker**
- Chain of Custody forms** (lab may provide): these are the sample collection forms on which you mark the sample area, location, surface, etc., and it also documents who has touched the sample.
- Trash bags:** Use heavy duty bags to prevent ripping.

TRAINING AND QUALIFICATIONS:

Success in collecting dust lead samples depends on training. While kits are available to do dust testing with no training, training is likely to help you follow federally recognized methods of sampling and do a better job. There are three types of federally approved lead training that teach lead dust sampling.

Lead Sampling Technician Course (5 hour training; no prerequisites; some state certification available)

- This is the training most strongly recommended by CEHRC.
- EPA and HUD support the Sampling Technician course. The course teaches people to conduct dust lead testing and conduct clearance testing.
- You may also become a state certified Sampling Technician. Having this certification will help to reinforce the validity of your results based on your credential and training; this may give residents an added level of comfort.

- Several states offer such certification—Indiana, Kentucky, Minnesota, Maine, New Hampshire, Ohio, Vermont, and Wisconsin. Iowa offers certification after a two-day training.
- While not all states recognize the Lead Sampling Technician discipline, HUD recognizes certification by any state as a qualification for persons to perform clearance testing after most non-abatement projects in federally-assisted housing.
- Certification usually involves proving that you passed the appropriate training course, and paying a state fee. Some states may require you to pay this fee each year.
- Certification is essential if you plan to do clearance testing after federally funded rehabilitation work that triggers clearance requirements to prove no dust lead hazards were left behind.

Lead Inspector Course (3 day training; minimal prerequisites; state and EPA certification available).

- This training teaches dust sampling, soil sampling and operating an XRF device to measure lead in paint. Inspectors can identify lead dust and paint hazards under federal regulations. Lead Inspectors are qualified to conduct federally funded dust clearance testing.

Risk Assessor Course (5 day training; requires completion of lead inspector training and 2 added days of training; significant prerequisites; state and EPA certification available).

- This training teaches people how to perform a risk assessment and recommend lead hazard control strategies to address lead hazards. Risk Assessors are qualified to conduct federally funded risk assessments, inspections, and dust clearance testing.

EPA is responsible for the oversight of work practice standards for lead-based paint activities (abatement, risk assessment, lead-based paint inspection), accreditation of training in these activities, and certification of persons and firms to perform these activities. EPA oversees this work directly in thirteen states, and has authorized all other states to operate the accreditation and certification programs in their jurisdictions. Several of these states certify sampling technicians. In the EPA-run states and most other states there are no prohibitions against sample collection by sampling technicians.

States may have different requirements for qualifications. Check your state standards and regulations before sampling.

LEAD BASED PAINT (LBP) DISCIPLINES* <i>Who Can Identify LBP Hazards?</i>			
	Lead Sampling Technician	Inspector	Risk Assessor
Qualified to perform:	Clearance after non-abatement work Other dust wipe sampling	Paint inspections Clearance Other lead sampling	Risk assessments Paint inspections Clearance Other lead sampling
Not qualified to perform:	Risk assessments Paint inspections Clearance after abatement Clearance using random sampling of units in multi-family properties	Risk assessments	
Training/Certification required	5 hours of training HUD requires states certification or risk assessor supervision Some states offer and require certification	3 days of training Certification by state or EPA	5 days of training (including Inspector training) Certification by state or EPA
Methods	Perform: Visual assessment Dust wipe sampling	Perform: Visual inspection Dust wipe sampling Soil sampling Paint chip sampling XRF testing of paint	Perform: Visual inspection Dust wipe sampling Soil sampling Paint chip sampling XRF testing
Objectives	Determine if dust hazards are present by taking a dust wipe and comparing the results to standards. To clear a unit after (non-abatement) work that disturbed lead-based paint.	Identify the existence, concentration and location of lead-based paint. To clear a unit after work that disturbed lead-based paint.	Assess a unit, identify hazards, and recommend methods for lead hazard reduction. To clear a unit after work that disturbed lead-based paint.

* Adapted from USEPA Lead Sampling Technician Student Manual -- Attachment I-A

For information about your state's programs to oversee lead-based paint activities and certify persons to do testing contact your state lead program.

(www.epa.gov/lead/traincert.htm).

WHEN TO ADD PAINT CHIP SAMPLING TO DUST SAMPLING:

Paint that is flaking, cracking, or peeling creates dust and paint chips. If peeling paint is lead-based, it is probably a major source of lead dust. When peeling paint is present, it is usually a good idea to take paint chip samples along with lead dust samples, because this can help identify the source of the lead dust.

See Lead Paint Background Materials for more information.

Reports

- Chain of Custody Form**
- Sampling Results Report**

The results from the lab are used to complete the Sampling Results Report.

FEDERAL STANDARDS:

The U.S. Environmental Protection Agency (EPA) has set national standards for dangerous levels of lead in dust on floors and windowsills (40 CFR 745.65(b)). These standards are measured in $\mu\text{g}/\text{ft}^2$ – micrograms of lead per square foot (12 in. x 12 in.). The EPA hazard standards for dangerous levels of lead in settled dust are:

Federal Lead Dust Hazard Standards	
Surface	Standard (micrograms in a square foot - $\mu\text{g}/\text{ft}^2$)
Floor (smooth or carpeted)	40 $\mu\text{g}/\text{ft}^2$
Windowsills (inside sill, also known as the "stool")	250 $\mu\text{g}/\text{ft}^2$

STATE STANDARDS:

Some have standards that are different from the current federal standards. If you are collecting samples in these states, compare the results to more protective state standards. (www.epa.gov/lead/traincert.htm)

How to Read the Results

Labs usually take 2 or 3 days to report results after they have been received. You may choose to get results by mail, fax, or email. After you get the results, follow these steps.

1. Check to see if the lab results have the right measurement units.

For lead-contaminated dust, the results should be in micrograms per square foot ($\mu\text{g}/\text{ft}^2$.)

- If you wrote down the sample area size on your **Chain of Custody** form, the lab will give you the results in $\mu\text{g}/\text{ft}^2$. It is best to have the lab do any conversions to get results in $\mu\text{g}/\text{ft}^2$. You must give the lab the sample dimensions so they can do this calculation. This is most important for windowsills where the sample area is not one square foot.
- If the lab did not give you the results in $\mu\text{g}/\text{ft}^2$, ask the lab to give you the results in this form. The lab may want to confirm the measurements with you.

2. Calculate the average dust lead level for floors and windowsills.

EPA regulations require that you average the results from each surface before comparing the results to the lead dust hazard standards. The standards are designed to help you figure out if there is a lead dust hazard throughout the house, not just in a specific spot.

- Average the results of all the floor samples:** Add up the results and divide the total by the number of samples collected.
- Average the results of all windowsill samples:** Add up the results and divide by the number of samples collected.
- If the results from the lab come back as “non detectable”,**

- The detection limit is the number the lab is confident reporting back as an accurate dust lead level. The issue of non-detectable results is most likely to come up for floors where the dust lead levels are so low that they are below what the lab can accurately report.
- Detection limits range from 5 to 20/ μg .
- CEHRC recommends that you show the non-detectable result as "0" (zero). Although a non-detectable result does not mean that there was no lead in that sample, factoring a 0 (zero) into your average will help make your results more credible in the end. (Proof that you did not inflate any numbers).

3. Compare results to the federal standards (or state standards if they are lower).

The EPA standards for dangerous levels of lead in dust are:

- 40 $\mu\text{g}/\text{ft}^2$ on floors (bare and carpeted); or
- 250 $\mu\text{g}/\text{ft}^2$ on windowsills.

Unit-Wide Dust Lead Hazard: If the average floor or sill dust lead levels are equal to or are greater than the standard, then dust lead levels are at dangerous levels in the house.

For example, if the results for four floor samples are 42 $\mu\text{g}/\text{ft}^2$, 18 $\mu\text{g}/\text{ft}^2$, 66 $\mu\text{g}/\text{ft}^2$, and 58 $\mu\text{g}/\text{ft}^2$, add these numbers together and divide by the number of samples.

$$\begin{array}{r}
 42 \\
 18 \\
 66 \\
 + 58 \\
 \hline
 184 / 4 = 46 \mu\text{g}/\text{ft}^2
 \end{array}$$

The floor dust lead average is 46 $\mu\text{g}/\text{ft}^2$, which is greater than 40 $\mu\text{g}/\text{ft}^2$. The results show that there is a floor dust lead hazard in the house.

Single Lead Dust Results Are Greater than the Lead Dust Standard: If any one floor or sill sample result has dust lead that is equal to or greater than the standard, then you can show that lead dust levels could be considered a lead hazard in that room.

- It is possible to find a room with high dust lead even though the average dust lead loadings are less than the standard. This tells you that although there is not a lead dust hazard throughout the house, there are rooms with harmful levels of lead in dust. High dust lead levels also suggest that there is a likely source of lead in and/or around that room.
- Finding a few places with high lead dust in a home that doesn't have a widespread lead dust problem is not unusual because there is a lot of variation in dust lead levels in a home. It has to do with the lead level in the paint (which can vary depending upon when a room or wall was built) and the condition of the paint (if it's creating lead dust or paint chips).

4. Check results from the “blank” sample.

See **Lead Dust Sampling Instructions** for more information on blanks. The result should be “below the detection limit or non-detectable.” If it is not, then one of two things has happened:

- Some part of your touching the wipe and putting it in the tube was added lead to the sample. You need to double-check your steps to stop adding lead to your sample. Change your procedures and submit another blank sample to check that you fixed the problem.
- The laboratory made errors in analysis that day and you may need to resubmit samples from the properties whose samples were in that shipment to the lab, in order to ensure accuracy in your results.

Explaining the Results to Residents

- If a lead dust hazard is identified, the residents should be notified. Give general information about how to repair deteriorated paint and control lead-contaminated dust through specialized cleaning methods.
- Notification to other individuals (such as the landlord) or organizations (such as the health department or code enforcement agency) depends on two things: the consent of the residents, and the advocacy strategy of your organization.
- Information should also be given to the residents about their legal rights and hazard control options.
- While families can reduce lead dust levels, it is the property owner's legal duty to provide safe housing.

- There is little point in cleaning to reduce lead dust hazards unless steps are also taken to control the source of the dust (such as peeling lead-based paint). Cleaning provides only very short term changes in harmful amounts of lead in dust and debris.
- Federal law requires landlords to disclose lead hazards found during sampling to future tenants or buyers. A lead hazard found in one home must also be disclosed to families renting other homes in a multi-family building.

Special Procedures for “Clearance Testing”

You can also use lead dust sampling for clearance testing, which means testing a home after work is done to ensure that lead dust hazards are not left behind.

- Clearance is required after lead abatement projects. Only state or EPA certified lead inspectors or risk assessors can perform clearance after abatement.
- HUD also requires clearance testing after most paint repair and renovation projects in properties built before 1978 that receive federal housing assistance (e.g., vouchers, Section 8 rentals, Community Development Block Grant (CDBG) and HOME funded rehabilitation projects that use more than \$5,000 per unit of federal funds) (24 CFR Part 35). Certified Sampling Technicians can perform required clearance in single units following paint stabilization, other repair work and renovation projects.

KEY STEPS

Dust clearance testing is similar to general dust testing. Follow the steps laid out earlier, with a few changes. The Sampling Technician training materials give you more information on these steps.

I. Decide where to sample:

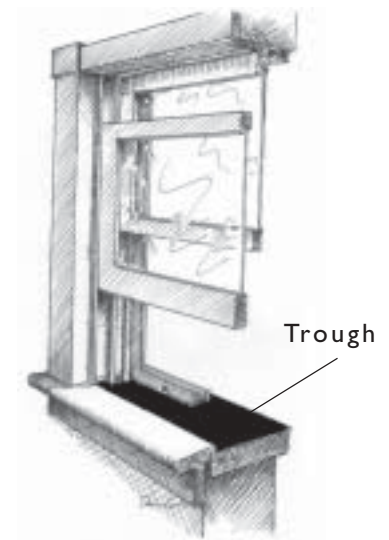
- Entire home or apartment.** This applies if the job involved several rooms.
- Work area.** This applies if the work was very limited (e.g., under HUD’s lead regulations for federally-assisted housing work under \$5,000 per housing unit.)

2. Conduct a visual assessment of the work area:

- Check for dust, construction debris, paint chips or peeling paint. At clearance you should not be able to find peeling paint, paint chips, debris or dust.
- If you find any of these, write it on the form and recommend to the resident that the paint be repaired and any dust or debris cleaned up by the people who performed the work. Provide information on lead-safe paint repair.

3. Take dust samples. Follow general dust sampling collection instructions.

- Take up to 4 samples on floors (one per room, in rooms where work took place)
- Up to 4 windows
- If work was done on windows, alternate between windowsills and window troughs.
- The window trough is sometimes called the exterior windowsill. It is the part of the window that the window sash rests on and includes the area between where the sash rests and the edge of the exterior sill.



4. Compare results to standards.

- Compare results from the single samples with standards for that surface. EPA regulations require you to compare the results of individual samples to the clearance standards. Do NOT average clearance results.
- Federal Clearance Standards:**
 - 40 $\mu\text{g}/\text{ft}^2$ on floors (bare and carpeted)
 - 250 $\mu\text{g}/\text{ft}^2$ on windowsills
 - 400 $\mu\text{g}/\text{ft}^2$ on window troughs. (40 CFR 745.227(e)(8)(viii)).
- Check if state standards are more stringent. If they are, compare results to state standards.

Key Differences Between Dust Sampling and Dust Clearance Sampling

Look for deteriorated paint. In addition to dust testing, clearance testing includes a visual check for deteriorated paint. If there is any deteriorated paint or dust that you can see, the project fails clearance (unless there is good evidence that the paint does not contain lead).

Wait before collecting “clearance” samples. If sampling is done after lead hazard control or rehabilitation work that disturbs paint, wait at least one hour before measuring the lead in dust. This allows time for the small lead particles to fall to the ground – “settle out.”

For More Information

CEHRC Factsheets

1. *Having Your Home Checked for Health Hazards: An Introductory Fact Sheet for Residents*
2. *What To Do if Your Home Has Lead Hazards*

Of interest to CEHRC Partners:

Fact sheets from the National Center for Healthy Housing:

1. *Testing for Lead Contaminated Dust*
2. *Fixing Deteriorated Paint*
3. *Cleaning Lead-Contaminated Dust*
4. *Selecting a Lead Laboratory*

www.centerforhealthyhousing.org/resources

For Resident Outreach Initiatives:

Lead Poisoning Prevention Outreach and Education Factsheets in English and Spanish available from the Alliance To End Childhood Lead Poisoning – www.aeclp.org

LEAD DUST: Sampling Checklist

PREPARE THE SAMPLE AREA:

1. Determine sample area.
2. Decide where to collect samples.
3. Lay out sample areas.

For floors: 1 ft² (12" x 12")

- Entry area
- Kitchen
- Living room/play area
- Child's bedroom/sleeping area

For windowsills: entire sill

- Kitchen
- Living room
- Child's bedroom/sleeping area
- Other bedroom/sleeping area

4. Label zip lock bag & put in all tubes.
5. Mark all tubes in bag with sample number.

COLLECT THE SAMPLE:

6. Put on clean gloves.
7. Wipe sample area.
8. Measure sample area and record sample location on **Floor Plan**.

FINISH THE JOB:

9. Fill out **Chain of Custody Forms** & double check your work.
10. Clean up equipment & supplies.

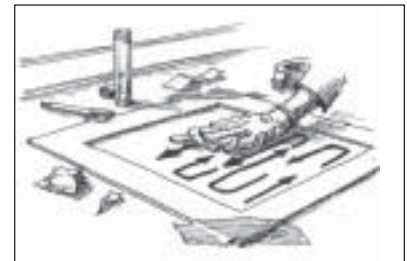
Remember: never throw away trash at the resident's home – take it with you.

FOLLOW-UP

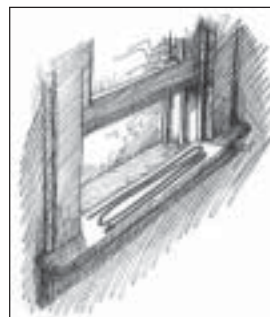
Fill out **Sampling Results Report**, attach the lab results and deliver to the resident.

Supplies:

- Disposable gloves
- Trash bags
- Pen
- Permanent marker
- Floor Plan
- Camera
- Tape measure or ruler
- Floor sample templates
- Individual wet wipes
- Tubes to hold the wipes
- Labels
- Quart-sized zip lock bag
- Chain of Custody Form
- Bag for trash



Wiping Floor Sample Area



Wiping Windowsill Sample Area

LEAD DUST

Sampling Instructions

I. Supplies

The following supplies and equipment are used to sample for lead in dust. You can buy most of them at a hardware or grocery store. Some supplies* may be provided by your lab.

- Disposable gloves
- Trash bags
- Pen
- Permanent marker
- Floor plan
- Camera
- Tape measure or ruler
- Floor sample templates*
- Individually wrapped wipes*
- Tubes to hold the wipes*



II.

- Labels for tubes
- Quart sized zip lock bag
- Chain of Custody form*
- Bag for trash

Avoid Common Mistakes

Be careful measuring. Be sure you know how to read the ruler or tape measure - practice before you get to the site.

Contaminating the wipe. Don't touch or handle things once you have the wipe open.

Contaminating the gloves. Don't touch anything between the time you put on the gloves and collect the sample.

Touching the sample area after you lay it out. You can remove or add lead dust that will give you the wrong result.

III. Sampling Instructions

PREPARE THE SAMPLE AREA

I. Determine the sampling area.

- Use the results of the **Visual Survey** to help guide you to areas where there is deteriorated paint, and where you know children spend time.
- In most cases, you will want to consider sampling rooms throughout the entire home.
- In apartment buildings you might also want to include common areas.

2. Decide where to take dust samples.

If you pick different locations than those recommended, explain why on the Chain of Custody form.

FLOORS:

- 4 floor samples
- Entry area, kitchen, playroom/living room, child's bedroom
 - a. Collect a sample from areas where you have identified deteriorated paint, where children spend time, and/or in random spots in the room.

b. Sample bare floors instead of carpet, when possible.

Carpet sampling will probably not give very



Visible

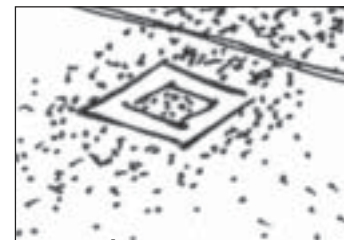
LEAD DUST Sampling Instructions

3. Lay out the sample area:

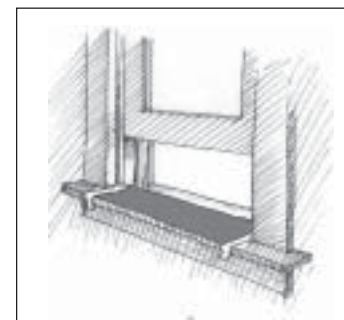
FLOORS:

Sample one square foot (12 inches by 12 inches).
The area inside the template should be 12 inches across and 12 inches high.

- A floor template is a hard (usually plastic) square (or sometimes "L") shape that is 12 inches x 12 inches (1 ft²).
- Lay out the floor template. Tape all four corners of the template to the floor.
- If you don't use the template, use tape to outline all four sides of the sample area. (See additional instructions)



Lay
out
the
floor
tem-
plate



Sample
windowsills
from jamb
to jamb

WINDOWSILLS:

Sample the windowsill from jamb to jamb.

- Use tape to outline the area. Put tape across the sill where the trim around the window meets the sill. This makes the edges straight and gives you a good rectangle to measure.

4. Prepare the tubes & zip lock bag:

- Label the bag with the home address and date of sampling. Use the bag to hold the tubes.
- You will use one tube for each individual sample.



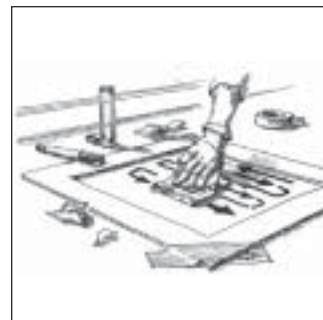
Prepare
tubes,
bags,
and
form.

COLLECT THE SAMPLE

Do not touch the area inside the template. This may remove lead dust and give you an incorrect result.

6. Put on clean gloves:

- Put a clean disposable glove on each hand before taking the sample.
- Use a new pair of gloves for each sample.

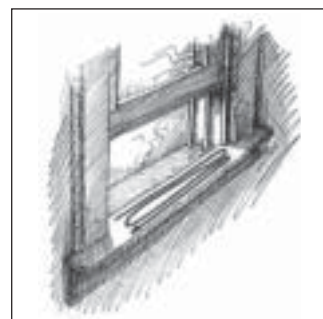
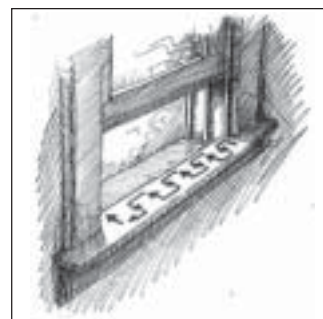


7. Wipe the sample area:

Wipe the space inside the template.

- Open the package and take the wipe out. If it is dry, it will not pick up the dust – throw it away and take out a fresh wipe.
- Hold the wipe between your thumb and fingers so your four fingers are holding the wipe against the floor.
- Starting at the upper left corner of the sample area, make an “S” like shape wiping side to side as you move down the area. Wipe the whole sample area, pressing firmly with your fingers.

Wipe
sample
area
floor



Wipe
sample
area
sill

8. Measure the Sample Area and Record Sample Location on Floor Plan:

- Write down the measurement of the sample area on the **Chain of Custody Form**.

- Write down the standard measurement of the template.

- It is important to measure after you collect the sample. If you measure before you collect the sample, you can move or remove lead dust.

(If you used tape, measure the width and length of the sample area inside the edges of the tape.)

- Write the number of the dust sample (i.e. **D1, D2**, etc.) on the **Floor Plan** where it was taken.

FINISH THE JOB**9. Fill out Chain of Custody Form & double check your work:**

- Make sure all tube caps are screwed on tight.

- Fill out the form and be sure to include: **property address, sample numbers, sample locations, and sample area size.**

- Count the number of tubes in your zip lock bag and make sure it matches the information on the form.

11. Send one “blank” per order of samples sent to the lab for analysis:

- Using a pair of clean gloves, shake the wipe open.

- Refold the wipe the same way you folded the other wipes and put it
back into the tube. Don't touch any other surfaces when you do this.

- Label the tube as your last sample using the next number (probably 9
if you take 8 samples). Mark the location as blank on your copy of the
Chain of Custody form only (you do not want the lab to see this
marking).

- Even if you are doing more than 1 home per day, you only need one
blank per shipment you send to the lab.

- For more information on blanks, see **Quality Control Check**.

IV.**12. Send the samples to a laboratory:**

- Double check labeling before mailing samples.

- Be sure to keep a copy of all forms for yourself.

- Mail the tubes and appropriate forms to the laboratory.
Sometimes
labs will provide a mailing package.