

**Michigan Department of Community Health
Bureau of Laboratories
Division of Chemistry and Toxicology, Trace Metals Section**

Soil Sampling Procedure for Lead

This sampling procedure covers the collection of bare soil in residential properties. It does not address sampling design content that is used by risk assessors and environmental investigators.

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1. Soil Sampling Tools and Materials:

- a. 50 mL polypropylene flat-bottom tubes with caps stored in a tray or plastic bag. 1-quart or 1-gallon plastic resealable bags may also be used. Plastic bags must be double-bagged unless they are 4 millimeter industrial strength.
- b. Non-sterilized non-powdered disposable gloves
- c. Property sketch
- d. Environmental Lead Sampling Request Form DCH-0558
- e. Pre-printed labels with address and collection date (advised)
- f. Permanent ink pen
- g. Disposable wipes
- h. Trash bags

2. Bare Soil Sampling Procedures and Techniques.

- a. Soil sampling is not recommended when the ground is frozen. If there is snow cover preventing soil sampling, soil samples must be collected when the snow has melted and the ground is not frozen.
- b. The soil samples and areas of bare soil should be identified on a site plan sketch.
- c. Sampling containers should be pre-labeled with site-specific identifiers (i.e., site address and collection date).
- d. Put on a new pair of clean, disposable gloves for each sampling event.

e. Sampling Techniques:

Techniques include single sample collection and multiple subsample collection, referred to as composite sampling. The type of sampling depends upon the pattern and extent of bare soil in an area to be sampled.

Although paint chips should not be oversampled, they should also not be excluded from the soil sample, since they are part of the soil matrix. The assessor should make an effort to avoid including grass, twigs, stones, and other large debris (other than paint chips) in the sample. Samples should be taken from bare soil areas only; grass or sod does not need to be removed.

When all subsamples of the composite sample have been placed in the sampling container, the container should be sealed. If using a plastic bag and the bag is not 4 millimeter industrial weight, the sample should be double-bagged.

Single Sample Collection: Single sample collection is used when the bare soil area is small. Determine the depth to which the container should be inserted in the soil in order to collect the top ½ inch of soil. Push the container into the soil and scrape the container at least 4 inches horizontally along the soil surface. Two additional samples should be taken within 1 ft. of the first for a total of three samples. If soil is dense or hard, coring sampling methods should be used.

Composite Sample Collection: Composite collection is used when the bare soil area is larger and/or has an elongated shape. Up to 10 subsamples of surface soil can be collected. Subsamples should be more than 1 ft. and less than 3 ft. apart. Larger area subsamples can be spaced up to 6 ft. apart.

f. Sampling Locations:

Building Foundation Perimeter: Depending upon bare soil present, most often the sampling technique used at the foundation perimeter is composite sampling. Refer to collection procedures in prior section. Subsamples should be taken linearly and evenly spaced along the length of the area to be sampled. Soil should be sampled within 3 ft. of the structure foundation.

Bare Soil Areas: Bare soil areas are defined as 9 sq. ft. or larger. A play area is defined as a bare soil area of frequent contact by the child under six years old as indicated by play equipment, toys, observations of play patterns, or information provided by parents, caretakers or property owners. Refer to collection procedures in prior section.

Vegetable Garden Soil: For vegetable gardens, 6-10 subsamples should be collected, depending on the size of the garden. Samples should be collected to a depth of 3 or 4 inches to account for previous soil mixing. Samples should be evenly spaced and

collected using an 'X' or zigzag pattern using a trowel or coring tool. Samples should be mixed in a clean plastic container and approximately one cup of soil should be removed for lead analysis.

3. Labeling the Container :

Label the tubes or bags with four individual and unique identifiers, using either a pre-printed label or permanent marker. The identifiers include a sample number, site identifier (i.e, street address), location where the sample was taken (i.e., dripline, yard or play area), and date of collection. Identifiers on the sample should match the sample number and descriptions on the Environmental Lead Sampling Requisition form.

4. Trash Disposal:

All used gloves and sampling debris should be put into a trash bag. The trash bag should be disposed of off-site.

5. Assessor Decontamination:

When conducting sampling, the assessor, should avoid hand-to-mouth contact (i.e., smoking, eating, drinking, and applying cosmetics) and should wash their hands with running water immediately after sampling. The assessor should ask to use the resident's bathroom for this purpose. Wet wipes may be used if running water or the bathroom is not available.

6. Form Completion and Fees:

- a. Complete the Environmental Lead Sampling Requisition. Record any field notes on the requisition or a separate piece of paper. Chain of custody requirements should be followed if applicable.
- b. Fees: County certified lead assessors are to submit a check payable to the State of Michigan and a list of clients with each specimen. Attach the check to the Environmental Lead Sampling Requisition. Interested parties may establish a billing procedure for testing services by contacting the laboratory at 517.335.9490. Public health-related samples, which are environmental lead specimens for lead-poisoned clients, are exempt from a fee. Individuals wishing to submit samples should contact their local health department to arrange billing, submittal, and payment. For more information regarding fees, contact the MDCH lab at 517.335.9490.

7. Quality Assurance/Quality Control:

Any questions or problems concerning environmental sampling results should be directed to:

MDCH - Trace Metals Laboratory
3350 N. Martin Luther King Blvd.
Lansing, MI 48909
Phone: (517) 335-8244
Fax: (517) 335-9776
Email: knottnerusm@michigan.gov or fisherk@michigan.gov

Questions on sampling procedures can be directed to the MDCH Healthy Homes Section at 517.335.9390.

8. Lead Hazard Identification:

In accordance with Michigan administrative rule R325.99402 and the U.S. Environmental Protection Agency 40 CFR Part 745.227, the following are the levels at which a soil sample is deemed a lead paint hazard during a lead risk assessment or environmental investigation. If soil testing for a lead abatement project clearance is performed, soil results under these levels are considered passing clearance.

Hazard Determination and Failing Clearance Levels - at or above:

400 µg/g	bare soil in child play areas
1200 µg/g	bare soil at the foundation/dripline and any other sections of the yard with bare soil

9. References:

- a. ASTM E 1727-05. Standard practice for Field Collection of Soil Samples for Subsequent Lead Determination. Copies are available on the ASTM website (for a fee) at: <http://www.astm.org/Standards/E1727.htm>.
- b. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, U.S. Department of Housing and Urban Development, July, 2012. Copies of the Guidelines are available on the HUD website at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines.

Dust Wipe Sampling for Lead

Surface wipe samples for settled dust shall be collected from floors (both carpeted and uncarpeted), window troughs, and window sills.

Contents:

1. Wipe Sampling Tools and Materials
2. Wipe Sampling Procedure
3. Blank Preparation
4. Assessor Decontamination
5. Form Completion and Fees
6. Quality Assurance/Quality Control
7. Lead Hazard Identification
8. References

1. Wipe Sampling Materials and Supplies:

- a. All wipe samples of settled dust must be collected using wipe material that meets ASTM Designation: E 1792. The required wipe for the MDCH laboratory is the individually-packaged "Ghost Wipe", a 15cm x 15cm disposable wipe. Check the wipe package to ensure that the wipe is not expired.
- b. Powderless plastic gloves. Disposable gloves are required to prevent cross-sample contamination from hands.
- c. 50 mL polypropylene flat-bottom tubes with caps. Plastic sealable bags are not acceptable for dust sampling. Containers should be pre-labeled with site-specific identifiers (i.e., address, collection date).
- d. Dust sample collection form: Environmental Lead Test Requisition, DCH-0558. This form can be obtained from the MDCH/Trace Metals Section and is required to accompany dust wipe samples for analysis.
- e. Template options:
 - i) Hard, smooth, reusable templates made of aluminum or reusable plastic or disposable cardboard or disposable plastic. Templates should be 1 ft x 1 ft (1 ft²) or of otherwise accurately known dimensions, between 0.1 ft² and 2 ft². Reusable templates should be wiped with a clean disposable cloth before and after each use. Disposable templates are not used for more than a single surface. Templates are not used for windows due to the variability in size and shape (use masking tape instead).
 - ii) Masking tape. Tape is used to define the sampling areas when a template is not practical. It is required for wiping window sills and troughs in order to avoid contact with window jambs and channel edges. It is also used for adhering templates to the surface to be sampled.
- f. Container labels or permanent marker
- g. Trash bag or other receptacle
- h. Measuring tape
- i. Disposable shoe coverings (optional)
- j. Rack, bag or box to carry tubes and other supplies/materials (optional)

2. Wipe Sampling Procedure:

- a. Don disposable gloves. If gloves are not stored in a sealed box, discard the first glove. Use new gloves for each sample collected.
- b. Outline wipe area:

Floors: For wide, flat areas, use a sampling template. The template should lie flat on the surface. Identify the area to be wiped. If no template is available, apply masking tape to perimeter of the wipe area to form an area of one square foot (12 in. by 12 in.). The tape should be positioned in a straight line and corners should be perpendicular.

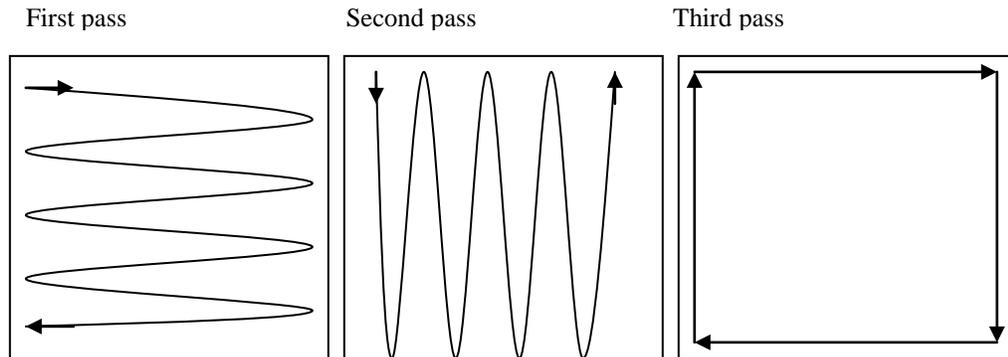
Window sills and other rectangular surfaces: Identify the area to be wiped, which should be at least 0.1 ft² in size (approximately 2 in. by 8 in.). Do not touch the wipe area. Mark the area with tape and measure the area to be sampled to within one-eighth of an inch.

When using tape, do not cross the boundary tape or floor markings, but be sure to wipe the entire sampling area. It is permissible to touch the tape with the wipe, but not the surface beyond the tape.

Do not walk on or touch surfaces to be sampled (the wipe areas).

- c. Inspect the wipe package. If it is contaminated with dust, clean the package with a cloth. Discard any wipes that are dried out or visibly contaminated.
- d. Partially unscrew the cap on the tube to be sure that it can be opened.
- e. Place the wipe at one corner of the wipe surface with wipe fully opened and flat.
- f. First wipe pass (side-to-side): With the fingers together, grasp the wipe between the thumb and the palm. Wipe using the pressure and length of the fingers and the palm of the hand. Press down firmly, but not excessively. Do not touch the surface with the thumb. If the wipe area is a square, wipe side-to-side with as many "S" or "Z" like motions as are necessary to completely cover the entire wipe area. Exerting excessive pressure on the wipe will cause it to curl. Exerting too little pressure will result in poor dust collection. Always press the front edge of the wipe forward. Attempt to remove all visible dust from the wipe area.
- g. Second wipe pass (top-to-bottom): Fold the wipe in half with the contaminated side facing inward. The wipe can be straightened out by laying it on the wipe area, contaminated side up, and folding it over. Do not touch the contaminated side of the wipe with the hand or fingers. Do not shake the wipe in an attempt to straighten it out, as dust may be lost during shaking. Once folded, place wipe in the top corner of the wipe area and press down firmly with the fingers and the palm. Repeat wiping the area with "S" or "Z"-like motions, but in a top-to-bottom direction for the second pass. Attempt to remove all visible dust.
- h. Third pass (perimeter): Fold the wipe in half again with the contaminated side facing

inward. Once folded, place wipe in the top corner of the wipe area and press down firmly with the fingers. Wipe around the perimeter of the area, staying inside the border, and focusing on collecting dust from the corners.

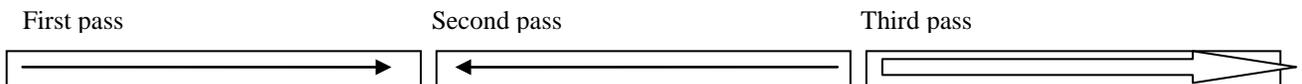


i. Window sills:

For window sills marked by masking tape, make two side-to-side passes over this surface, the second pass with the wipe folded so that the contaminated side faces inward. After the second pass, fold the wipe in half again, with the contaminated side facing inward, and wipe the surface for a third time, focusing on collecting dust from the corners of the sampling area. Do not attempt to wipe the irregular edges presented by the contour of the window channel. Avoid touching other portions of the window with the wipe. Do not use more than a single surface wipe for each container. If heavily dust-laden, a smaller area should be wiped, as long as the area is a minimum of 0.1 ft² (approx 2 in. x 8 in.).

j. Window troughs (wells):

For a window trough, mark the sampled area using tape, and make two side-to-side passes over this surface. After the first pass, fold the wipe in half so that the contaminated side faces inward. After the second pass, fold the wipe in half again, with the contaminated side facing inward, and wipe the surface for a third time, focusing on collecting dust from the corners of the sampling area. It is not necessary to wipe the entire window trough, but do not wipe less than 0.1 ft² (approx. 2 in. x 8 in.).



k. Packaging the wipe:

After wiping, fold the wipe with the contaminated side facing inward again, insert the wipe into the tube without touching anything else and screw the cap onto the tube.

l. Labeling the container:

Label the tube with at least two identifiers, using either a pre-printed label or permanent marker. The identifiers include a sample number, site identifier, (i.e., street address),

location where the sample was taken (i.e., room number and floor/sill/trough), dimensions of the wipe area, and date of collection. Identifiers on the sample should match the sample number and descriptions on the Environmental Lead Test Requisition form.

m. Area Measurement:

After sampling, measure the surface area wiped to the nearest eighth of an inch using a tape measure or a ruler. The size of the area wiped must be at least 0.10 ft² in order to obtain an adequate limit of quantification. No more than 2 square feet should be wiped with the sample wipe. Record specific measurements or square inches for each area wiped on the test requisition form. For floor sampling, 1.0 ft² is the standard area.

n. Trash Disposal:

After sampling, remove the masking tape and throw it away in a trash bag. Remove gloves; put all contaminated gloves and sampling debris into a trash bag. Remove the trash bag when leaving the dwelling. Do not throw away gloves and sampling debris inside the dwelling unit.

3. Blank Preparation:

Collect one blank wipe for every 20 field samples. The field blank is handled the same as field samples except that no surface is wiped. The purpose of the field blank is to ensure quality sampling techniques and detect sampling material contamination. To collect a blank wipe, remove a wipe from the wrapper with a new glove, shake it wipe open, refold as it occurs during the actual sampling procedure, and then insert it into empty tube without touching any surface or other object.

Contamination of samples can be minimized by frequent changing of gloves, the use of shoe covers and regular cleaning of sampling equipment.

4. Assessor Decontamination:

When conducting sampling, the assessor, should avoid hand-to-mouth contact (i.e., smoking, eating, drinking, and applying cosmetics) and should wash hands with running water immediately after sampling. The assessor should ask to use the resident's bathroom for this purpose. Wet wipes may be used if running water or the bathroom is not available.

5. Form Completion and Fees:

Complete the Environmental Lead Sampling Requisition. Record any field notes regarding

type of wipe used, lot number, collection protocol, etc. on the requisition or a separate piece of paper. Chain of custody requirements should be followed, if applicable.

Fees: County certified lead assessors are to submit a check payable to the State of Michigan and a list of clients with each specimen. Attach the check to the Environmental Lead Sampling Requisition. Interested parties may establish a billing procedure for testing services by contacting the laboratory at 517.335.9490. Public health-related samples, which are environmental lead specimens for lead-poisoned clients, are exempt from a fee. Individuals wishing to submit samples should contact their local health department to arrange billing, submittal, and payment. For more information regarding fees, contact the MDCH Lab at 517.335.9490.

6. Quality Assurance/Quality Control:

If a field blank is greater than or equal to 20 µg, the field blank is considered contaminated. Since sample results are not corrected for contamination based on the field blank or any other analytical blank, the laboratory recommends recollection of the site when field blanks show contamination.

Any questions or problems concerning environmental sampling results should be directed to:

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Questions on sampling procedures can be directed to the MDCH Healthy Homes Section at 517.335.9390.

7. Lead Hazard Identification:

In accordance with Michigan administrative rule R325.99402 and the U.S. Environmental Protection Agency 40 CFR Part 745.227, the following are the levels at which a dust sample is deemed a lead paint hazard during a lead risk assessment or environmental investigation. For clearance examination testing for lead abatement projects, if dust wipe results are under these levels, the dust testing portion of a clearance examination passes.

Hazard Determination and Failing Clearance Levels - at or above:

40 µg/ft², floors

250 $\mu\text{g}/\text{ft}^2$, interior window sills
400 $\mu\text{g}/\text{ft}^2$, interior window troughs

8. References:

- c. ASTM E 1728-03. Standard practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination. Copies are available (for a fee) on the ASTM website at: <http://www.astm.org/Standards/E1728.htm>.
- d. *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, U.S. Department of Housing and Urban Development, June, 1995. Copies of the Guidelines are available (for free) on the HUD website at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/lbp/hudguidelines.
- e. ASTM E1792. Standard Specification for Wipe Sampling Materials for Lead in Surface Dust. Copies are available (for a fee) on the ASTM website at: <http://www.astm.org/Standards/E1792.htm>.