

**School Lead Sampling Attached to Community
Public Water System**

Drinking Water Branch

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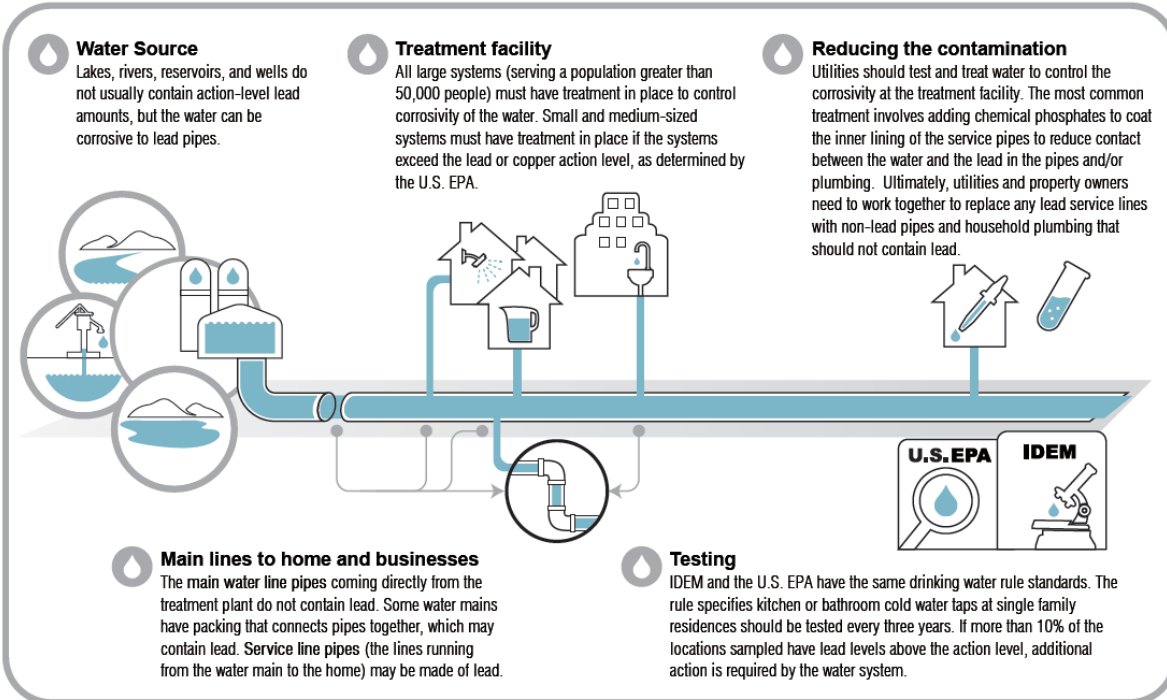
The following guide has been developed by the Indiana Department of Environmental Management (IDEM) for schools and daycares to assess if a lead risk is present in the drinking water at their facility. This document provides information on how to conduct a plumbing assessment, water sampling techniques, and what to do with your sample results. This guide is specifically for those schools that are connected to a community water system (i.e. pay a water bill) and are interested in performing investigatory sampling. Schools that are on their own private well are required to collect lead and copper samples under the Safe Drinking Water Act (SDWA).

The water of a community public water system (PWS) is tested before it leaves the water treatment plant and throughout the distribution system. Lead and copper samples are collected throughout the distribution system from locations considered high-risk. High-risk sites are single-family structures that contain copper pipes with lead solder installed after 1982, contain lead pipes, and/or are served by a lead service line; or are multi-family residences when those residences comprise 20% of the system and contain copper pipes with lead solder installed after 1982 or are served by a lead service line. The number of lead and copper samples collected by the community PWS is based on the population served by the community PWS.

The water source does not usually contain lead at amounts above the action level, but the water can be corrosive to lead pipes. All large systems (serving a population greater than 50,000 people) must have treatment in place to control corrosivity of the water. Small and medium-sized systems must have treatment in place if the systems exceed the lead or copper action level. The main water line pipes coming directly from the treatment plant do not contain lead. Some water mains have packing that connects pipes together, which may contain lead.


How Lead Gets in the Water


Some public water systems are facing a complex problem, due to aging pipes. Lead can be found in the pipes and/or plumbing that carries water to its consumers.



Sources of Lead

Lead can get into drinking water after leaving the treatment plant when it comes into contact with plumbing materials containing lead within the schools. Lead may be present in various parts of the plumbing system including lead solder, brass fixtures, and lead pipes.

 Valves Often Are Overlooked When Focus is on Faucets



- Shut-off valves frequently are captured in 250 mL to 1 L samples
- Often not certified ANSI/NSF Section 9

Schools require a higher pressure of water compared to single family homes due to fire sprinkler systems which means a larger service line that is generally not made of lead.

The lead from the plumbing system gets into the drinking water through leaching. The most common source of lead leaching is corrosion, a reaction between the water and plumbing system materials containing lead. The potential for lead to leach into drinking water increases the longer water remains in contact with the plumbing system materials containing lead. Due to the extended periods of no water use at schools (overnight, weekends, holidays, summer), schools increase the likelihood of elevated lead levels at the tap.

Reason to Test for Lead

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and it can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Lead is stored in the bones, and it can be released later in life.

Testing Your Facility for Lead and Copper

IDEM recommends schools follow the following steps to provide meaningful results. Conducting the planning steps is important before collecting any water samples to ensure detailed documentation to eliminate confusion when reviewing the results from the laboratory. By following these steps, school and health officials will be able to quickly identify and correct sources that contribute lead into drinking water. The steps will also help provide school and health officials with information that will allow them to respond accurately and timely to any questions from the school community that may arise during and after the sampling event. Using an enlarged copy of the school's fire evacuation plan will help with mapping the potable water and drinking water fixture locations.

Step 1: On-Site Plumbing Assessment

Identify Building Water Lines:

Review any available records pertaining to the building's plumbing material including building permits, blue prints, plumbing permits, as-built plans, information about the service line material, and all potable water pipes. Pay attention to any lead pipe material observed in reviewing available records. For each building assessed, determine the location of the water service line(s) entry points into the building as there may be more than one. Below are some questions to ask during the plumbing assessment:

- When was the school built?
- Are there new buildings, additions, or major renovations? If so, when?
- What are the potable water pipes in the facility made of and where are they located? What materials were used to solder the potable water pipes?
- Are there brass taps, fittings, or valves? Note the locations. (Most drinking water fixtures are chrome plated brass)
- Is there any electrical equipment grounded to potable water pipes?
- Is any water treatment being done in the building including water softening (ion exchange)? Note point of use and/or point of entry treatment and location.
- Are there records of previous water testing within the school?

Determine the route cold water takes after it leaves the water service line entry point and route throughout the school. Assumptions may need to be made since many potable water lines are not visible under floors or in walls and ceilings.

Inventory the Drinking Fountains and Sinks (Fixtures)

Walk through the entire school and document all drinking water fixtures such as water coolers, bubblers, sinks in classrooms with bubbler attachment, and cold water faucets in teacher's lounge, nurse's station, and in the kitchen used for food preparation or formula preparation. The visible plumbing of these fixtures should be inspected and identify copper lines, lead solder, and brass components including chrome-plated brass fixtures, as these features are believed to be a contributing source of lead in drinking water. Document if faucets have screens or aerators. Screens and aerators must remain in place during sampling but may be cleaned after the sampling is conducted.



For each drinking water fixture, document the following:

- Material used to connect and solder the cold water pipes to the fixture?
- Brass taps, fittings, or valves?
- Is the fixture chrome-plated brass?
- Brand and model of water cooler?
- Signs of corrosion such as leaks, rust-colored or bright blue water; or green, orange, or brown stains?
- Anything unusual, such as cold water runs hot or tap does not turn off completely?

***NOTE: Check all water coolers to ensure they are not identified as having a lead-lined tank under the Lead Contamination Control Act (LCCA) which was signed into law on October 31, 1988.** The LCCA mandated the repair, replacement or recall and refund of drinking water coolers with lead-lined water tanks. This Drinking Water Coolers with Lead Lined Water

Tanks (<http://tinyurl.com/kr8kppf>) list is available online. If a water cooler is identified as being on this list, it must be removed from service immediately.

Step 2: Identify and Label Drinking Water Sample Locations

Using the Plumbing Assessment from Step 1, select the drinking water fixtures for sampling. Priority should be given to drinking fountains that children have access to, classroom faucets, kitchen faucets used for food or formula preparation, nurse's station, breakrooms, teacher's lounge, and other sinks known to be used for food preparation and/or water consumption (coffee maker). **Faucets that are not used for drinking such as hand washing sinks, dishwashing sinks, art room sinks, janitor's closet, or mechanical room taps should not be sampled. These locations will not give meaningful results for the drinking water of the school.**



(Do Not Sample from Dishwashing sinks or mechanical room taps)

Assign a unique sample site identification (ID) number that reflects the type of fixture and location. Document each sampling location on a map and be sure to put a label at the sampling site. Below are suggested abbreviations:

- B = Bubblers
- WC = Water cooler
- F = Faucet
- O = Other

Sample site ID example, a drinking water bubbler in classroom 21 could be "Room 21 B" and the sample site ID for a classroom faucet in the same room could be "Room 21 F." If a room or area have multiple fixtures of the same type, add an additional description such as left, right, north, or south as an indicator of the fixture being identified. Once the sample site ID has been

assigned, label its location on the map and place the sample site ID on the sample site. School personnel should ensure that labels are not removed or damaged. The labeled fixtures and map will be useful of any resampling or fixture replacement is needed.

Lead Sample Plan			
Sample Code	Floor	Room	Description
SP001	Second Floor	South Hall	Water Fountain 1 - East
SP002	Basement	South Hall	Water Fountain 2 - West
SP003	Basement	Kitchen	Kitchen Sink 1 - East
SP004	Basement	Kitchen	Kitchen Sink 2 - West
SP005	First Floor	South Hall	Water Fountain 1 - East
SP006	First Floor	South Hall	Water Fountain 2 - West
SP007	First Floor	Teachers Lounge	Sink for Coffee
SP008	Second Floor	South Hall	Water Fountain 1 - East
SP009	Second Floor	South Hall	Water Fountain 2 - West

Step 3: Develop a Sampling Sequence

Create a sampling sequence of the fixtures to be sampled. The order of the sample site ID will not necessarily follow the list of identifying the sample fixtures. The sample fixture closest to the service line entry point should be the first sample location and the next closest sample fixture will be the second sample location. Continue following the potable water away from the service line entry point until the farthest sample fixture from the service line point of entry has been added to the sampling sequence.

Each sample fixture will have an initial first draw sample. To assess the potable water pipes beyond the sample fixture and/or the cooling tank in water coolers, a 30 second flush sample is suggested. **Not every sample site should have a 30 second flush sample as it may affect the initial first draw samples for other sample sites. Examples of situations where a 30 second flush sample would not be appropriate are a set of drinking fountains right next to each other or sinks along the same wall close to each other. In these situations, only collecting one 30 second flush sample from those set of sample locations is suggested. Collecting a 30 second flush sample from every sample location as described above could pull water from one of the other sample location's water piping and affect not only the 30 second flush samples, but the first draw samples from the other sample locations.**



Only one of the above drinking fountains (water coolers) should have a 30 second flush sample

Step 4: Form a Sample Team and Obtain Supplies

Once the sample fixtures have been identified and sampling sequence has been planned, get a team together to plan a sampling date and collect the sampling supplies. Contact a certified lab to order required number of sample bottles. Sample bottles should be 250 mL bottles. A certified lab can be found on the Indiana State Department of Health website <https://www.in.gov/isdh/24859.htm>. The lab needs to be certified for lead and copper testing.

Below are supplies to collect the samples:

- 250 mL sample bottles from certified lab
- Gloves
- Glasses or goggles
- Recordkeeping form
- Writing utensils
- Watch or clock with a seconds hand



Other additional supplies that might assist with the sample collection event are a rolling cart, permanent markers, boxes for transport of samples, and copies of the sampling sequence for the sampling team.

A sampling sequence and pre-marking the sample bottles before the sampling event will help shorten the time of the sampling event.

Step 5: Schedule and Collect Samples

The sampling event should not be scheduled during a weekend or during a school break when the water is not being regularly used. It is suggested that the sampling event be scheduled during a Wednesday, Thursday, or Friday morning during a usual week of school being in session. The water needs to not be used for at least six (6) hours prior to the sampling event.

Be sure to contact the local PWS the school is connected to as well as the school community to inform them of the planned sampling.

When the date of the sampling event has been decided, school officials and personnel need to be reminded the night before to not use the water overnight because of the scheduled sampling event. Do not remove aerators or screens from any fixtures prior to the sampling event. If it is found that water has been used within the required six (6) hours of stagnation prior to the sampling event, the sampling event should be rescheduled.

Directions for First Draw Sampling

1. Either select the appropriate pre-marked sample bottle or select a sample bottle and write on the sample bottle the proper Sample ID and First Draw sample identifier.

2. On the recordkeeping form, document all appropriate information about the sample location.
3. After all appropriate information has been recorded, uncap the sample bottle with the appropriate Sample ID for the intended sample fixture and place the opened sample bottle under the sample fixture or where the water will arc if it is a drinking fountain fixture.
4. Open the cold water handle or push the button and fill the sample bottle. Be sure to leave enough room for acid to be added at the laboratory.
5. Cap the sample bottle and verify that all appropriate information is documented on the recordkeeping form.
6. Place the bottle into a transportation box or bin.
7. Continue following the sample sequence plan and collect the first draw samples using the steps above.

Directions for 30 Second Flush Sampling

1. After collecting the first draw sampling events, prepare for a 30 second flush sample from pre-select sample locations. **Not every sample site should have a 30 second flush sample as it may affect the initial first draw samples for other sample sites.**
2. Either select the appropriate pre-marked sample bottle or select a sample bottle and write on the sample bottle the proper Sample ID and 30 Second Flush sample identifier.
3. On the recordkeeping form, document all appropriate information about the sample location.
4. After completion of the record keeping form, uncap the sample bottle and keep hold of the sample bottle away from the sample fixture where the water will be arcing.
5. Be sure the watch or clock with a second hand can be seen when opening the cold water handle or pushing the button. When the watch is able to be viewed, open the cold water handle or push the button of the sample fixture and keep the water flowing for at least 30 seconds.
6. After running the water for 30 seconds, place the sample bottle under where the water is arcing and fill the sample bottle. Be sure to leave enough room for acid to be added at the laboratory.
7. Cap the sample bottle and verify that all appropriate information is completed on the recordkeeping form.

8. Place the sample bottle in a transportation box or bin.
9. Continue following the sample sequence plan and collect the 30 second flush samples at pre-decided locations using the above steps. **Not every sample site should have a 30 second flush sample as it may affect the initial first draw samples for other sample sites.**

Step 6: Deliver to Laboratory

Collect all the filled sample bottles and recordkeeping forms and deliver to your selected certified laboratory. Be sure to have all required documentation and information to deliver the sample bottles in accordance with required delivery arrangements setup by the laboratory.

A laboratory certified for lead and copper sampling should only be used. You may find a list of certified laboratories on the Indiana State Department of Health website <https://www.in.gov/isdh/24859.htm>.

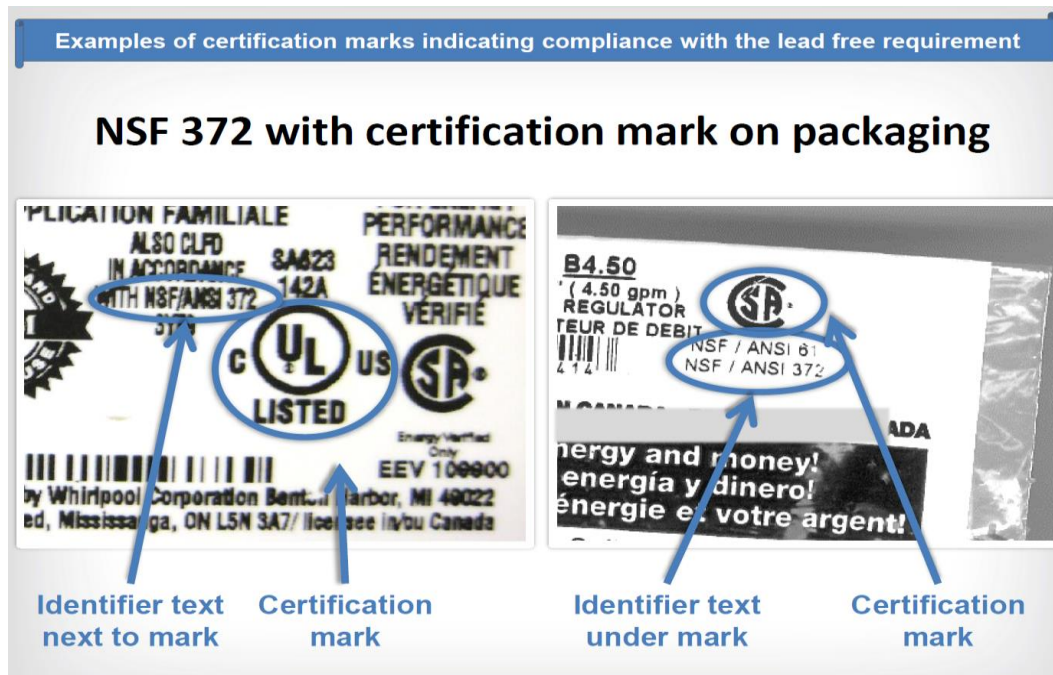
Step 7: Communicate Results

A communication plan should be developed to communicate the results after receiving the lead and copper results back from the lab. It is a good idea to have a designated person as the point of contact in order to address any questions regarding the Lead and Copper sampling.

A letter including the lab results and describing plans to address any results greater than an Action Level should be provided to staff, students, and parents. The Action Level for Lead is 15 ug/L (ppb) and the Copper Action Level is 1.3 mg/L (ppm).

A sample letter is included in the IDEM fact sheet "[Follow-up Steps for Schools with Lead and/or Copper Sampling Results above the Action Level](#)".

Step 8: Remedial Actions for Sample Sites over an Action Level



Permanently reduce or eliminate the sources of lead or copper that originate in your building's plumbing. Be sure to contact a licensed plumber and to use replacement materials that comply with the "January 2014 Lead-Free Components Certification". Contact your local building department for required permits. Permanent measures to address long-term health concerns may include:

- Shut off and remove or replace problem taps or components.
- Check ground wires and eliminate any that may accelerate corrosion.
- Check and replace all Lead Service lines. Contact local PWS to check status of lead service lines.
- Replace lead pipes within the school or reconfigure plumbing to bypass sources of lead contamination.
- Replace brass faucets and fittings that contain lead.
- Replace drinking fountains that contain lead components.
- Remove copper lines with lead solder.
- Install time-operated solenoid valves to automatically flush problem outlets.
- Use certified lead-free materials to repair or replace the facility's plumbing system.
- Use only cold water for food and beverage preparation. Clean aerators in accordance with regular maintenance schedule.

After any fixture is replaced, it is recommended to collect another first-draw sample at the new fixture after regular use.

It is important that you share the results and follow-up remedial actions with your school community and other interested stakeholders.

A school wide flushing protocol is not a recommended long term solution.

Helpful Information and Links

- The USEPA has established action levels for lead and copper for public water supplies that are 15ppb (ug/L) for lead and 1.3ppm (mg/L) for copper.
- IDEM Drinking Water and Lead website: <https://www.in.gov/idem/6968.htm>
- USEPA 3Ts for Reducing Lead in Drinking Water in Schools: <https://www.epa.gov/ground-water-and-drinking-water/3ts-reducing-lead-drinking-water-toolkit>
- USEPA Drinking Water Best Management Practices for Schools and Child Care Facilities Served by Municipal Water Systems: https://www.in.gov/idem/files/lead_epa_schools_pws.pdf
- USEPA How to Identify Lead Free Certification Marks for Drinking Water System and Plumbing Products: [US EPA How to Identify Lead Free Certification Marks for Drinking Water System and Plumbing Products](#)

Contact Information

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