

Lead in Drinking Water - Frequently Asked Questions

WQA proudly serves as an educator of water treatment professionals, certifier of water treatment product, public information resources and voice of the water quality improvement industry. This document addresses frequently asked questions about lead in drinking water, developed by staff at WQA.

1. Where can I find the latest updates on the drinking water crisis in Flint, Michigan?

The EPA has established the Flint Safe Drinking Water Task Force to provide the latest news to Flint residents. Below is the link to the taskforce website and to the Flint, Michigan website:

<http://www.epa.gov/flint>

<http://mi.gov/flintwater>

2. How can lead get into the water supply?

Studies indicate nearly all the lead in users' tap water does not come from the primary water source or from the municipal treatment plant, but is a result of corrosion resulting from materials containing lead coming into contact with water after it leaves the treatment plant.¹ Lead can enter a home's drinking water by leaching from lead service connections, from lead solder used in copper piping, and from brass fixtures.

3. What are potential health effects from lead?

Lead poisoning often shows no symptoms; however, signs such as irritability, weight loss, vomiting, constipation, or stomach pain could occur.² Young children and pregnant women are at the greatest risk, even from short-term exposure. Reduced cognitive development and neurobehavioral deficits are associated with blood levels less than 10 micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$) in children.² Thus, it is determined there is no safe blood lead level in children.³ Individuals will adsorb more lead if they have poor nutrition than those with better diets. To learn more, read the information on the Centers for Disease Control's (CDC) website:

http://www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm

4. Where can I go to get my water tested?

WQA strongly recommends water testing be conducted at each point of use following appropriate sampling procedures capturing lead levels after a period of disuse before a specific water treatment product is selected. Water conditions can change, test water before treatment has been installed and continue testing after installation.

The EPA website is a resource to find EPA and state-accredited laboratories that can perform a water analysis:

<http://water.epa.gov/scitech/drinkingwater/labcert/statecertification.cfm>

All the certified laboratories in Michigan are listed on the web page below:

http://michigan.gov/documents/deq/deq-rrd-Lab-ChemistryLabsListCertifications_429759_7.pdf

5. How do I find a certified professional?

To find a water treatment professional (WQA member) in your area, please visit the link below and search by your location: <http://www.wqa.org/Find-Providers>

To find certified water professionals who have completed WQA's professional certification program, please visit this link and search by your state: <http://www.wqa.org/Programs-Services/Resources/Find-Providers/Find-Certified-Professionals>



6. Where do I find a product certified for lead reduction?

American National Standards Institute (ANSI) accredited entities offering product certification include: Water Quality Association's Product Certification Program, NSF International, International Association of Plumbing and Mechanical Officials, and Underwriters Laboratory. All of these certifiers have product listings. To find WQA certified products for lead reduction and links to the manufacturer's website, consumers can visit wqa.org. Products certified through WQA's Product Certification Program have been tested and certified to the material safety requirement and contaminant reduction claim(s) as specified by the standard. Products displaying the WQA Gold Seal provide assurance that they have been rigorously tested and meet the requirements of the standard, ensuring they are actually effective for the contaminants which are covered by the marketing claims. Factory audits are performed by WQA on a regular basis to ensure there are no changes to the product which would negatively impact safety or performance. WQA is also audited yearly by ANSI to keep its accreditation. Confirmation of WQA's accreditation can be found on ANSI's website.

7. Does a "lead-free" claim mean the product can remove lead from the water?

No, a product is considered compliant with the "lead-free" standard, NSF/ANSI 372, if its weighted average lead content is no greater than 0.25%. This certification is to standard NSF/ANSI 372 and is not a claim that the product completely removes any trace of lead from the water.

8. How do I maintain a filter once it is installed?

Studies have shown the reported levels of lead found in some Flint, MI water results are higher than conditions under which the manufacturer set the replacement recommendations in published manuals.⁴ Consumers should contact a water treatment professional as described above, or follow the equipment manufacturer's installation instructions and contact the manufacturer to confirm usage and capacity. To ensure the manufacturer can provide the most accurate recommendations, have test results for lead and iron on hand for review.

9. What treatment methods can be used at the tap or whole-house?

Lead can exist in water in a broad array of forms, therefore, more than one type of technology may be needed for adequate removal. **Soluble** (or dissolved) lead may be removed by ion exchange, reverse osmosis, adsorption, or distillation. Insoluble (or **particulate**) lead may be removed by fine filtration and adsorption as well as by reverse osmosis and distillation.

Solid block and precoat adsorption filters, using a mixture of activated carbon and a lead adsorbent, can remove particulate lead by filtration and adsorption, and soluble lead by adsorption. Contact time, type and size of activated carbon and the lead adsorbent material, flow rate per unit area, and the design of submicron filter void sizes to ensure effective filtration of the lead species are critical to the success of this treatment technology. Removal of lead by **reverse osmosis** is effective because the membrane removes the soluble lead and also acts as a barrier to particulate lead. **Strong-acid cation exchange softeners** only remove soluble lead, and will not remove particulate lead. Properly designed and operated **distillation** units are capable of reducing both forms of lead.

System performance characteristics should be verified by tests conducted under established test procedures and water analysis. Thereafter, the resulting water should be monitored periodically to verify continued performance. The application of the water treatment equipment must be controlled diligently to ensure acceptable feed water conditions and equipment capacity are not exceeded. Use certified products recommended by water treatment professionals. Visit WQA.org to locate water professionals in your area. Read more about water treatment in WQA's technical fact sheet on lead:

https://www.wqa.org/Portals/0/Technical/Technical%20Fact%20Sheets/2014_Lead.pdf

10. How do you determine if the lead in drinking water is particulate, dissolved, or a percentage of both?

It is important to establish the exact water quality parameters in each home when installing water treatment products in Flint. Some homes were found to contain high levels of lead, including particulate lead, far exceeding the conditions under which water treatment devices are tested and certified. For example, the water in LeeAnne Walter's home was found to contain up to 13,200 ppb of lead.⁴ Due to the unusually high levels of lead found in Flint, including particulate lead, WQA recommends water treatment professionals in Flint test before and after installation of treatment even when installing a certified device. Field sampling kits for dissolved and total lead can be obtained through a local certified drinking water laboratory, or through the WQA laboratory.

11. What types of exposure to drinking water with lead should I be concerned about?

Lead in drinking water is mostly [inorganic](#) leached from lead contained in plumbing. Ingestion is the route of most concern for lead than dermal exposure, although organic lead is of concern for dermal exposure. Examples of organic lead would be [tetraethyl](#) lead and [tetramethyl](#) lead, not generally found in drinking water, however.

For more information please visit the links below:

<http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=6>

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10031

12. What can cause water to have a brown color?

A brown color is not attributed to lead in the water. This can be from iron being oxidized when it is exposed to the chlorine added to the water at the treatment plant for disinfection. Taste and odor contaminants, including iron, are mostly considered to contribute undesirable aesthetic effects, such as bad taste, odor, color or cloudiness. These contaminants and those covered under the USEPA National Secondary Drinking Water Regulations (NSDWRs) at the Secondary Maximum Contaminant Level (SMCL) may alter the appearance of the water but do not impose a health risk. The SMCL for iron is 0.3 mg/L.

As a result of corrosive conditions, iron will mostly exist in as oxidized, or ferric, iron (Fe^{3+}), and to some extent can be dissolved iron (Fe^{2+}). The visibly red or brown water when first drawn from the tap is oxidized iron. Consult with a water treatment professional for appropriate filtration methods for oxidized iron.

If water is coming out brown, it should be tested for iron levels in addition to testing for any lead concerns. Test before and after treatment has been installed, especially if filtered water turns red after a while. To learn more read WQA's technical factsheet on taste & odor contaminants:

<https://www.wqa.org/LinkClick.aspx?fileticket=UzyTWNS66UY%3d&portalid=0>

References/Sources:

1. Brown, Mary Jean (2012). *Lead in Drinking Water and Human Blood Lead Levels in the United States*. Division of Emergency and Environmental Health Services, National Center for Environmental Health. Atlanta, Georgia. Accessed Jan 21, 2016 from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/su6104a1.htm>
2. Agency for Toxic Substances and Disease Registry (2007). *Toxicological profile for lead*. Atlanta, Georgia. US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. Accessed Jan 28, 2016 from: <http://www.atsdr.cdc.gov/toxprofiles/tp13.pdf>
3. Centers for Disease Control and Prevention. *What do Parents Need to Know to Protect Their Children?* Atlanta, Georgia. Accessed Jan 28, 2016 from: http://www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm
4. FlintWaterStudy.org (2015). *Lead Results from Tap Water Sampling in Flint, MI during the Flint Water Crisis*. Accessed Jan 21, 2016 from: <http://flintwaterstudy.org/2015/12/complete-dataset-lead-results-in-tap-water-for-271-flint-samples/>