# Lead Filters for Drinking Water

Filters on water faucets and pitchers are often used in response to a lead in drinking water problem. These particular filters are certified to remove not only lead but other water contaminants. While the goal is to ensure that the water is safe to drink, there are several potential issues to be aware of.

## Background

General background on the use of filters is provided below:

- The National Sanitation Foundation (NSF) International certifies filters regarding their ability to remove particulate (e.g., undissolved particles) and soluble (dissolved in water) lead. [1]
    - Some filters are capable of removing either particulate or dissolved lead and some can remove both.
    - All filters have a rated capacity (e.g., 100 to 200 gallons, after which the replaceable filter must be changed).
- Water filters certified by NSF for lead reduction are evaluated using water that contains 150 parts per billion (ppb) of lead, a concentration is 10 times higher than the U.S. EPA action level for lead in drinking water. This level of contaminated water simulates typical use during and beyond the filter's claimed service life cycle. Certification is only confirmed when the product has met all lead reduction requirements and other requirements of the standard. To maintain certification, NSF retests the certified products periodically and audits the manufacturing facilities annually. [2]
- NSF certified water filters reduce lead in drinking water in the following ways:
    - Water dispensers or filters attached to the faucet allow water to flow through adsorption media which captures contaminants such as lead.
    - Contaminants, such as lead, are trapped in the filter and remain inside the filter, reducing their presence in the finished drinking water.
    - Many filters have meters or indicators that show when the filter needs to be replaced. (Manufacturer's specifications should be consulted for details on filter change frequency and filter capacity.)
- Filters are not a "corrosion control" device, but can be useful in reducing the health risks associated with lead exposure, both in water with and without corrosion control.
- The USEPA has performed filter studies in Flint and now Newark, NJ and a final report is pending.

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[1] See "Lead in School Water and Lead Plumbing Pipes," http//www.nsf.org/consumer-resources/water-quality/faucets-plumbing/lead-schools?panel=water-school-lead

[2] National Sanitation Foundation, August 15, 2019 http://www.nsf.org/newsroom/nsf-certified-water-filters-tested-with-water-containing-150-ppb-lead

**Potential Concerns**

The installation and basic capability of filters can pose problems, the more prominent of which are outlined below:

- Problems may occur due to poor installation, manufacturing defects, failure to follow manufacturers' instructions, heavy use of hot water (which should not be run through a filter), or unusual conditions in the water supply.
- Concern exists over very small lead particles from lead solder or lead service lines. While certified filters remove high amounts of lead, in some unusual situations enough lead passes through certain types of filters so that the treated water contains more than the federal standard of 15 parts per billion of lead.
    - If corrosion control is optimized to strike a balance between silicate, pH and phosphate, the thin coating that is formed from "lead passivation" (i.e., increased pipe resistance to chemical reaction) will prevent leaching, including these small lead particles.
- To determine that a filter achieves a specific target (i.e., lead below 1, 5, 10 or 15 ppb) in a given situation, it should be tested after installation. Even with testing, there is no guarantee that the water will always contain less lead than the target, as influent lead levels vary, as does filter performance.
- Any treatment system needs to be maintained and all filters require periodic replacement. Overused filters can discharge higher concentrations of lead than is entering the filter.
- Certain certified filters are designed to screen only a limited number of gallons of water (e.g., 100) that will be used for drinking and cooking.
- Differences in local water chemistries can affect both the leaching of lead from pipes and the performance of filters.[3]
- The USEPA and NJDEP should research filters further and offer updated regulations or written guidance on their use in private and public water systems.

**Filters Certified to Reduce Lead[4]**

Several different types of water filters have been certified by NSF for reducing lead in drinking water.

NSF/ANSI Standard 53 reduction claims for drinking water treatment systems:

- Pour-through pitcher/carafe: Water drips through a filter in a water pitcher using gravity.
- Faucet mount: Mounts on kitchen faucet. Uses diverter to direct water through a filter.
- Counter-top connected to sink faucet: Connects to existing sink faucet through a hose/tubing.
- Plumbed-in to separate tap or to kitchen sink: Installs under a sink; filtered water is usually dispensed through a separate faucet directly to the kitchen sink.

[3] National Sanitation Foundation, August 15, 2019 http://www.nsf.org/newsroom/nsf-certified-water-filters-tested-with-water-containing-150-ppb-lead

[4] Ibid

- Refrigerator filter: Installed in your refrigerator and typically dispensed through the refrigerator door.

NSF/ANSI Standard 58 reduction claims for reverse osmosis drinking water treatment systems:

- Reverse Osmosis (RO): Connects to your plumbing under the sink and uses a membrane filter to reduce lead (also can reduce minerals/Total Dissolved Solids).

**Pitcher Filters**[5]

Pitcher filters are only one of several risk reduction options after lead service line replacement. The American Water Works Association (AWWA) Standard C810-17 includes (1) flushing (i.e., running water through) the new or replaced service line immediately after installation, (2) flushing the water lines in the home, and (3) providing instructions to the occupant to flush taps used for drinking or cooking periodically. The standard also recognizes that some situations may warrant using point-of-use filters, or customers may desire to use POU filters.

According to the AWWA, a number of systems have distributed pitcher filters after either exceeding the lead action level or as part of lead service line replacement protocols. To-date, "maintenance" of the pitcher filters in these systems has been limited to the provision of:

(1) instructions to the customer on POU use;
(2) a supply of replacement filters for the pitcher, sufficient for the intended period of performance, and
(3) a point-of-contact at the utility or an allied organization for assistance.

Past experience has identified several challenges:

1. *Confirming delivery to the intended recipient* – When pitchers are left behind by field crews or delivered by third-party providers, there are instances of theft, failure to deliver, failure to deliver in a timely manner, and other issues one would associate with leaving a package on a doorstep.
2. *Adequate supply of NSF certified devices* – At times, the available supply of NSF-certified filter products has been limited. Surges in demand that are unanticipated by the available manufacturers can lead to shortages and delays in filter delivery to the water system (or fulfillment center) for subsequent delivery to customers.
3. *Potential legal liability for failure of the customer to properly use the device* – It is conceivable that claims could be brought against a water system if a customer failed to adequately maintain the pitcher filter and subsequently claimed an illness was attributable to the water from the pitcher.
4. *Impact on household behavior* – It is not clear to what degree households will take seriously a recommendation to use and properly maintain a pitcher filter.

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[5] *American Water Works Association, "Addressing Questions Posed in Federalism Consultation, Long-Term Lead and Copper Rule Federalism Consultation", March 8, 2018*

The AWWA is not aware of any research demonstrating the effectiveness of pitcher filters reflecting actual customer behavior.

Introducing filters as a regulatory requirement creates a new barrier to implementation. With respect to agency oversight of such a requirement, a traceable record to demonstrate delivery of pitchers within the specific criteria included in the rule language would be required. A regulatory requirement to provide filters, therefore, has the unintended impact of creating a new set of bureaucratic requirements that are a distraction and barrier to timely situation-specific risk mitigation.

**Plumbed in Point-of-Use (POU) Devices[6]**

Requiring water utilities to install and maintain POU devices in customers' homes is an approach for addressing lead from lead service lines in community water systems that would be fraught with difficulties. There are implementation considerations associated with utilizing plumbed-in POU devices beyond the burden imposed by the standard of performance described in EPA's Guidance for Safe Drinking Water Act compliance. They include:

1. Inability to gain access to 100% of homes with lead service lines to install, maintain and monitor filter performance.
2. Liability for harm to customer's property when installing devices (a frequent anticipated risk when installing POU devices on existing faucets and countertops).
3. Personnel safety when installing, maintaining and monitoring filter performance.
4. Inability to assure coordination with customer and consistent, adequate maintenance of the installed device.

A single-choice risk mitigation measure should not be written into regulation. No other federal Safe Drinking Water Act regulation specifies a single-choice treatment option.

Installed POU devices are only a viable solution when the number of homes being treated is manageable and the inhabitants cooperate. As noted previously, EPA guidance for the use of POU devices describes a standard of care that includes proper selection and installation, ongoing maintenance and regular monitoring of performance. Historically, EPA has recognized that this treatment strategy was not a cost-effective risk reduction strategy compared to centralized treatment, other than for very small communities.

**For more information:**

- American Water Works Association, "Addressing Questions Posed in Federalism Consultation, Long-Term Lead and Copper Rule Federalism Consultation", March 8, 2018.

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[6] *American Water Works Association, "Addressing Questions Posed in Federalism Consultation, Long-Term Lead and Copper Rule Federalism Consultation", March 8, 2018.*

- National Sanitation Foundation, August 15, 2019 http://www.nsf.org/newsroom/nsf-certified-water-filters-tested-with-water-containing-150-ppb-lead.