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DEPARTMENT OF HEALTH

# Water Treatment Units for Arsenic Reduction

## Selecting a Treatment Unit


You can purchase and install a treatment unit at a home you own, or you can work with a water treatment specialist to make sure you get the right type of treatment unit for your needs. Search for water treatment specialists in your telephone book or at Find Water Treatment Providers (www.wqa.org/find-providers).

- The table on the back of this page outlines information about point-of-use and point-of-entry devices that reduce arsenic levels in water.
  - **Point-of-use (POU)** water treatment units treat water at one faucet (e.g., in your kitchen). These devices can sit on the counter, attach to the faucet, or be under the sink.
  - **Point-of-entry (POE)** water treatment units are installed on the water line as it enters the home and treat all the water in the home.
- Make sure the treatment unit you select is certified by NSF, Underwriter's Laboratory (UL), or Water Quality Association for arsenic reduction.

## Maintaining a Treatment Unit

All home water treatment units require regular maintenance. Maintenance can include changing filters, cleaning scale buildup, or disinfecting the unit. Follow the manufacturer's recommendations for installing, cleaning, and maintaining a treatment unit. After installing treatment, retest the treated water to make sure the unit is working.

## Paying for a Treatment Unit

The upfront costs for installing a treatment unit may seem high. However, that investment helps keep you and your family healthy both now and over the long term. Treatment costs are often lower than bottled water costs over several years. While Minnesota does not have a specific program to cover the costs of home water treatment units, your household may qualify for one of the following grants or loans. These grants or loans can be used to help pay for a treatment unit. Contact the program to find out if you qualify and how to apply.

- **AgBMP Loan Program** provides low interest loans to farmers, rural landowners, and agriculture supply businesses.[1]
- **Single Family Housing Repair Loans and Grants** provide low interest loans for families with income below 50 percent of the area's median income and grants for people over the age of 62 years.[2]
- **Fix Up Program** provides fixed interest rate loans to families who own the property.[3]

## References

- Minnesota Department of Health. Home Water Treatment (www.health.state.mn.us/divs/eh/water/factsheet/com/pou.html).
- New Hampshire Department of Environmental Services. 2012. Environmental Fact Sheet: Arsenic in New Hampshire Well Water (PDF) (https://www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/documents/dwgb-3-2.pdf).
- Ohio Department of Health. 2012. Arsenic Treatment and Removal for Private Water System Wells (PDF) (https://www.odh.ohio.gov/-/media/ODH/ASSETS/Files/eh/water/factsheet/As_treatment-removal.pdf?la=en).

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[1] Contact your local Soil and Water Conservation District or see Agriculture Best Management Practices (BMP) Loan Program (https://www.mda.state.mn.us/grants/loans/agbmploan.aspx).

[2] Single Family Housing Repair Loans and Grants (https://www.rd.usda.gov/programs-services/single-family-housing-repair-loans-grants).

[3] Go to Minnesota Housing (www.mnhousing.gov), click on "Improve Your Home."

# Table of Comparisons: POU and POE Water Treatment Units for Arsenic Reduction

| Treatment Option | Reduces | Description | Advantage/Disadvantage | POU Cost Estimate[4] | POE Cost Estimate |
|---|---|---|---|---|---|
| **Reverse Osmosis with Preoxidation[5] (RO)** | arsenic, chloride, lead, manganese, nitrate, nitrite, other dissolved solids[6], pesticides, PFCs/PFASs, radium, sodium, and sulfate | Dissolved solids are removed from water as the water goes through a membrane. The membrane has pores tiny enough to let water pass through, but stop many contaminants. | **Advantage:** Reduces or removes the widest array of contaminants.<br>**Disadvantage:** Can create a lot of wastewater. | *Initial*: $300-$1,500<br>*Maintenance*: $100-$200 every 1-2 years | *Initial:* $5,000-$12,000<br>*Maintenance*: $250-$500 every 1-2 years |
| **Distillation** | arsenic, bacteria, iron, lead, manganese, nitrate, nitrite, other dissolved solids, some pesticides, sulfate, viruses, and bacteria | Distillers use heat to boil the water, which makes steam. The steam rises and leaves contaminants behind. The steam hits a cooling section where it condenses back to liquid. | **Advantage:** Removes up to 99.5 percent of dissolved solids.<br>**Disadvantage:** Water may taste 'flat' because oxygen and minerals are reduced. | *Initial:* $300-$1,200<br>*Cost consideration:* Energy cost to boil water | N/A |
| **Oxidation Filtration** | Arsenic (only if level of iron is above 100 micrograms per liter [µg/L]), hydrogen sulfide, iron, and manganese. | A media bed changes dissolved contaminants into solid particles. Those solid particles are large enough to be filtered out. | **Advantage:** Can address multiple water quality issues.<br>**Disadvantage:** Requires periodic regeneration of the media, which can be messy and toxic and must be handled and stored carefully. | N/A | *Initial:* $1,500-$3,000<br>*Maintenance:* $100 per year |
| **Adsorptive Media with Preoxidation** | Depends on the type of media; some media only removes arsenic. Activated alumina removes arsenic, fluoride, selenite, and uranium. | A positively charged media bed causes negatively charged arsenic ions to be pulled out of the water and attach to the media. | **Advantage:** Produces very little wastewater and spent media is not hazardous.<br>**Disadvantage:** You may have to change the filter cartridge more often if your water has a pH above 8. | *Initial:* $300-$700<br>*Maintenance:* $300-$500 every 6 months to year | *Initial:* $2,400-$4,500<br>*Maintenance:* $700-$900 per year |
| **Anion Exchange with Preoxidation** | arsenic, nitrate, fluoride, sulfate, and uranium | As water passes through resin beads, the beads replace arsenic with chloride ions. It is similar to a water softener, but specific to arsenic. | **Advantage:** Simple to maintain.<br>**Disadvantage:** Treated water can be acidic and cause corrosion. If not maintained properly, high concentrations of arsenic can be dumped back into the water. | N/A | *Initial:* $1,500-$2,500<br>*Maintenance:* $700-$900 every 8-10 years |
| **Bottled Water** | Must meet U.S. Safe Drinking Water Act standards (arsenic must be below 10 µg/L). | Common forms of bottled water include 12-ounce bottles, 1-gallon jugs, and home water delivery. | **Advantage:** No large upfront cost.<br>**Disadvantage:** Expensive over time. Bottles create a lot of waste. | Cost for a family of four: $600-$3,000 per year[7] | N/A |

[4] Costs are estimates based on quotes obtained in 2017; actual costs may vary. In general, the low-end cost is for a treatment unit the homeowner installs; the high-end cost is for a treatment unit installed by a water treatment specialist.

[5] There are two types of arsenic in Minnesota groundwater: arsenic III and arsenic V. Including preoxidation with your water treatment ensures the treatment reduces both types.

[6] Dissolved solids refers to minerals, salts, metals, cations, or anions dissolved in water.

[7] Estimate based on each family member consuming 64 ounces of water a day from 12-ounce bottles ($3,000), 1-gallon jugs ($600), or home water delivery ($1,000).