Metals Package

Interpreting Well Water Quality Results

for common metals and minerals

Using this fact sheet

This fact sheet is intended to help you interpret the results of your drinking water test results:

Some of these tests are important because they deal with health-related contaminants like toxic metals

Other tests will tell you about important aesthetic concerns associated with water (i.e. taste, color, and/or odor)

Others may be beneficial metals or minerals that may be found in well water

Interpreting your numbers:

No considerations	Aesthetic concerns are possible	Health standard or health advisory level

INDIVIDUAL TESTS: PAGE

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Copper	2
Iron	2
Lead	2
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Manganese	3
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Zinc	4

Arsenic

Arsenic is a naturally occurring element that can be released from soils or other geologic material that groundwater contacts. Water less than 0.010 mg/L (or 10 µg/L or ppb) is considered safe for consumption.

When concentrations are greater than 0.010 mg/L, steps should be taken to reduce arsenic in drinking water because of concerns that long-term consumption of water with this level of arsenic may increase the risk of certain types of cancers. There are additional concerns when water contains greater than 0.100 mg/L (100 µg/L or ppb) arsenic.

Less than 0.005* **0.010** **0.100 mg/L**

If arsenic concentrations are greater than 0.010 mg/L:
Consider testing for arsenic again at a state or commercial laboratory; if the test confirms greater than 0.010 mg/L of arsenic, avoid using water for drinking and cooking. **Water treatment such as reverse osmosis systems or distillation have been shown to be effective for reducing arsenic levels.**

Limit of Detection (LOD):

The lowest metal or mineral concentration likely to be reliably distinguished from a sample blank and at which detection is feasible.

Concentrations below the LOD are reported as "Less than" the value at which the analytical equipment used to measure your sample is capable of detecting.

Calcium and other minerals

Calcium, as well as sulfur, phosphorous, potassium, are essential nutrients and are considered beneficial to all sorts of biological processes in the body. They are naturally occurring in well water as a result of groundwater dissolving these minerals from soils or rocks. Each of these can have effects on aesthetics, including taste, color, and smell of water.

Copper

Not naturally occurring at significant concentrations in groundwater; copper can be found at elevated levels when naturally corrosive water contacts copper plumbing. Bluish-green staining of sinks or toilet tanks is an indication of copper corrosion. Levels less than 1.300 are considered safe for drinking water. Levels above 1.300 mg/L in drinking water can result in digestive issues (ex. upset stomach, nausea, diarrhea) for some individuals.

If copper levels are greater than 1.300 mg/L or 1300 µg/L:
Elevated copper is most evident in water that sits in plumbing for an extended period. Allowing the water to run for 1-2 minutes prior to using water for drinking and cooking will significantly reduce your exposure to copper.

Less than 0.001*

0.500

1.300 mg/L

Cobalt and Iron

Cobalt can be found throughout the environment. Exposure is through air, food, and drinking water. No national standard exists. But It may cause gastrointestinal problems. Iron is a naturally occurring mineral found in soils and rocks that store groundwater; it is a common aesthetic complaint for many well owners. Concentrations of iron above 0.3 mg/L or 300 µg/L may result in taste issues and/or result in reddish-brown staining of sinks, showers and toilets. Low levels of iron can be removed by a water softener. Amounts greater than 1.0 mg/L or 1000 µg/L may require treatment specifically designed for iron removal.

Less than 0.008*

0.300

1.000 mg/L

Lead

Elevated lead can occur when water contacts brass fixtures, lead pipes or lead solder. The health-related drinking water standard for lead is 0.015 mg/L (15µg/L or ppb). In children, lead exposure has been linked to damage to the central and peripheral nervous system, learning disabilities, shorter stature, impaired hearing, and impaired formation and function of blood cells.

If you have elevated lead, brass fixtures, lead pipes or lead solder in your plumbing system:
Run your water for 1-2 minutes prior to use for drinking/cooking in order to flush water with high lead levels from your water system.

Less than 0.004*

0.015 mg/L

Magnesium

Naturally occurring in water as a result of groundwater dissolving magnesium from soils or dolomite rock. Magnesium is an essential nutrient and is considered beneficial to health, although the amount found in water is generally a small portion of magnesium compared to what we get from a healthy diet. Magnesium is related to hardness and can contribute to the formation of scale when found at high concentrations. Typical values may range between 3 and 35 mg/L (300-3500 µg/L) of magnesium in unsoftened well water.

Manganese

Manganese is a naturally occurring mineral found in soils and rocks that groundwater is stored and moves through. Concentrations of manganese above 0.050 mg/L may result in taste issues and/or result in black staining of sinks, showers and toilets.

The health advisory level for manganese is 0.300 mg/L. Drinking water with greater than 0.300 mg/L over many years may harm the nervous system. Manganese can be reduced using appropriate treatment.

Less than 0.001*

0.050

0.300 mg/L

Potassium

Naturally occurring at concentrations less than 5 mg/L. Potassium is beneficial to health, however the amount found in water is not a significant source of potassium compared to a healthy diet. If water softener uses potassium chloride softener salt, concentrations will be significantly greater than 5 mg/L (5000 µg/L or ppb).

Sodium

Sodium is naturally found in groundwater at levels less than 5 mg/L (or 5000 µg/L). It is generally not included in our test results. In some coastal communities, saltwater intrusion into groundwater is a problem. For individuals on prescribed no salt diets, the American Health Association and US EPA recommend less than 20 mg/L in drinking water. Water with greater than 60 mg/L of sodium may have a salty taste associated with it.

When sodium levels exceed calcium and magnesium levels, it suggests that water is softened or partially softened. Sodium may be elevated in areas where groundwater is impacted by septic system effluent or nearby road salt use. If sodium was elevated from one of these two sources, chloride levels would likely be elevated as well.

People often prefer the taste of calcium and magnesium in unsoftened water versus softened water that contains sodium. As a result, water softeners often bypass the cold-water kitchen faucet.

Less than 0.3*

20

60 mg/L

Information about Drinking Water Standards:

Interpreting your results section is based on the U.S. Environmental Protection Agency's (EPA) Maximum Contaminant Levels (MCL) for public drinking water supplies.

Levels considered safe for long-term consumption are below the MCL or the Health Advisory Level.

Aesthetic limits are taken from the Secondary Drinking Water regulations for public water systems and are based on the potential to influence taste, color, and/or odor of the water.

Drinking water standards are not enforceable for private wells, however the standards may be useful in helping homeowners decide if corrective measures are needed.

Sulfate

Naturally occurring in groundwater at low levels, generally less than 25 mg/L (25000 µg/L or ppb). High levels of sulfate occur naturally in some groundwater aquifers. Excessive water hardness (calcium and magnesium) is common in water that contains significant sulfate.

Concentrations over 250 mg/L may give water an off taste and may induce a laxative type effect (diarrhea like symptoms) in persons not accustomed to consuming water with high levels of sulfate. Water with greater than 500 mg/L sulfate may reduce milk production in dairy cows.

Less than 0.1* | **250** | **500 mg/L**

Zinc

Concentrations greater than 1 mg/L or (1000 µg/L or ppb) usually occur when corrosive water is distributed through galvanized pipes. There is a health advisory level of 2 mg/L, too much zinc can cause stomach cramps, nausea and vomiting. There is an aesthetic limit of 5 mg/L; water containing more than 5 mg/L may have a chalky appearance and metallic or astringent taste.

If water contains greater than 2 mg/L of zinc:
Concentrations of zinc are likely to be greatest in water that sits in the plumbing system for extended periods of time. If zinc is elevated, letting the water run for 1-2 minutes prior to use should significantly reduce concentrations.

Less than 0.003* | **2** | **5 mg/L**

Additional information:

All About Arsenic+– Search online for "All About Arsenic-Data to Action"
Find information about multiple arsenic and other toxic metal related projects administered through the Community Environmental Health Laboratory at MDI Biological Laboratory.
What's Wrong with My Water? - Search online for "WDNR What's wrong with my water"
Diagnose taste, color, and odor problems and solutions using this resource from the Wisconsin Department of Natural Resources
Treating My Water- Check out the "Be Well Informed" Search online for "Be Well Informed"

When measuring concentrations of metals and minerals in water:

1 milligram per liter (mg/L) = 1 part per million (ppm)

1 microgram per liter (ug/L) = 1 part per billion (ppb)

and

1 ppm = 1,000 ppb

Adapted for Maine from the Center for Watershed Science and Wisconsin

Contact arsenic@mdibl.org for more information about this adapted fact sheet.

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