



The drop on water

Copper

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Copper (Cu) is found naturally in rock, soil, plants, animals, water, sediment, and air. Copper often occurs in nature as a metal in minerals. The principal copper ores are sulphides, oxides, and carbonates.

Sources

Copper is frequently found naturally in groundwater; however, levels are generally very low.

Common synthetic sources of copper are fertilizers, septic systems, animal feedlots, industrial waste, and food processing waste.

Copper is often used in household plumbing materials, such as pipes and faucets. Corrosion of copper pipes is the greatest source of copper in drinking water. The amount of copper dissolved in drinking water depends on factors such as the pH, temperature, and alkalinity of water, as well as the length of piping and the amount of time water is left sitting in pipes.

Aesthetic Objective for Drinking Water ≤ 1.0 mg/L

In water, dissolved copper may or may not have a taste, smell, or colour. It can only be detected through a chemical test.

The Canadian drinking water quality guideline for copper is an Aesthetic Objective (AO) of less than or equal to **1.0 milligrams per litre (mg/L)**.

The AO is low enough to minimize unpleasant tastes and staining of laundry and plumbing materials due to copper, and also low enough to prevent any health effects.

QUICK FACTS

- Copper is naturally occurring, but most copper found in drinking water is from household plumbing materials.
- Very high concentrations of copper can cause nausea and other gastrointestinal discomforts.
- Copper in water can stain plumbing fixtures a characteristic blue or green colour.
- Copper can be detected through chemical testing.
- The Canadian drinking water quality guideline for copper is an Aesthetic Objective (AO) of less than or equal to **1.0 mg/L**.
- To improve the aesthetic quality of drinking water, homeowners may consider water treatment options or use an alternative water source.

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Health Effects

All living organisms, including humans, need copper to live; however, high concentrations of copper in drinking water can be harmful.

Immediate health effects from drinking water with copper levels above the guideline limit include nausea, vomiting, diarrhea, and stomach cramps. Effects may be felt at concentrations of copper as low as 4 mg/L in water.

Blue or green staining of plumbing fittings, sinks, and bathtubs is characteristic of copper in water.

Testing

Regularly test your well water for a standard suite of chemical parameters, including copper. Use an accredited water testing laboratory. Find a list of accredited water testing laboratories at www.gov.ns.ca/nse/water/waterlabs.asp or see the Yellow Pages under “laboratories.”

Get the special sampling bottles and instructions on proper sampling from the laboratory.

The cost of analyzing water samples can range from \$15 for a single parameter to \$230 for a full suite of chemical parameters. The cost can vary depending on the lab and the number of parameters being tested.

REGULAR TESTING

Homeowners are responsible for monitoring the quality of their well water:

- Test for bacterial quality every 6 months.
- Test for chemical quality every 2 years.
- Test more often if you notice changes in physical qualities – taste, smell, or colour.

Regular testing alerts you to problems with your drinking water.



Solutions

If copper is present above 1.0 mg/L in the first test, you should determine the source of the copper. Get a second test, taking a sample of water from the well before it enters the building. This will help determine whether the copper is present in the groundwater, well materials, or plumbing materials.

Copper is an aesthetic parameter. Aesthetic parameters can impair the taste, smell, or colour of water. Although copper does not pose a serious health risk at levels normally found in drinking water, if the source of copper is corrosion of plumbing materials, be aware that other metals, such as lead or cadmium, may also be released into the water. Get a metal scan done at an accredited water testing laboratory, because the presence of other metals in drinking water may pose health risks.

If copper is confirmed to be the only metal present above the guideline limit, the following options are available to make your water more pleasing to consume:

- Remove the source of copper.
- Flush faucets until the water runs as cold as possible before using the water for drinking, cooking, or teeth brushing.
- Avoid using hot tap water for drinking, cooking, or making baby formula.
- Adjust pH so water is less corrosive (for more information, see our fact sheets on pH and corrosive water).
- Use a treatment system to reduce copper levels in your water.

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Treatment

Copper cannot be removed from water through boiling. Boiling water may increase the concentration of copper.

If the groundwater is found to have high levels of copper before entering the home, flushing the faucet will not be effective. Consider the following treatment systems to reduce copper levels:

- adsorption (carbon/charcoal)
- distillation
- ion exchange
- reverse osmosis

Buy a treatment system that has been certified to meet the current NSF standards for copper reduction. NSF certification is an internationally recognized safety standard. NSF International is a not-for-profit, non-governmental organization that sets health and safety standards for manufacturers in 80 countries. See its website at www.nsf.org.

Once installed, re-test your water to ensure the treatment system is working properly. Maintain the system according to the manufacturer's instructions to ensure a continued supply of safe drinking water.

For more information on water treatment, see our publications *Water Treatment Options* and *Maintaining Your Water Treatment*, part of the *Your Well Water* booklet series at www.gov.ns.ca/nse/water/privatewells.asp.

FOR MORE INFORMATION

Contact
Nova Scotia Environment at
1-877-9ENVIRO
or 1-877-936-8476

www.gov.ns.ca/nse/water/


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