

Copper In Drinking Water

This brochure describes the guidelines for controlling copper levels in drinking water supplies. In addition, the brochure describes the sources of copper, health effects of copper and ways to reduce exposure to copper in drinking water. See the DNR publication titled *Lead in Drinking Water* for information on lead in drinking water.

The Wisconsin Department of Natural Resources Bureau of Drinking Water & Groundwater would like to thank the Groundwater Coordinating Council (GCC) Education Sub-Committee for their part in the development and editing of this publication. For more information on the GCC, it's member organizations and programming, please visit ***dnr.wi.gov/topic/groundwater/GCC/About.html***

Wisconsin Department of Natural Resources
Bureau of Drinking Water & Groundwater

What Is Copper?



Copper is a reddish metal that occurs naturally in rock, soil, water, sediment, and air. Its unique chemical and physical properties have made it one of the most commercially important metals. Since copper is easily shaped or molded, it is commonly used to make pennies, electrical wiring, and water pipes. Copper compounds are also used as an agricultural pesticide and to control algae in lakes and reservoirs.

Copper also occurs naturally in plants and animals. It is an essential element for all known living organisms, including humans. However, very large single or long-term intakes of copper may harm your health.

How can I be exposed to copper?

Copper and its compounds are common in the environment. You may be exposed to copper by breathing air, eating food, or drinking water containing copper. You may also be exposed by skin contact with soil, water, or other copper-containing substances.

Copper forms different compounds when it joins with one or more other chemicals. These may be naturally-occurring or manmade. Most copper compounds found in air, soil, and water are strongly attached to dust, or embedded in minerals, and cannot easily enter the body. These forms are not likely to affect your health. Other forms become dissolved in water and are not attached to other particles. In this form, copper is more likely to affect your health.

How does copper get into my water supply?



Levels of copper found naturally in ground water and surface water are generally very low; about 4 micrograms of copper in one liter of water (4 µg/l) or less. Copper levels may increase significantly if corrosive water comes in contact with copper plumbing and copper-containing fixtures in the water distribution system. This normally occurs if corrosive water remains motionless in the plumbing system for six hours or more. Copper in drinking water increases with the corrosivity of the water and the length of time it remains in contact with the plumbing.

Higher copper levels have sometimes been noted in new homes constructed with copper plumbing. Copper levels tend to decrease with time as coatings form a natural barrier between the water and the plumbing materials.

How can copper affect my health?

Copper in our diet is necessary for good health. You eat and drink about 1000 micrograms (1000 µg) of copper per day. Drinking water normally contributes approximately 150 µg/day. Immediate effects from drinking water which contains elevated levels of copper include vomiting, diarrhea, stomach cramps, and nausea. The seriousness of the effects can be expected to increase with increased copper levels or length of exposure.

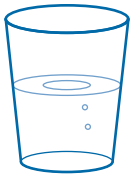


Long-term exposure (more than 14 days) to very high levels of copper in drinking water has been found to cause kidney and liver damage in some people. Children under one year of age are more sensitive to copper because it is not easily removed from their system. People with liver damage or Wilson's disease are highly susceptible to copper toxicity.

On the average, drinking water accounts for less than 5% of our daily copper intake. The U.S. Environmental Protection Agency (U.S. EPA) has determined that copper levels in drinking water should not exceed 1300 µg/l. No adverse health effects would be expected if this level is not exceeded. Measures should be taken to reduce exposure to copper if this level is exceeded.

How can I find out if my water is safe to drink?

Elevated copper levels in drinking water may significantly increase your exposure to copper and cause adverse health effects. You may find that there is a metallic taste in your drinking water before copper levels are high enough to cause adverse health effects. You may also notice blue or blue-green stains around sinks and plumbing fixtures.
The only way to be certain of the copper level in your drinking water supply is to have the water tested. It is recommended that you use a laboratory that is state certified to analyze copper levels in drinking water.



If you are being served by a public water system, the owner of the utility will have results of copper sampling which has been done in parts of the distribution system. If the EPA action level of 1300 µg/l for copper is exceeded in more than 10% of samples collected, the utility must conduct further testing to determine if the corrosivity of the water is contributing to an increase in the copper levels. They are also required to optimize corrosion control measures to reduce the corrosivity of the water to acceptable levels. If you have questions regarding copper monitoring, contact your water utility.

How can I reduce my exposure to copper in drinking water?

The easiest and most effective method for reducing exposure to copper is to avoid drinking or cooking with water that has been in contact with your house plumbing for more than six hours. When first drawing water in the morning or after a work day, flush the system by running the cold water faucet for 2-3 minutes, or until the water gets as cold as possible. (If you live in an apartment complex, flushing the system may take longer). Water used for showering or washing also helps flush the system.

It is still a good idea to flush each faucet where water is drawn for drinking or cooking purposes since some fixtures contain copper.



Another option for reducing your exposure to copper is to drink water from a known "safe" source. This may be a useful option, particularly if it will be used by young children as drinking water, or for making infant formula.

If you are experiencing elevated copper levels in drinking water, it is possible that lead levels are also elevated. This is especially true if the plumbing system in your home or apartment contains lead solder joints, lead service lines, or brass fixtures. Since lead and copper enter drinking water under similar conditions, it is advisable to test for lead when testing for copper.

Where can I get more information?

For additional information on the health effects of copper, you may contact the Wisconsin Department of Health Services, Division of Public Health at (608) 266-1120 or visit their website at **dhs.state.wi.us**.

The DNR has more information about drinking water and groundwater protection on its website at **dnr.wi.gov**. Search: drinking water. Select from a variety of listed topics.

Contact Us

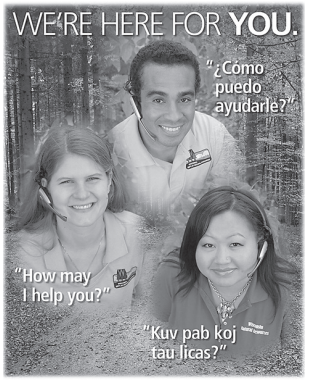
Customer Service Staff are here to assist you.

How may we help you?
Call Toll Free 1-888-WDNRINFO (1-888-936-7463)
Or, go to **dnr.wi.gov**, Search: Contact
Click on one of the following options:

Chat with customer service.

Call a representative.

Email your question.



Toll free hotlines
Violation Hotline:
1-800-TIP-WDNR or phone 1-800-847-9367
Confidentially report suspected wildlife, recreational and environmental violations.

Emergency Spill Hotline:
1-800-943-0003 phone

Bilingual Services are available
Drinking Water & Groundwater Program
101 S. Webster
P.O. Box 7921
Madison, WI 53707-7921
(608) 266-1054

For more information, go to **dnr.wi.gov**, Search: Drinking Water

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