



Copper in Drinking Water

What is Copper?



Natural Copper Nugget, 44 grams. (Images-of-elements.com)

Copper is a naturally occurring metal found in rock, soil, water, and sediment. Pure copper is red-orange but becomes blue-green when exposed to air and water. For centuries, humans have used it to produce copper alloys including brass and bronze. Today, copper is widely used in the production of many items including pennies, electrical wiring, and plumbing materials such as household water pipes.

Does copper have health benefits?

Yes. Copper is an important mineral that you take into your body when you eat certain types of food such as seafood, nuts, vegetables, and fruits. Your body needs it for growth and overall health. The Food and Drug Administration recommends a dietary allowance of 2 milligrams (mg) of copper per day. Copper plays an important role in many of your body's organs and systems. For example in:

- Making red blood cells
- Keeping nerve cells healthy
- Supporting your immune system

- Formation of collagen
- Protecting cells from damage
- Absorbing iron into the body
- Converting sugar into energy

Your body does not require large amounts of copper to remain healthy, but if your copper level is deficient, you may experience problems such as anemia, low white blood cell count, bone loss or broken bones. You should be able to get enough copper from the foods you eat.

Can copper be harmful to my health?

Yes, too much copper can be harmful. Ingesting too much copper on a regular basis can cause liver damage, abdominal pain, cramps, nausea, diarrhea, and vomiting. Copper toxicity is rare in healthy individuals, but it can occur in people with Wilson's disease, a rare genetic disorder resulting in abnormal copper absorption and metabolism. Copper toxicity is a life-threatening condition that can cause heart failure, kidney failure, liver damage, brain disease and coma. Children under one year old are more vulnerable to the toxic effects of copper because their bodies have not developed the ability to regulate copper and maintain the proper level.

How does copper get into drinking water?

The major source of copper in drinking water is corrosion of household plumbing, faucets, and water fixtures. Water dissolves the copper in pipes, brass fittings, and brass faucets. The amount of copper in your water depends on the types and amounts of minerals in the water, how long water stays in the pipes, the water temperature and acidity.



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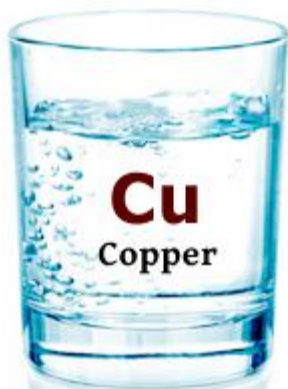


Image from Filterwater.com

Over time, plumbing parts with copper in them usually build up a natural coating that prevents copper from being dissolved into the water. Plumbing systems with copper parts that are less than three years old usually have not had time to build up this protective coating.

What are the regulations regarding copper in drinking water?

Copper is listed as an inorganic contaminant in the National Primary Drinking Water Regulations (NPDWR) (Code of Federal Regulations Title 40, Part 141, Subpart I). The U.S. Environmental Protection Agency (EPA) has established an action level for copper in drinking water at 1.3 milligrams/liter (mg/L) of water. This action level for copper is part of the Lead and Copper Rule (LCR) contained in the NPDWR and represents a measure of the effectiveness of corrosion control treatment in water distribution systems.

The action level for copper is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during a monitoring period is greater than 1.3 mg/L. If the action level for copper is exceeded, the operator of that public water system (PWS) must take action to make the

water in its drinking water distribution system less corrosive. The copper action level of 1.3 mg/L established by the LCR is also the maximum contaminant level goal (MCLG) for copper. A MCLG is the level of a contaminant in drinking water below which there is no known or expected health risk. MCLGs allow for a margin of safety and are non-enforceable public health goals.



Blue-green staining caused by copper corrosion. Image from beauchampwater.blogspot.com

How can I tell if my water contains too much copper?

Water with a lot of dissolved copper in it can give drinking water a bitter or metallic taste, or give it a blue color. The water may also leave a blue-green stain on faucets, toilet bowls, and sinks.

Your PWS operator is required to monitor the levels of copper in your drinking water to determine whether the water they provide is corrosive. The results of the copper monitoring can be found in the Consumer Confidence Report (CCR) that the PWS operator is required to publish every year.



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How Does This Apply on Navy and Marine Corps Installations?

It is Department of the Navy (DON) policy that all Navy and Marine Corps PWSs be operated and maintained to comply with Federal and State laws and regulations as well as Department of Defense (DoD) and DON policies. For many overseas DoD installations, host nation environmental final governing standards (FGS) for drinking water quality have been established. The FGS reconcile the requirements of applicable international agreements and host nation environmental standards with the DoD overseas environmental baseline guidance document. The FGS normally reflects the more protective requirement, unless a specific international agreement with the host nation mandates a different applicable standard for installations. Navy medical department personnel at each Navy and Marine Corps installation conduct public health surveillance of drinking water quality that includes reviewing test results from the PWS operator's water quality compliance monitoring program and providing public health advice and consultation to the installation Commanding Officer. The installation water quality compliance program that is usually conducted by Navy Facilities Engineering Systems Command (NAVFAC) Public Works Department includes extensive testing of the water supply system.

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

If the water from the cold-water faucet has been sitting for several hours, you should let it run for

For more information on Copper in Drinking Water:

Learn more: [General Information and Facts \(navy.mil\)](https://www.navy.mil/Information/FAQs/FAQs%20-%20Public%20Health/Pages/FAQs%20-%20Public%20Health/Copper%20-%20Public%20Health.aspx);

Learn more: [Copper ToxFAQs \(cdc.gov\)](https://www.cdc.gov/leadandcopperrule/faq/copper.html)

Learn more: [Lead and Copper Rule Implementation Tools | Drinking Water Requirements for States and Public Water Systems | US EPA](https://www.epa.gov/leadandcopperrule/lead-and-copper-rule-implementation-tools)

Learn more: [Common Hidden Contaminants \(wqa.org\)](https://www.wqa.org/resources/contaminants/)

one to two minutes until you feel the water temperature become and stay colder. You should do this before using it for drinking, cooking, and preparing beverages (especially baby formula). Your local municipal water provider will inform you if longer faucet run times are needed to respond to local conditions.



Image from earthjustice.org

Copper is likely to be highest in hot water faucets so never drink, cook, or prepare beverages (especially baby formula) from the hot water faucet.

Boiling does not remove copper from drinking water. Excessive boiling of water for food preparation, drinking or preparing beverages may increase the copper concentration in the water by evaporation.