HOUSING & ENVIRONMENT

THE UNIVERSITY OF GEORGIA
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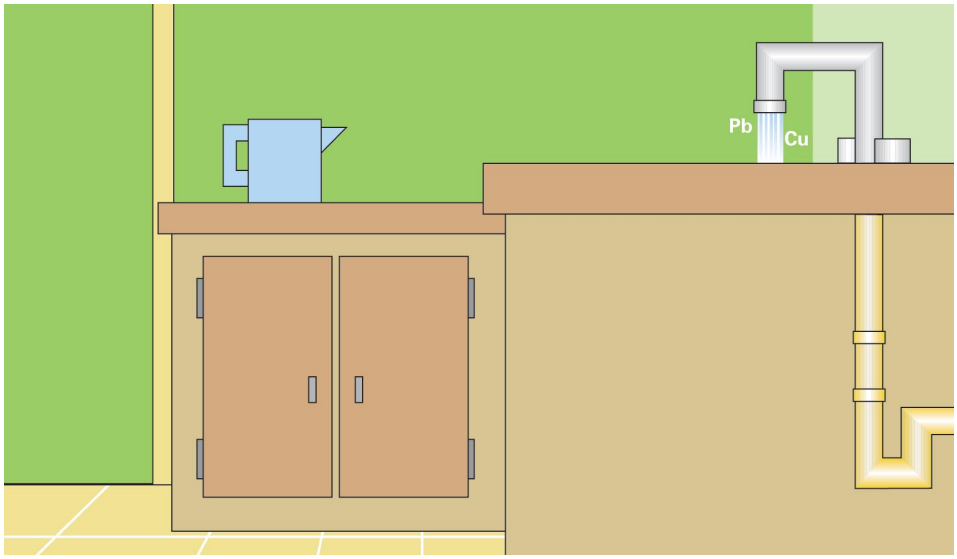
YOUR HOUSEHOLD WATER QUALITY: LEAD AND COPPER

During the recent history of indoor plumbing, both pipes and plumbing fixtures have been made of lead and copper or their alloys, such as brass. Some solder used at copper pipe joints may also contain lead. Water can dissolve small amounts of these metals from plumbing which, upon drinking, may be harmful to your health. In 1992, the lead and copper rule, published by the USEPA, became effective and required that municipal water suppliers must treat water to reduce concentrations below action levels of 0.015 mg lead per liter or 15 parts per billion (ppb) and 1.3 mg copper per liter or 1.3 parts per million (ppm). Keep in mind, however, that the EPA does not regulate private water supplies (such as well water), nor can the EPA control the lead and copper contamination that may result from your household pipes.



CAN DRINKING WATER THAT CONTAINS LEAD OR COPPER MAKE ME SICK?

Both lead and copper are harmful when too much is ingested, but lead is more toxic because it builds up in the body until it reaches toxic levels. **Lead** damages the brain, nervous system, kidneys, reproductive system, and red blood cells. It is more toxic to children than to adults, and it can harm their mental and physical development. **Copper** is much less toxic than lead; however, elevated levels of copper for 14 days or more can cause permanent kidney and liver damage in infants under the age of one year and it can cause nausea, vomiting, and diarrhea in people of all ages. Persons with Wilson's disease (one in 30,000 people worldwide) cannot excrete excess copper and it can accumulate to poisonous levels. If not detected and treated, this disease can be fatal.

WHAT ARE THE MAXIMUM ALLOWABLE LEVELS OF LEAD AND COPPER?

Element	Health Concern Level	Staining and Bitter Taste Level
Lead (Pb)	>15 ppb	Not applicable
Copper (Cu)	>1.3 ppm	>1.0 ppm

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WHAT CAN I DO IF MY WATER CONTAINS LEAD OR COPPER?

If lead or copper exceed a safe amount in your water supply, there are three general measures that can be taken to correct the problem:

1. Control water corrosiveness so that it does not dissolve as much lead and copper from the plumbing.

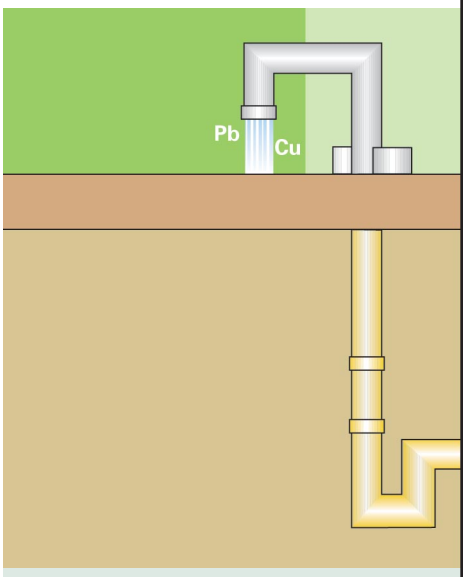
2. Remove the sources of the lead or copper in the plumbing.

3. Remove the lead or copper by treating the water before drinking.

Options one and two are the preferred alternatives.

WHAT IS CORROSION CONTROL?

Low pH, hardness, and alkalinity, and low dissolved solids all increase corrosion of plumbing. To assess the corrosion potential of water, analysis of water using the Georgia Expanded Water Test Package is recommended. A Saturation Index is calculated from the measured values to assess the need for treating the water to reduce corrosion. Treatments recommended typically increase the pH by adding calcium carbonate or magnesium oxide. Corrosion of pipes is greater if grounding wires are connected to them. A professional electrician should be called to correct this problem.



Need more information about the presence of lead and copper in your pipes? Call your local county extension agent.

WHAT IS SOURCE REMOVAL?

The EPA banned the use of lead and lead solder in plumbing systems in 1988, so houses built after this time should be free of lead. The EPA did not ban the use of copper because its concentration in water is also easily controlled by treating water to reduce its corrosiveness.

If lead concentrations in water are above the limit, one or more of the following may need to be corrected:

- Presence of 50/50 lead/tin solder at plumbing joints. This solder is dull gray and is shiny where scratched, whereas 95/5 tin/antimony solder remains shiny.
- Brass fittings in well pumps.
- Lead-containing well screens and/or packing collars.
- Lead pipes and service lines in older homes.

WHAT ARE THE TREATMENT OPTIONS FOR LEAD AND COPPER REMOVAL FROM DRINKING WATER?

Lead and copper can be removed from drinking water by:

- Reverse osmosis
- Distillation
- Ion exchange

Some other tips:

- Do not drink water from hot water lines since lead and copper are more soluble at elevated temperatures.
- Water that has stood over night will have higher levels of lead and copper. Allowing the cold water tap to run for one minute before drinking is advisable if your system has a problem with elevated levels of lead and/or copper.

Sources:
"Lead and Copper in Water Supplies," Nebraska Department of Health and Human Services.
Dorman, Dale. "Your Drinking Water: Lead," The University of Georgia Cooperative Extension Service Circular 819-14, July 1994.
"Lead and Copper Rule," Office of Water, USEPA, June 1991.
"Consumer's Guide to Lead." USEPA Region 4, 2001.
http://www.epa.gov/region4/water/drinkingwater/lead1.htm
Wilson's Disease Association International, 1998/99, Gate Pharmaceuticals.
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