



## Household Water Quality

# Lead in Household Water

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People are exposed to lead from a variety of sources. In Virginia there are negligible amounts of lead in surface water and groundwater, but the water in household plumbing systems can contain high levels of lead. Because lead is a serious health hazard, it is very important to reduce lead contamination of drinking water.

### Sources of Lead in Household Water

If your plumbing was installed before 1930, it probably contains lead pipes. Since then copper pipes have largely replaced lead pipes, but lead solder may still be used.

In many cases, lead levels decrease as a building ages because mineral deposits from the water coat the inside walls of pipes, providing a barrier between the lead and the water. However, water with low pH (acidic) is too corrosive to deposit this protective coating, or scale. Instead, corrosive water will dissolve the metal pipe and fittings, depending on the extent of the water's corrosivity, its temperature, and the length of time it is in contact with the lead source.

Shallow groundwater sources are generally more corrosive than deep wells. Soft water enhances dissolving of lead from plumbing because the absence of minerals in soft water tends to make the water more reactive.

### Effects

Lead reacts with enzymes in the body to slow or stop essential physiological reactions. Since lead is accumulated and stored in the bones, continued exposure to it will severely affect our health. When lead levels become so high that they saturate the bones, blood lead levels begin to affect nerve tissue.

Fetuses, infants, and young children are particularly vulnerable to lead poisoning. Doses of lead that might have little effect on adults can severely affect small bodies. Also, growing children rapidly absorb any lead they consume. A child's mental and physical development can be irreversibly stunted by overexposure to lead.

Generally, lead contamination from drinking water contributes between 10 and 20 percent of total lead exposure in young children. For information on other sources of lead exposure, contact your local Virginia Cooperative Extension office or county health department.

### Testing for Lead

Under the authority of the Safe Drinking Water Act, EPA set the limit for lead in water at **15ppb (15 parts per billion in water)**. This means that utilities must test the water to ensure that water from the customer's tap does not exceed 15ppb in at least

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90 percent of the homes sampled. Utilities are required to take action to correct the problem if the water exceeds the limit in more than 10 percent of the tap water samples. Furthermore, utilities must notify citizens of all violations of the standard. According to EPA estimates, more than 40 million U.S. residents use water that can contain lead in excess of 15ppb.

The only sure way to determine if your water contains too much lead is to have it tested. You should be particularly suspicious and pursue testing if your home has lead pipes (lead is a dull-gray metal that is so soft you can easily scratch it with a house key), and/or there are signs of corrosion in the plumbing system (frequent leaks, rust-colored water, or stained dishes or laundry). As noted previously, lead levels generally decrease with the age of the plumbing.

Water samples can be analyzed for lead content at a certified water testing laboratory. For more information about the location of these laboratories, contact the local Cooperative Extension office or county health department. To evaluate the highest levels of lead present, you should take a sample from the tap after water has been held in the pipes for six hours or overnight. A second sample, taken after the water has flowed from the tap for four or five minutes, will show if flushing the line substantially decreases lead content. For reliable results, carefully follow the laboratory's instructions when you collect each water sample.

The water should also be tested for pH and corrosivity. A pH below the recommended standard of 6.5 indicates the water is acidic enough to corrode plumbing systems.

## Reducing Exposure to Lead

If tests confirm that drinking water contains too much lead, avoid consuming water that has been in contact with the plumbing for more than six hours. Let the cold tap water run for four or five minutes before you drink it or use it for cooking. Use only cold water for drinking and cooking. Hot water dissolves more lead from pipes. Bottled water is an alternative to tap water.

## Treatment

The first step in limiting lead in drinking water may be to neutralize acidic water by using a soda or

phosphate feeder or a tank that contains lime. High or persistent lead levels in drinking water can be reduced by **reverse osmosis (RO)** or **distillation** treatment. These methods also will remove a high percentage of other impurities from drinking water.

Ordinary carbon and mechanical filters are not designed to remove lead. If lead is a problem in your plumbing system, do not connect water softeners to pipes leading to drinking water taps. All water treatment devices must have proper maintenance to achieve effective lead removal. Additionally, consumers should verify manufacturer claims before purchasing any water treatment device by contacting the National Sanitation Foundation or the Water Quality Association.

## Alternative Home Plumbing Materials

The June 1986 amendments to the Federal Safe Drinking Water Act banned the use of any pipe or pipe fitting with more than 8% lead and any solder or flux with more than 0.2% lead in public drinking water supply systems, residences, and other buildings connected to a public drinking water system. Furthermore, the Virginia Uniform Building Code prohibits the use of lead pipe and solder in plumbing in all new home construction.

Such alternative products as tin/antimony (95/5%) or tin/silver (96/4%) can be used for solder in home plumbing systems. Both materials have been shown to be more resistant than lead solder to the dissolving action of corrosive water. Plastic piping, if allowed by local building codes, should also be considered as an alternative.

## ACKNOWLEDGMENT

Adapted with permission from a publication by Faye T. Plowman, University of New Hampshire Cooperative Extension.

The authors wish to thank the following individual who reviewed this publication:

Cecil Sink, New River Health District Lead Assessor