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Corrosivity

What is Corrosivity?

Corrosivity is a measure of how aggressive water is at corroding pipes and fixtures. Corrosive water can mobilize lead and copper from pipes into drinking water and can eventually cause leaks in plumbing.

Corrosive potential of water is increased by:

- **pH** (lower than 6.5 or higher than 8.5)
- **water flow rate** (faster flow)
- **water temperature** (higher temp)
- **dissolved gases** (more dissolved gas)
- **conductivity** (higher conductivity)
- **dissolved solids** (high dissolved solids)
- **certain bacteria** (more bacteria)
- **suspended solids** (more sediment)
- **chlorine** (more chlorine)

Determining Corrosivity

One common index of corrosivity is the Langelier Index (LI). The LI is calculated using pH, temperature, total dissolved solids, alkalinity, and total hardness. The LI is a measure of the balance between pH and calcium carbonate (CaCO_3). As the LI value becomes more negative, the water is increasingly under-saturated with CaCO_3 and therefore has increased corrosion potential. As the LI value becomes more positive, the water is increasingly over-saturated with CaCO_3 . Over-saturation results in CaCO_3 precipitation which can coat and protect pipes from corrosion but can cause scaling in pipes, hot water heaters, and fixtures. While not a perfect analytical tool, the LI serves as a useful guide for assessing corrosive ability of well water.

<u>Langelier Index</u>	<u>Description</u>	<u>General Recommendation</u>
-4	Severe Corrosion	Treatment Recommended/Consider Lead/Copper Test
-3	Moderate Corrosion	Treatment Recommended/Consider Lead/Copper Test
-2	Moderate Corrosion	Treatment May Be Needed/Consider Lead/Copper Test
-1	Mild Corrosion	Treatment May Be Needed/Consider Lead/Copper Test
-0.5	None-Mild Corrosion	Probably No Treatment
0	Near Balanced	No Treatment
0.5	Some Faint Coating	Probably No Treatment
1	Mild Scale Coating	Treatment May Be Needed
2	Mild to Moderate Coating	Treatment May Be Needed
3	Moderate Scale Forming	Treatment Advisable
4	Severe Scale Forming	Treatment Advisable

Adapted from Wilkes University Center For Environmental Quality;
Corrosion, Saturation Index, Balanced Water in Drinking Water Systems

Controlling Corrosion

Corrosiveness may be increased by installing water softeners, aeration devices, increasing hot water temperatures, chlorinating water or improper matching of metal pipes. Corrosion control options include pretreatment systems, installation of non-conductive unions, reducing hot water temperature, and replacing metal piping with CPVC. Pretreatment systems include neutralizing tank filters and caustic liquid treatment. These systems change the pH, hardness, and/or alkalinity to achieve a less corrosive water chemistry.

Additional Resources:

Corrosion ... in Drinking Water Systems; Wilkes University Center for Environmental Quality

<http://www.water-research.net/corrosion.htm>

Lead and Copper Fact Sheet; MSU Extension Water Quality

<http://waterquality.montana.edu/docs/homeowners.shtml> (listed under "Drinking Water")

Household Drinking Water Protection and Treatment; MSU Extension Service

<http://waterquality.montana.edu/docs/homeowners.shtml> (listed under "Drinking Water")

Northern Plains and Mountains Regional Water Program– Drinking Water Initiative

<http://region8water.colostate.edu/regional/DrinkingWater/slideshow/projects.shtml>