Todd Creek Village
METROPOLITAN DISTRICT

Proud to be your area water provider

A Deeper Dive into Water Quality

To continue last month's introduction into the differences between hard and soft water and which is better for what, we'll take a deeper diver into the water supplied through our system. If you've never heard of the Langelier saturation index (LSI), it's actually a critical factor in determining the stability, and thus, quality of the water we drink. The LSI is a calculated number used to predict the calcium carbonate stability of water which indicates whether the water will precipitate, dissolve, or be in equilibrium with calcium carbonate. In 1936 Wilfred Langelier developed a method to predict the pH at which water is saturated in calcium carbonate (called pHs). The LSI is expressed as the difference between the actual system pH and the saturation pH [LSI = pH (measured) - pHs].

- For LSI > 0, water is super saturated and tends to precipitate a scale layer of CaCO3.
- For LSI = 0, water is saturated (in equilibrium) with CaCO3. A scale layer of CaCO3 is neither precipitated nor dissolved.
- For LSI < 0, water is under saturated and tends to dissolve solid CaCO3.

If the actual pH of the water is below the calculated saturation pH, the LSI is negative and the water has a very limited scaling potential. Conversely, if the actual pH exceeds pHs, the LSI is positive, and being supersaturated with CaCO3, the water has a tendency to form scale. At increasing positive index values, the scaling potential increases. In case you've forgotten your high school chemistry basics, CaCO3 stands for Calcium Carbonate, the carbonic salt of calcium, a very common substance found in rocks. It is also the main component of eggshells, snail shells, seashells, and pearls, and is used for a number of therapeutic applications including as an antacid for temporary relief of indigestion and heartburn, as a supplement for preventing and treating osteoporosis and calcium deficiency, and many normal functions of the body—especially bone formation and maintenance.

In practice, water with an LSI between –0.5 and +0.5 will not display enhanced mineral dissolving or scale forming properties. Water with an LSI below –0.5 tends to exhibit noticeably increased dissolving abilities while water with an LSI above +0.5 tends to exhibit noticeably increased scale forming properties. It is important to note that the LSI is temperature sensitive and becomes more positive as the water temperature increases. This has particular implications in situations where well water is used. The temperature of the water when it first exits the well is often significantly lower than the temperature inside the building served by the well or at the laboratory where the LSI measurement is made. This increase in temperature can cause scaling, especially in cases such as hot water heaters. Conversely, systems that reduce water temperature will have less scaling.

Todd Creek Village Metropolitan District strives to maintain a neutral LSI = 0. This balance produces water that is not corrosive, is less likely to damage plumbing, and prevents excess calcium buildup in pipes that can cause clogging issues. **Side note:** *as mentioned, the LSI index of water changes with temperature. As such, when ice cubes made with water that contains calcium carbonate are put into water you can sometimes see the calcium turn to a solid (white particles in the water) and then they disappear after a short period of time. That is because the calcium warms to the temperature of the water in the glass and turns back to a liquid.*

Transparency Notice: Board meetings are held the second Thursday of each month at 2:00 pm via Zoom. The public is always welcome and encouraged to attend.

TODD CREEK METROPOLITAN DISTRICT VILLAGE

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