



## Water Quality Hardness – What Does it Mean?

Hard water contains high levels of dissolved calcium and magnesium ions. Calcium and magnesium occur naturally in soils. As groundwater or surface water comes into contact with these minerals, they may dissolve and enter the water supply. Calcium and magnesium help give water a pleasant taste and are necessary for our health. A small portion of our necessary dietary intake of calcium and magnesium comes from the water we drink.

The Environmental Protection Agency (EPA) has developed the *National Primary Drinking Water Regulations* with enforceable standards on the amount of contaminants allowed in drinking water. These standards protect the public from contaminants that may pose a risk to human health. All public water providers must meet requirements of these standards when supplying water to their customers.

In addition, the EPA has a set of standards known as the *National Secondary Drinking Water Regulations*. These standards are recommended guidelines that water providers can follow, but the standards are not enforceable. Substances found on this list are not harmful to human health, but may cause unpleasant changes in taste, odor and color.

The EPA has not placed calcium or magnesium on either list. The reason is that neither substance is considered harmful to health, or thought to cause concerns with taste, color or odor. This link is to a complete list of EPA's Primary and Secondary Drinking Water Regulations:

[https://www.epa.gov/sites/production/files/2016-06/documents/npwdr\\_complete\\_table.pdf](https://www.epa.gov/sites/production/files/2016-06/documents/npwdr_complete_table.pdf)

One parameter on the Secondary list that is related to water hardness is Total Dissolved Solids (TDS). TDS is a measure of *all* dissolved minerals in the water. The recommended maximum standard for TDS in drinking water is 500 milligrams per liter (mg/L). Above this level, the taste and color of water may be affected, and it may leave deposits on appliances and dishes.

Water hardness is measured in the laboratory by the amount of calcium carbonate present. Although there is no set standard for the classification of water hardness, the following chart provides generally accepted classifications based on the concentration of calcium carbonate.

Water Hardness Measured as Calcium Carbonate (CaCO <sub>3</sub> )	
Concentration in (mg/L)	Classification
0 to 60	Soft
61 to 120	Moderately Hard
120 to 180	Hard
More than 180	Very Hard

Source: United States Geological Survey (USGS); The USGS Water Science School, <http://water.usgs.gov/edu/hardness.html>



Water that is classified as hard will leave mineral deposits on faucets and dishes, and may have a salty taste, but will not negatively affect human health. Some parts of the country have very hard water with typical concentrations of calcium carbonate ranging from 200 to 300 mg/L in drinking water.

Colorado's groundwater supplies are naturally high in calcium and magnesium ions, so groundwater is usually classified as being hard. Conversely, surface water sources contain lower concentrations of hardness ions. Therefore, any time a water provider has to switch supplies from surface water to groundwater, or increase the ratio of groundwater to surface water, customers may notice mineral deposits on dishes and changes in taste. Water providers can provide tips to manage these aesthetic changes such as using vinegar to remove hard water deposits on faucets or dishes.