

The drop on water

# Calcium and Magnesium

Calcium (Ca) and magnesium (Mg) are both abundant in soil and rocks. They are both essential to human health.

## Sources

Calcium and magnesium are very common elements. Calcium is the fifth most abundant natural element, and magnesium the eighth. Both elements are present in all natural waters.

The most common source of calcium and magnesium in groundwater is through the erosion of rocks, such as limestone and dolomite, and minerals, such as calcite and magnesite.

## Aesthetic Objective for Drinking Water

No numerical Canadian drinking water quality guidelines exist for calcium or magnesium.

Calcium and magnesium are major contributors to water hardness. As contributors to hardness, calcium and magnesium can negatively affect drinking water quality. These effects are mainly aesthetic. See our fact sheet on hard water for more information.

## Health Risks: Calcium

Calcium may have beneficial effects when ingested. It may block the absorption of heavy metals in the body and is thought to increase bone mass and prevent certain types of cancer.

Very high concentrations of calcium may adversely affect the absorption of other essential minerals in the body.

## QUICK FACTS

- Calcium and magnesium are both abundant elements in water, soil, and rocks.
- Calcium and magnesium can be detected through chemical testing.
- No numerical guidelines for Canadian drinking water quality exist for calcium or magnesium.
- Calcium in drinking water may have some beneficial effects, but at very high levels can have some negative health effects.
- Magnesium in drinking water can have a laxative effect and can also affect the taste of water.
- Calcium and magnesium are major contributors to water hardness.
- If drinking water is excessively hard, consider water treatment options or alternative sources of water.

# Calcium and M

## Health Risks: Magnesium

Magnesium may contribute undesirable tastes to drinking water. Sensitive people may find the taste unpleasant at 100 mg/L. The average person finds the taste unpleasant at about 500 mg/L. These levels are well above the magnesium concentrations found in most water.

Magnesium in drinking water may have a laxative effect, particularly with magnesium sulphate concentrations above 700 mg/L. However, the human body tends to adapt to this laxative effect with time.

## Testing

Regularly test your well water for a standard suite of chemical parameters, including calcium, magnesium, and hardness. Use an accredited water testing laboratory. Find a list of accredited water testing laboratories at [www.gov.ns.ca/nse/water/waterlabs.asp](http://www.gov.ns.ca/nse/water/waterlabs.asp) or see the Yellow Pages under “laboratories.”

Get the special sampling bottles and instructions on proper sampling from the laboratory.

The cost of analyzing water samples can range from \$15 for a single parameter to \$230 for a full suite of chemical parameters. The cost can vary depending on the lab and the number of parameters being tested.

## REGULAR TESTING

Homeowners are responsible for monitoring the quality of their well water:

- Test for bacterial quality every 6 months.
- Test for chemical quality every 2 years.
- Test more often if you notice changes in physical qualities – taste, smell, or colour.

Regular testing alerts you to problems with your drinking water.

# Magnesium

## Solutions

Calcium and magnesium are present in all water in Nova Scotia. If well water is found to be excessively hard (greater than 180 mg/L of  $\text{CaCO}_3$ ), get a second test to confirm the original results.

Calcium and magnesium, the main contributors to hardness, are aesthetic parameters. Aesthetic parameters may impair the taste, smell, or colour of water. Although hardness does not pose a health risk at levels normally found in well water, it can affect the function and lifetime of the plumbing system and appliances.

Water hardness is measured by adding up the concentrations of calcium and magnesium and converting this value to an equivalent concentration of calcium carbonate ( $\text{CaCO}_3$ ). The optimum range of hardness in drinking water is from 80 to 100 mg/L. If excessive hardness is confirmed (greater than 180 mg/L of  $\text{CaCO}_3$ ), treating your water is optional. You may choose to treat your water to

- improve the taste and make it more pleasing to consume
- increase the ability of soap to produce a lather
- decrease scale formation on well and plumbing materials and appliances

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## Treatment

We recommend purchasing a treatment system that has been certified to meet the current NSF standards. NSF International is a not-for-profit, non-governmental organization that sets health and safety standards for manufacturers in 80 countries. See its website at [www.nsf.org](http://www.nsf.org).

The most common treatment methods to reduce hardness, and therefore calcium and magnesium, in drinking water is ion exchange (water softener). Ion exchange works by pumping water through a tank containing a resin. This causes calcium and magnesium ions to be exchanged for sodium or potassium ions. This increases the concentration of sodium or potassium in the water. See our fact sheets on sodium and potassium for more information.

Another effective treatment method is reverse osmosis.

Once a system is installed, re-test your water to ensure the treatment system is working properly. Maintain the system according to the manufacturer's instructions to ensure a continued supply of safe drinking water.

For more information on water treatment, see our publications *Water Treatment Options* and *Maintaining Your Water Treatment*, part of the *Your Well Water* booklet series at [www.gov.ns.ca/nse/water/privatewells.asp](http://www.gov.ns.ca/nse/water/privatewells.asp).

## Considerations

If water is softened by sodium or potassium ion exchange, you should use a separate, unsoftened supply of water for cooking and drinking.

## FOR MORE INFORMATION

Contact

Nova Scotia Environment at  
1-877-9ENVIRO  
or 1-877-936-8476

[www.gov.ns.ca/nse/water/](http://www.gov.ns.ca/nse/water/)

  
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