



The drop on water

# Fluoride

Fluoride (F<sup>-</sup>) is a negative ion of the element fluorine (F), which can be found in various chemical compounds. It is present in air, water, soil, and most foods.

## Sources

Fluoride is a naturally occurring chemical found within many rock types. Fluoride in groundwater is often associated with weathering processes, primarily in areas underlain by shales, sandstones, and some fractured zones of granite bedrock, but not only in these areas.

Common synthetic sources of fluoride include

- the manufacture of phosphate fertilizers
- runoff from agricultural areas using chemical fertilizers
- septic and sewage treatment system discharges from areas with fluoridated water

Fluoride is added to many municipal drinking water supplies and dental products, such as toothpastes and mouthwashes, to help prevent tooth decay.

## QUICK FACTS

- Fluoride is likely to be present in groundwater in areas underlain by shales, sandstones, and some granite bedrock.
- Fluoride in drinking water has no taste, smell, or colour.
- Fluoride can only be detected through chemical testing.
- The Canadian drinking water quality guideline for fluoride is **1.5 mg/L**.
- Exposure to excess fluoride in drinking water can cause dental fluorosis. Over the long term, it can cause skeletal fluorosis.
- Well water with fluoride levels greater than **1.5 mg/L** should not be used for drinking, cooking, or teeth brushing. It may be used for bathing, handwashing, and dishwashing.
- If fluoride is present above **1.5 mg/L** in drinking water, consider water treatment options or alternative sources of water.

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## **Maximum Acceptable Concentration for Drinking Water = 1.5 mg/L**

In water, fluoride has no taste, smell, or colour. It can only be detected through a chemical test.

The Canadian drinking water quality guideline for fluoride is **1.5 milligrams per litre (mg/L)**.

## **Health Risks**

Exposure to low concentrations of fluoride, such as those added to municipal water supplies (0.8 – 1.0 mg/L), can reduce the risk of dental cavities.

Exposure to fluoride concentrations greater than 1.5 mg/L when teeth are developing (up to age 6 or 7) can cause dental fluorosis, which can cause discolouration of teeth, white spots, and pitting or mottling of tooth enamel. Exposure to extreme concentrations of naturally occurring fluoride over a long period of time can result in skeletal fluorosis, which can cause chronic joint pain, restriction of mobility, and increased risk of bone fractures.

The risk to human health is through ingestion only – drinking, cooking, teeth brushing. Well water with fluoride levels greater than 1.5 mg/L may be used for bathing, handwashing, and dishwashing.



## Testing

Regularly test your well water for a standard suite of chemical parameters, including fluoride. 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.

## Solutions

If fluoride is present above 1.5 mg/L in the first test, get a second test to confirm the original results.

If fluoride is confirmed to be present above 1.5 mg/L in the well water,

- Find an alternate source of water for drinking, cooking, and teeth brushing, such as bottled water or another well that has been tested and found to be safe.  
or
- Treat your current source of water to reduce fluoride levels.

## 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.

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## Treatment

Fluoride cannot be removed from water through boiling, chlorination, or pitcher-style filtration units.

Effective treatment methods include

- anion exchange, if other anions are not present
- distillation
- reverse osmosis

Buy a treatment system that has been certified to meet the current NSF standards for fluoride reduction. 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).

Once 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 for anion exchange method

Fluoride is a negative ion (anion) in solution. When you use anion exchange treatment, the resin in the unit will remove certain anions more readily than others. If other more preferred anions are present such as uranium, sulphate, arsenic, nitrate, or nitrite, the effectiveness of the unit may be reduced. The resin in the anion exchange unit may need to be regenerated more frequently to reduce the concentration of fluoride to a satisfactory level. It is important that a detailed chemical analysis of your water be completed to determine if other substances are present that will affect fluoride treatment.

Anion exchange may not be the best choice to remove fluoride if other more preferred anions are present.

## 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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