

NITRATE AND NITRITE & WELL WATER

What are Nitrate and Nitrite?

Nitrate and nitrite are nitrogen-based chemicals which occur naturally in water, soil, plants and food. Nitrate and nitrite are found more commonly in groundwater than in surface water and are two of the more commonly detected well water contaminants.

Principle sources of nitrate or nitrite contamination are fertilizers, septic tank waste, livestock manure, and erosion of natural deposits. The most vulnerable wells are those in farm communities or areas with large numbers of aging septic tanks.

What are the health effects of Nitrate and Nitrite?

Ingestion of water containing high nitrate or nitrite concentrations can be fatal to infants (especially less than 6 months of age). When ingested, nitrate is converted to nitrite by bacteria in saliva and in the digestive tract. In babies, this process can interfere with the ability of the child's blood to carry oxygen, which can lead to a blood disorder called methemoglobinemia or "blue baby syndrome". Symptoms include shortness of breath and blue coloring to skin. For these reasons, water containing nitrate or nitrite should not be used to prepare food or formula for infants less than 6 months of age. Nitrate and nitrite are rarely a problem for people older than 6 months. However, some individuals are more susceptible to health problems from nitrate or nitrite due to certain health conditions. These include:

- Women who are pregnant or trying to become pregnant as some studies have shown an increased risk of spontaneous miscarriage or birth defects.
- Persons without enough stomach acids to metabolize and excrete nitrate or nitrite.
- Persons who lack the enzyme methemoglobin reductase, which converts affected red blood cells back to normal.

In addition, long term exposure to nitrate and nitrite can lead to diuresis, starchy deposits, hemorrhaging of the spleen, and cancer. If you suspect contamination or experience illness, stop drinking or cooking with the water immediately, and do not resume use until testing has proven it to be safe. Always seek the advice of your medical doctor if you have any health concerns.

How do I test for Nitrate and Nitrite?

You should test for nitrate and nitrite annually as their levels can fluctuate over time. Contact your state or local health department or use our [interactive map](#) for a list of state-certified laboratories in your area.

Understanding Your Test Results

Your test results may show levels of nitrate, nitrite, and a total nitrate/nitrite level. The EPA's maximum limit for nitrate in public drinking water is 10 milligrams per liter (mg/L), or 10 parts per million (ppm); for nitrite, the limit is 1 ppm. The sum of the amount of nitrate and nitrite in drinking water should not total more than 10 ppm.

For example, if the nitrate level of your well is 10 ppm and the nitrite level is 1 ppm, the total nitrate/nitrite level is 11 ppm, which exceeds the maximum safe limit set by the EPA and should be treated.

Contaminant	EPA Limit
Nitrate as N	10 parts per million
Nitrite as N	1 part per million
Total (Nitrate + Nitrite) as N	10 parts per million

Although your testing laboratory may report nitrate as N as listed above, it can also be reported as nitrate NO₃. If your result is reported as nitrate NO₃, you should refer to the maximum level of 45 ppm which is equivalent to 10 ppm nitrate as N. Some states may set limits for nitrate and nitrite even lower than those set by the EPA. Check with your local health department or state environmental agency for maximum levels used in your state. Well owners should use these maximums as guidelines to know when to treat their drinking water.

What are the treatments for Nitrate and Nitrite in well water?

Treatments to reduce nitrate and nitrite include anion exchange, distillation, electrodialysis and reverse osmosis. These technologies may have a wide range of effectiveness based on the amount of nitrate or nitrite in the water supply and other contaminants that may be present in the water. Look for treatment systems that are certified by [NSF](#) or [Water Quality Association \(WQA\)](#). Certified water treatment professionals can help you select the right treatment. To locate a certified water treatment professional in your area, visit [WQA's website](#).

It is imperative to maintain treatment devices and change filters as specified by the manufacturer or your water treatment professional. You should also retest your water after treatment is installed and after maintenance to confirm the effectiveness of the device.

NOTE: Boiling your water WILL NOT remove nitrate or nitrite, and in fact will increase their concentration in your water.

For More Information on Nitrate and Nitrite & Well Water

Contact your licensed well contractor, local health department, or the [wellcare®](#) Hotline for more information on nitrate and nitrite and additional measures you can take to protect your well and well water.



Information to help maintain and protect your water well system:

[wellcare®](#) is a program of the [Water Systems Council \(WSC\)](#). WSC is the only national organization solely focused on protecting the health and water supply of more than 13 million households nationwide who depend on private wells.

This publication is one of more than 100 [wellcare®](#) information sheets available FREE at www.watersystemscouncil.org.

Well owners and others with questions about wells and well water can contact the [wellcare®](#) Hotline at 1-888-395-1033 or visit www.wellcarehotline.org to fill out a contact form or chat with us live!

JOIN THE WELLCARE® WELL OWNERS NETWORK!

By joining the FREE [wellcare®](#) Well Owners Network, you will receive regular information on how to maintain your well and protect your well water.

Contact us at 1-888-395-1033 or visit www.wellcarehotline.org to join!