



## FACTSHEET: pH of Groundwater

### INTRODUCTION

This factsheet provides basic information for private water well owners regarding the pH level of their well water. To determine if water is generally safe to drink, water test results are compared to the US EPA [Primary Drinking Water Regulations](#) table of contaminants, the EPA [Secondary Drinking Water Standards](#). The above standards only apply to public water systems, but the quality and health implications are the same for private well owners. In addition, the WDEQ has a set of standards (Chapter 8 Table 1) for water quality based on class of use, including domestic, agriculture and livestock. Keep your analytical results and your sampling documentation with your well information for future reference if there is a question about change in water quality.

### WHAT IS pH?

The pH of your water reflects how acidic your water may be. pH is measured on a scale of 0 to 14 with a value of 7 being neutral. A pH value less than 7 means your water is more acidic and potentially corrosive, while values greater than 7 are more basic or alkaline.

### WHAT IS THE STANDARD FOR pH IN GROUNDWATER?

The US EPA does not regulate pH as a primary drinking water standard. It is considered an aesthetic, or secondary water quality concern. The US EPA has set a secondary drinking water standard for pH of 6.5 to 8.5 s.u.

Wyoming Water Quality Rules and Regulations Chapter 8 has set this same standard for drinking water and livestock uses.

### HOW DOES pH AFFECT MY WATER QUALITY?

Water with a low pH (acidic) may cause your water to have a metallic taste and to be corrosive, which can lead to leaching of metals from household piping or geologic materials. Low pH water can also cause bluish-green stains from copper piping or reddish stains from galvanized iron piping.

Water with a high pH (alkaline) may indicate that a high level of alkalinity minerals are present in your groundwater (mainly carbonates, bicarbonates and hydroxides). High pH can cause water to taste bitter, cause water to feel 'slippery,' reduce the effectiveness of detergents, cause scale build up on water fixtures, and reduce the efficiency of hot water heaters or chlorination treatments.

### IS THE pH OF MY WATER A HEALTH CONCERN?

The pH of your water is not a direct health concern, but can cause aesthetic issues like taste or plumbing issues without treatment. A more immediate concern regarding pH is the potential for low pH waters to leach heavy metals from plumbing (such as copper, lead, or zinc) or geologic materials into untreated drinking water supplies.

On the next page is a scale depicting the pH scale from 0 to 14 and the pH levels of some common materials.

### WHAT CAUSES pH IN WELL WATER TO BE LOW OR HIGH?

The pH levels in groundwater can be influenced by a variety of causes, including the natural geologic condition (soil and bedrock), recharge of rainwater or snowmelt (slightly acidic), or anthropogenic sources (wastewater disposal,

industrial or agricultural discharges, spills and releases).

**WHAT CAN BE DONE TO TREAT pH ISSUES IN MY WATER?**

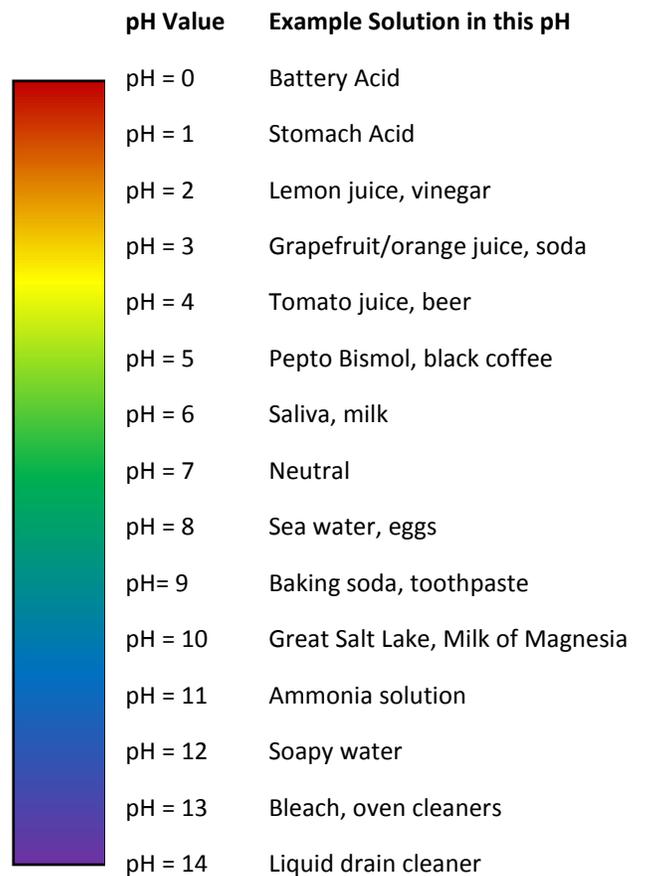
The information below is intended as an information source only. The WDEQ suggests you discuss appropriate water treatment options with a qualified water treatment specialist, since other constituents in your water may affect the selection of the appropriate water treatment method.

Water that has a low pH (acidic) can be treated using a neutralizing filter containing calcite or ground limestone (calcium carbonate), or magnesia (magnesium oxide) to raise the pH. Neutralizing filters must be backwashed periodically since they also serve as mechanical filters that remove solid particles from the water. They also require periodic replacement of the neutralizing material. Water with a neutralizing filter should be tested for water hardness since the filter material will add calcium or magnesium to the water.

For high capacity wells, a chemical feed pump can be used to feed a solution of soda ash (sodium carbonate) into the water supply. Soda ash can raise the pH level of water to over 8. If the water also contains a lot of iron, or requires disinfection, a chemical feed pump is preferred since hypochlorite bleach and soda ash may be mixed into a single solution to be fed through the pump.

Water that has a high pH, can be treated with a point-of-entry acid injection pump to lower the pH to around 7. This can eliminate the bitter taste of water and improve the effectiveness of chlorination. A corrosion-resistant chemical feed pump is used to inject a low pH solution, such as acetic acid (vinegar), into the water supply system.

**THE pH SCALE**



**REFERENCES**

Nelson, Dennis, Nov 2002, *Natural Variations in the Composition of Groundwater*  
 US EPA, Secondary Drinking Water Standards  
 University of Rhode Island, 2013, Safe Well Water RI, Tip Sheet 12, *pH of Well Water*  
 University of Massachusetts, Center for Agriculture, Food and the Environment, June 2007, *pH – Acidity of Private Drinking Water Wells*  
 Water Systems Council, Wellcare®, Sept 2007, *Information for you about pH in Drinking Water*  
 World Health Organization, rev 2007, pH in Drinking Water (WHO/SDE/WSH/07.01/1)