

# FACT SHEET

## Alkalinity & pH

### What is alkalinity?

Alkalinity is the ability of a substance to neutralize acids. Common acid-neutralizing household items include baking soda, baking powder, and antacid tablets. In the Midwest, limestone is a naturally occurring acid-neutralizing mineral. Water with a large quantity of dissolved limestone (in the form of calcium bicarbonate) is hard and has a high alkalinity. Total alkalinity is the measure of all alkaline substances dissolved in the water.

### What is pH?

pH is the measure of the strength of an acid on a scale of 0-14. A pH of 7 is neutral, less than 7 is acidic, and greater than 7 is basic. In Latin, pH stands for potens hydrogen, meaning “hydrogen power.” The larger the number of hydrogen ions present in the water, the more acidic it becomes and the lower the number on the pH scale.

### What is the relationship between alkalinity and pH in drinking water?

Highly alkaline waters are usually hard with a slightly basic and stable pH. The amount and chemical form of the alkalinity can be changed by adding a strong acid or base. When a strong base is applied to hard water, the pH rises and the natural alkalinity changes from a soluble to an insoluble form. The insoluble alkalinity settles out, and softened water is the result. Lime (calcium oxide) is the strong base typically used to raise the pH of the water. The use of a strong base to soften water works best in water with high alkalinity. Lime softening treatment facilities, such as Des Moines Water Works (DMWW), create high pH water to remove hardness minerals during this precipitation process. After the water is softened, the pH is lowered with acid-forming carbon dioxide. Some alkalinity remains in the water to keep it stable and resistant to a change in pH.

### What is the federal government standard for total alkalinity and pH in my drinking water?

There are no primary federal drinking water regulations for pH or total alkalinity. However, alkalinity and pH are important since they affect the presence of substances that are federally regulated, the effectiveness of chlorine disinfection, and the aggressiveness of water on plumbing materials. Therefore, utilities must follow operational permit requirements to assure the production of safe water.

DMWW's operating permit requires that pH values be greater than 8.7 to provide effective corrosion protection. DMWW seeks to maintain a pH of approximately 9.5 in the distribution system for optimum protection from pipe corrosion. This helps maintain a dependable supply of water to the customer and protects you from heavy metals, such as lead, that could otherwise enter your tap water.

### What are the health effects of alkalinity and pH?

There are no adverse health effects associated with alkalinity or pH in your treated drinking water.