Drinking Water Basic Tests

Sciencefaircenter.com Study Kit

Each water sample is tested for this Set of parameters:

pH, Alkalinity, Water Hardness, Nitrate, Nitrite, Free Chlorine and Total Chlorine (7 tests per Set)

Log onto www.sciencefaircenter.com/documentation.tpl for additional information on this study kit.

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pH CHECK

Colorimetric test strips

This pH test is very versitile in that it can be used for drinking water testing, food processing, environmental applications or in any other water matrix.

pH is short for "power of Hydrogen." The balance of positively charged and negatively charged hydrogen ions in water determines pH.

Water that has a low pH is acidic or aggressive and can corrode plumbing resulting in metal ions being present in drinking water and damaged fixtures and pipes. Water that has a high pH is basic and will leave scale in pipes and on fixtures.

This test features two test pads both measuring pH at in the same range using different color indicators. This makes color matching easier than with other colorimetric tests.

This test reports water pH at the following levels:
2, 3, 4, 5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 11, 12.

Results are obtained from this test in less than 1 minute.

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NOTE:
These pH test strips perform optimally in water with a Total Alkalinity above 80 mg/L or ppm. Water highly saturated with dissolved solids or highly buffered samples will give elevated results for pH.

NOTE:
National Secondary Drinking Water Regulations set forth by EPA recommend a pH level between 6.5-8.5

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TOTAL ALKALINITY

COLORIMETRIC TEST STRIPS

Total Alkalinity is a fundamental parameter in water testing. Alkalinity indicates the buffering capacity of natural waters. A water is said to be buffered if the pH is not changed greatly by addition of acides or bases. The most effective buffering action is within the pH range of water from near 6.0 to about 8.5.

Most natural waters are buffered by some extent by reactions which involve dissolved carbon dioxide CO_2. It forms an indispensible reservior of carbon for photosynthesis. Thus, the productivities of water can be correlated with alkalinity and the buffering system.

The color chart for this test allows you to read total alkalinity in mg/L or ppm.

This test reports total alkalinity concentrations in water at 0, 40, 80, 120, 180 and 240 mg/L or ppm.

Results are obtained from this test 30 seconds.

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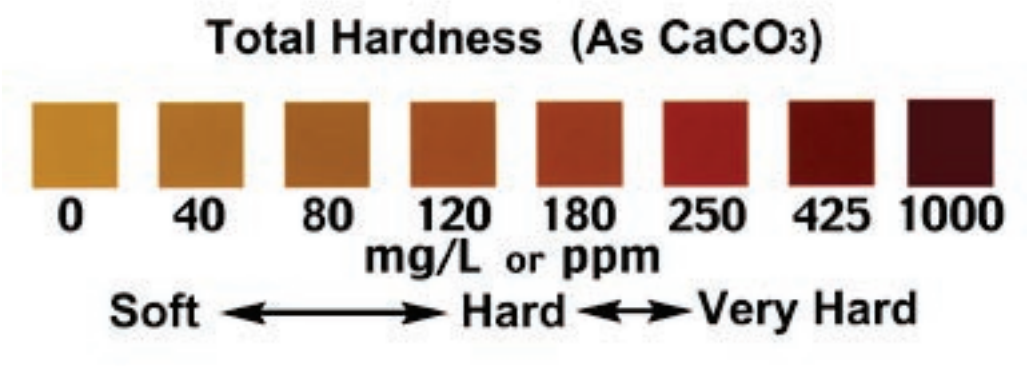

TOTAL HARDNESS

Colorimetric test strips.

Water Hardness is composed of mostly calcium and magnesium. The water hardness comes from naturally occurring minerals in the local and regional geology being dissolved by water.

Hardness is a key water parameter and its control is important to assure proper water quality. Low Hardness (Soft water) can contribute to corrosive water. High Hardness (Hard water above 400) can lead to clarity and scaling problems. Water softeners are used to reduce Total Hardness of water.

Testing for hardness in tap water is very common and is very quick and easy with these test strips. The color chart for this test allows you to read Total Hardness in mg/L or ppm.

This test reports calcium hardness concentrations in water at 0, 40, 80, 120, 180, 250, 425, 1000 mg/L or ppm.

Results are obtained from this test in about 5 seconds.

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Background Information

Total Hardness (TH) is a measure of the total amount of calcium and magnesium that has naturally leached into the water during its journey through the watershed. In the U.S. water hardness is most often reported as milligrams per liter (mg/L) or parts per million (ppm) as calcium carbonate (CaC03).

It is difficult to produce soap suds in water with high levels of calcium and magnesium ions, hence the term "hardness".

In addition to reducing the effectiveness of soaps and detergents, hard water may cause an insoluble scale to form on fixtures and on the inside of pipes. Scale formation depends on several factors, one of which is pH.

The EPA does not regulate the levels of hardness in the water supply. There are, however, generally recognized levels that describe the amount of hardness in a water sample:

Hardness as Calcium carbonate (ppm)	Classification
0-60	Soft
61-120	Moderately Hard
121-180	Hard
>180	Very Hard

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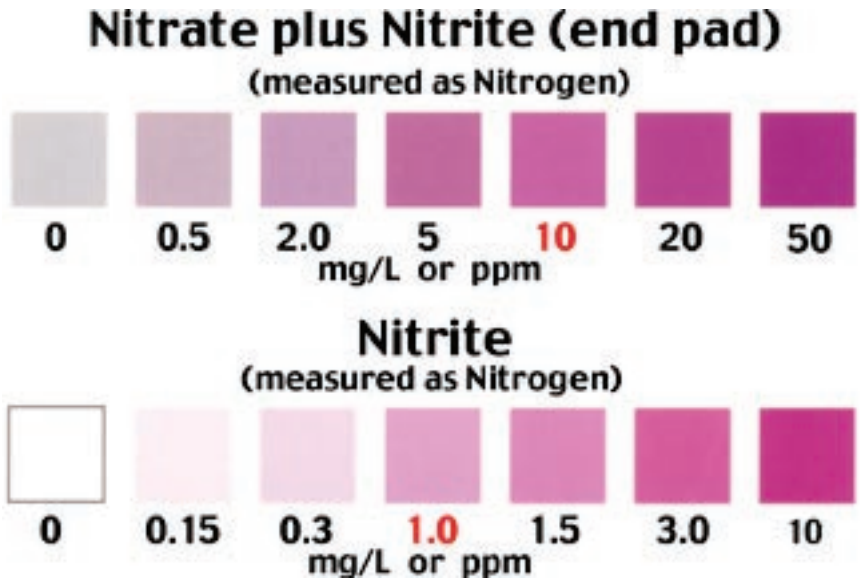

NITRATE / NITRITE NITROGEN

Colorimetric test strips.

Nitrate /Nitrite test strips are for testing water in many applications from drinking water to water used to wash produce.

Nitrates and nitrites occur normally in nature from the breakdown of ammonia in the nitrogen life cycle. Nitrates in nature cause plant and algae growth that may affect the balance of water-based ecosystems.

Nitrate is found in fertilizers and animal waste. Rain tends to wash fertilizers containing nitrates into nearby natural water systems and ground water. Groundwater used as drinking water that contains nitrogen represents a hazard to babies. Many die every year as a result from “Blue Baby Syndrome.”

This test reports concentrations compatible with EPA limits of total nitrogen and nitrite nitrogen in water.

The test reports levels of:
NO3 (as N): 0, 0.5, 2.0, 5, 10, 20, 50 mg/L or ppm;
NO2 (as N): 0.15, 0.3, 1, 1.5, 3, 10 mg/L or ppm.

Results are obtained from this test in 1 minute.

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Conversion Ratio

Nitrate and Nitrite Nitrogen (as N) test results are usually expressed as mg/L or ppm. Sometimes the concentration of Nitrates or Nitrites needs to be expressed as Nitrate (N03) or Nitrite (N02).

To convert nitrate nitrogen concentration to nitrate concentration. multiply the test strip result by 4.4.
EXAMPLE: 5 PPM nitrate nitrogen x 4.4 = 22 mg/L or ppm nitrate.

To convert nitrite nitrogen concentration to nitrite concentration, multiply the test strip result by 3.3.
EXAMPLE: 1.5 PPM nitrite nitrogen x 3.3 = 4.95 mg/L or ppm nitrite.

Background Information

NOTE: Both pads react with Nitrite. The end pad, which has zinc added, converts the Nitrate to Nitrite and, therefore, reacts with both Nitrate and Nitrite. To determine the true Nitrate Nitrogen level you must subtract the Nitrite level from the Nitrate plus Nitrite (end pad) level.

National Primary Drinking Water Regulations set forth by USEPA recommend a Nitrate (measured as Nitrogen) level less than 10 mg/L or ppm and a Nitrite (measured as Nitrogen) level less than 1 mg/L or ppm.

The World Health Organization guideline value is 50 mg/L (acute) for Nitrate (as N03) and 3 mg/L (acute) for Nitrite (as NO2).

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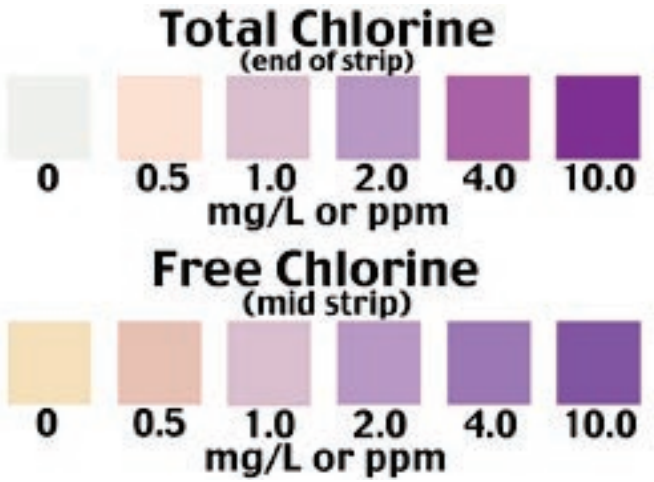

TOTAL and FREE CHLORINE

Colorimetric test strips.

Total and Free Chlorine test strips are used for testing drinking water from a city water treatment system. This dual test is a convenient way of monitoring Total and Free Chlorine.

This test has been calibrated around EPA drinking water standards. Free Chlorine levels of 4.0 mg/L or greater exceeds Maximum Contaminant Level (MCL) as recommended by EPA.

The test reports mg/L or ppm of:
Total Chlorine 0.0, 0.5, 1.0, 2.0, 4.0, 10.0
Free Chlorine 0.0, 0.5, 1.0, 2.0, 4.0, 10.0

Results are obtained from this test in 30 seconds.

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