

## EN API 5 in 1 AQUARIUM TEST STRIPS INSTRUCTIONS FOR USE

It is important for aquarists to provide a healthy aquarium environment by approximating the water conditions of the natural habitats of their fish. This requires routine water testing to make sure that conditions are correct for the fish being kept. API 5 in 1 AQUARIUM TEST STRIPS are the quick and easy way to test 5 of the most important measures of aquarium water quality: General Hardness (GH), Carbonate Hardness (KH), pH, Nitrite (NO<sub>2</sub>) and Nitrate (NO<sub>3</sub><sup>-</sup>). These 5 parameters should be tested weekly, since natural materials in the aquarium, such as fish waste and decaying food, as well as water changes and evaporation can cause these levels to shift over time.

### Testing Instructions

1. Dip strip directly into aquarium.
2. SWIRL 2 TIMES.
3. Remove horizontally with pads face up.
4. DO NOT SHAKE OFF EXCESS WATER.
5. Compare to the color chart on the tube.
6. Starting with the pad closest to your hand, immediately read General Hardness (GH) and Carbonate Hardness (KH).
7. Wait 30 seconds, then read pH, Nitrite (NO<sub>2</sub><sup>-</sup>) and Nitrate (NO<sub>3</sub><sup>-</sup>).



### Testing Tips

- Keep wet fingers out of the tube. • Close tube tightly after removing strip.
- Store in a cool, dry place. • For best results, read in a well-lit area.

## GENERAL HARDNESS (GH) TEST

### What is General Hardness (GH)?

GH is the measure of Calcium (Ca<sup>2+</sup>) and Magnesium (Mg<sup>2+</sup>) ion concentrations dissolved in freshwater. These minerals are present in municipal, well and bottled spring water. The GH in tap water depends on the source of the water and the treatment process that it has undergone. Hard water [≥200 ppm (mg/L)] is high in calcium and magnesium. Soft water [50 - 100 ppm (mg/L)] is low in these minerals.

### Testing Tips

- This test reads from 0 - 180 parts per million (ppm) in freshwater. (ppm is equivalent to mg/L) To convert ppm to German Degrees (°dGH), divide the reading by 17.9.
- It is important to monitor the GH in both the aquarium and in the tap water. Some tap water supplies have a low GH while others have a high GH.
- Even if the GH is correct initially, it can increase sharply over time. As water evaporates from the aquarium it leaves the hardness minerals behind. Topping off with tap water simply adds more minerals to the aquarium. This can result in stressful conditions for the fish.
- This test cannot be used in saltwater because the Calcium (Ca<sup>2+</sup>) and Magnesium (Mg<sup>2+</sup>) ion concentrations in saltwater are above the range of this test.

### What the Test Results Mean

The table below is a guide to the desired General Hardness (GH) for certain common tropical fish and live plants:

ppm (mg/L)	°dGH	Type of Fish
30	1.7°	Discus, arowanas, elephant nose, neons, cardinals, live plants
60	3.4°	Most tropical fish, including angelfish, tetras, botia, community aquariums, live plants
120	6.7°	Most tropical fish, including swordtails, guppies, mollies, cichlids, goldfish.
180	10°	African Cichlids, goldfish

### Reducing GH

- GH can be lowered by using an API WATER SOFTENER PILLOW in the filter. This will remove the calcium and magnesium ions through ion exchange.
- Partial water changes using distilled or deionized water can also reduce the GH. Use the API TAP WATER FILTER to remove all minerals from tap water, creating deionized water. The TAP WATER FILTER turns any tap water into perfect aquarium water.

### Increasing GH

African Cichlids require water with a high GH. API ELECTRO-RIGHT or African Cichlid salts can be used to increase the GH.

### Note

For more precise readings, use the API KH & GH TEST KIT, which is a liquid reagent test. This is a titration kit that measures both KH (Alkalinity or Carbonate Hardness) and GH in increments of 17.9 ppm (1° dGH or dKH). The range of the titration kit is also higher than these test strips, being able to accurately measure GH greater than 180 ppm.

## CARBONATE HARDNESS (KH) TEST

### What is Carbonate Hardness (KH)?

Carbonate Hardness (KH), also known as Alkalinity, is the measure of Carbonate (CO<sub>3</sub><sup>2-</sup>) and Bicarbonate (HCO<sub>3</sub><sup>-</sup>) ion concentrations dissolved in freshwater or saltwater. Carbonate Hardness helps to stabilize the pH in aquarium water. An aquarium with a low KH level [50 - 100 ppm (mg/L)] will tend to be acidic. An aquarium with a very low KH level will be subject to rapid pH shifts if not monitored carefully. This causes stressful conditions for fish. An aquarium with a high KH level [≥200 ppm (mg/L)] will tend to have a high pH. Even if the KH is correct initially, it can decrease over time as the carbonates are used by the biological filter and plants.

### Testing Tips

- This test reads from 0 - 240 ppm (mg/L) in freshwater. This test measures KH in ppm (mg/L). To convert ppm to German Degrees (°dKH) divide the reading by 17.9.
- Carbonate and Bicarbonate ions are present in municipal, well and bottled spring water. The KH in tap water depends on the source of the water and the treatment process that it has undergone.

### What the Test Results Mean

In order to provide the proper environment for your fish, and to ensure a stable pH, it is important to monitor the KH in both the aquarium and the tap water. The table below is a guide to the desired KH for certain common tropical fish and live plants:

ppm (mg/L)	°dKH	Type of Fish
40	2.2°	Discus, arowanas, elephant nose, neons, cardinals, live plants
80	4.5°	Most tropical fish, including angelfish, tetras, botia, community aquariums, live plants
120	6.7°	Most tropical fish, including swordtails, guppies, mollies, cichlids, goldfish
180	10°	African Cichlids, goldfish, brackish water & marine fish
240	13.4°	Rift Lake Cichlids, goldfish, brackish water & marine fish

### Reducing KH

KH can be lowered by making partial water changes using distilled or deionized water. Use the API TAP WATER FILTER to remove all minerals from tap water, creating deionized water. The TAP WATER FILTER turns any tap water into perfect aquarium water.

### Increasing KH

KH can be increased by using API PROPER pH®:

- API PROPER pH 6.5, 7.0 and 7.5 are non-carbonate buffers that automatically adjust the pH and stabilize the KH in freshwater.
- API BUFFER MAX CICHLID™ is a carbonate buffer suitable for African cichlid, brackish water and marine aquariums.

### Note

For more precise readings, use the API KH & GH TEST KIT, which is a liquid reagent test. This is a titration kit that measures both KH and GH (General Hardness) in increments of 17.9 ppm (1° dKH or dGH). The range of the titration kit is also higher than these test strips, being able to measure KH greater than 240 ppm.

## pH TEST

### Why Test pH?

In order for your fish to thrive, it is important to maintain the pH in the aquarium at a level similar to their native habitat. pH is the measure of the acidity of water. A pH reading of 7.0

is neutral, a pH above 7.0 is alkaline and a pH below 7.0 is acidic. The water in the natural habitat of some species is neutral, while that of other species is either acidic or alkaline. Most freshwater fish will thrive at a pH range of 6.8 - 7.5. The pH of natural ocean water is between 8.2 - 8.4; therefore, saltwater fish and invertebrates should be kept in that range.

### Testing Tips

- The pH should be tested weekly, since natural materials in the aquarium, such as fish waste and decaying food, can cause changes in pH over time.
- This test kit measures pH from 6.0 - 9.0 in fresh and saltwater. pH below 6.0 will read 6.0 and pH above 9.0 will read 9.0. In these extreme conditions, pH adjustments to the water will not show any change until the pH is within the range of this kit.
- Be sure to use the freshwater color chart when testing freshwater and the saltwater chart when testing saltwater.

### What the Test Results Mean

#### Recommended pH Levels

A pH of 6.8 - 7.2 is ideal when keeping a community aquarium containing a variety of tropical fish. Goldfish should be kept in their own aquarium and prefer a pH of 7.5. Many Amazonian fish, like angelfish and neon tetras, prefer a pH of 6.5 - 6.8. Mollies and swordtails thrive at pH 7.2 - 7.5. Most African cichlids need a pH of 8.2 or higher.

To raise or lower pH in a freshwater aquarium, use API® pH UP™ or pH DOWN™. API PROPER pH® 6.5, 7.0 and 7.5 can be used to automatically adjust the pH to the appropriate level. API BUFFER MAX CICHLID™ is a carbonate buffer that can be used to bring aquarium water to the correct pH for African cichlids.

A pH of 8.2 - 8.4 is ideal for saltwater fish and invertebrates. Use API BUFFER MAX™ MARINE, a carbonate buffer, to adjust the pH in saltwater and reef aquariums.

### Notes:

- API pH TEST STRIPS measures pH from 6.0 - 9.0 in increments of 0.5. For more precise low range readings in freshwater, use the API pH TEST KIT, which is a liquid reagent, and reads from 6.0 - 7.6 in increments of 0.2 and 0.4.
- For more precise high range readings in either freshwater or saltwater, use the API HIGH RANGE pH TEST KIT, which reads from 7.4 - 8.8 in increments of 0.2 and 0.4.

## NITRITE & NITRATE TEST

### Why Test Nitrite & Nitrate?

Nitrite (NO<sub>2</sub><sup>-</sup>) and Nitrate (NO<sub>3</sub><sup>-</sup>) are produced in the aquarium by the biological filter. Beneficial bacteria convert toxic ammonia into nitrite (also toxic) and then convert the nitrite into nitrate. An established aquarium should have 0 ppm (mg/L) nitrite; but nitrate will continue to increase over time.

**Nitrite:** Testing for nitrite is essential, so that if it is present, steps can be taken to remove it. Nitrite in the aquarium water interferes with fish respiration, and high levels of nitrite quickly lead to fish death. Even a trace amount of nitrite causes fish stress, suppressing the immune system. This increases the likelihood of disease and subsequent death.

**Nitrate:** The biological filter constantly produces nitrate in an aquarium. A high nitrate level indicates a buildup of fish waste and organic compounds, causing poor water quality and contributing to the likelihood of fish disease. Excessive nitrate also provides a nitrogen source that can stimulate algal blooms (green water). Many aquarists believe that maintaining a low level of nitrate improves the health of fish and invertebrates.

### Testing Tips

- Nitrite and Nitrate should be tested once a week as a routine part of aquarium maintenance in order to make sure that they do not reach undesirable levels.
- This test kit reads total Nitrite (NO<sub>2</sub><sup>-</sup>) and total Nitrate (NO<sub>3</sub><sup>-</sup>) in parts per million (ppm), which are equivalent to milligrams per liter (mg/L).
- Nitrite Test reads from 0 to 10 ppm (mg/L); Nitrate Test reads from 0 to 200 ppm (mg/L).
- Be sure to use the correct color chart when reading the results.

### What the Test Results Mean

#### Nitrite:

- In new aquariums the nitrite level can gradually climb to 5 ppm or more. As the biological filter becomes established (in 4 to 6 weeks) the nitrite levels will drop to 0 ppm (mg/L).
- In established aquariums the nitrite level should always be 0 ppm (mg/L). The presence of nitrite in established aquariums indicates possible over-feeding, too many fish or inadequate biological filtration.

#### Nitrate:

- In new aquariums the nitrate level can gradually climb as the biological filter becomes established.
- A nitrate level of 40 ppm (mg/L) or less is recommended for freshwater aquariums. For saltwater aquariums, many marine aquarists prefer to keep the nitrate level as low as possible, especially when keeping invertebrates.

## Reducing Nitrite and Nitrate

### In Freshwater

- API NITRA-ZORB® will remove both nitrite and nitrate from freshwater aquariums. NITRA-ZORB is a very effective blend of resins in a rechargeable pouch. It will not only remove nitrite and nitrate, but ammonia as well.
- Partial water changes can help to reduce nitrite levels but may not reduce nitrate levels much, because tap water may contain up to 40 ppm (mg/L) nitrate. If your tap water contains nitrate, use the API TAP WATER FILTER to remove all pollutants, including nitrate, from the water in order to make the water changes effective. The TAP WATER FILTER turns any tap water into perfect aquarium water.
- Use API STRESS ZYME® to help speed up the development of the biological filter to reduce the level of nitrite.
- Use API AQUARIUM SALT to reduce the nitrite toxicity to the fish while the biological filter is removing the nitrite.

### In Saltwater

- Use API STRESS ZYME to help speed up the development of the biological filter to reduce the level of nitrate.
- Partial water changes help to reduce nitrite levels but may not reduce nitrate levels much, if tap water is used to make the saltwater. This is because tap water may contain up to 40 ppm (mg/L) nitrate. If your tap water contains nitrate, use the API TAP WATER FILTER to remove all pollutants, including nitrate, from the water in order to make the water changes effective.

### Note:

API NITRITE/NITRATE TEST STRIPS measures Nitrite from 0 - 10.0 ppm (mg/L) in 6 increments: 0, 0.5, 1.0, 3.0, 5.0 and 10.0 ppm (mg/L) and Nitrate from 0 to 200 ppm (mg/L) in 6 increments: 0, 20, 40, 80, 160 and 200 ppm (mg/L). For more precise, low range Nitrite readings, use API NITRITE TEST KIT, which is a liquid reagent, and reads from 0 - 5 ppm (mg/L) in 6 increments: 0, 0.25, 0.5, 1.0, 2.0 and 5.0 ppm (mg/L). For more precise low range Nitrate readings, use API NITRATE TEST KIT, which reads from 0 - 160 ppm (mg/L) in 7 increments: 0, 5, 10, 20, 40, 80 and 160 ppm (mg/L).