

# water quality

## *what is water quality?*

Water quality deals with the balance of chemicals and minerals in your aquarium water. Good water quality is an essential factor in maintaining new or established aquariums. Poor water quality stresses fish, which leaves them susceptible to disease and possibly death. Below are some of the important components of water quality and how they work together.

### **Temperature:**

Water temperature is an important part of maintaining water quality and keeping fish healthy. The temperature of the water in an aquarium should be within the appropriate range for the species you selected. Fish are more stressed and susceptible to disease when exposed to a higher or lower than usual temperature for an extended period of time, or when exposed to a temperature change greater than 2 to 3 degrees within a 24-hour period.

During power outages, the temperature of an aquarium can drop rapidly. To retain heat, wrap the aquarium with a blanket.

### **Ammonia:**

Ammonia ( $\text{NH}_3$ ) is produced when fish waste, organic matter and uneaten food break down. Ammonia is very toxic to fish and is converted into nitrite by nitrogen-fixing *Nitrosomonas* bacteria.

### **Nitrite:**

Nitrite ( $\text{NO}_2$ ) is also very toxic to fish, although slightly less harmful than ammonia. Nitrite is converted into nitrate by *Nitrobacter* bacteria.

### **Nitrate:**

Nitrate ( $\text{NO}_3$ ) is relatively harmless to fish,



Developed with and approved by a qualified veterinarian.

unless fish are exposed to high concentrations. In the wild, plants use nitrate as fertilizer and complete the cycle by releasing oxygen into the water. Nitrate levels in most aquariums can be controlled with regular water changes.

### **pH:**

The pH scale measures pH levels from one to 14. Seven is the neutral pH level, where the water is neither acid nor alkaline. As the scale goes down, water becomes more acidic, and as the scale goes up, water becomes more alkaline. The pH scale is logarithmic; every pH level is 10 times that of the previous level. Even a small change in pH levels on the scale represents a large change in the water chemistry.

pH levels in your aquarium should match the pH levels required by the fish in the aquarium. Keep pH levels as constant as possible. Rapid changes in pH can cause stress and even death. Fish are more stressed and susceptible to disease when exposed to a change in pH greater than 0.3 in a 24-hour period.

### **Water hardness:**

Water hardness is the measurement of minerals dissolved in the water. Hard water has high levels of dissolved minerals and is usually high in pH. Soft water has low levels of dissolved minerals and is usually low in pH. In soft water, pH levels can change rapidly, but pH levels in hard water tend to be more stable.

If you need to change pH levels because you have extremely hard or soft water, Petco sells commercial products to aid in adjusting pH levels. Ask a store partner for details.

### **Chlorine and chloramine:**

Municipalities add chlorine and chloramine to tap water to kill bacteria that are toxic to fish. You can remove chlorine and chloramines from water with a standard chemical dechlorinator. Several chemical dechlorinators that treat chlorine and chloramines are available at Petco.

**Copper:**

The copper levels in your existing tap water should be close to zero, which will not harm your fish. However, in large amounts, copper is toxic to invertebrates and can be toxic to fish. If you own a house with copper plumbing, you should be aware that copper could leach into the water supply. If you think you may have a concern with copper, buy a test kit. Chemical copper removers or reverse osmosis can remove copper, or you can find another water source for your aquarium.

**Specific gravity:**

If you have a brackish or saltwater aquarium, it is important to maintain proper specific gravity levels. Otherwise, your beautiful fish will become stressed and susceptible to disease or death. Specific gravity is commonly measured with a hydrometer. Check the specific gravity levels recommended for your species of fish and maintain those levels.

**Water test kit:**

Maintaining a healthy aquarium involves regular water quality checks. During the initial setup, water tests should be performed every couple of days. After ammonia and nitrite levels have reached zero and nitrate levels are within acceptable limits, water tests should be performed at least once a week. Poor water quality is the major cause of stress and disease in aquarium life. If fish look stressed or ill, test water quality immediately.

Following are basic items that should be included in test kits. Every aquarium should be tested for pH, ammonia, nitrite and nitrate levels. Brackish and saltwater need to be tested for specific gravity levels.

- Ammonia
- pH
- Nitrite
- Nitrate
- Specific gravity

**Note: Individual test kits are available that include instructions on how to test and adjust water quality.**

**Biological filtration:**

Biological filtration occurs when beneficial bacteria convert ammonia into nitrites, and nitrites into nitrates. This process is called biological filtration because bacteria are required to complete this process. This process is also called the nitrogen cycle. When starting a new aquarium, ammonia and nitrites build up before they are processed by beneficial bacteria (sometimes called New Tank Syndrome).

**Mechanical filtration:**

Mechanical filtration occurs when waste and debris suspended in the water are removed by passing them over materials that capture small particles (such as synthetic foam or nylon fiber floss). The mechanical filter can also serve as a home for beneficial bacteria, making it the medium for the aquarium's biological filtration as well.

**Chemical filtration:**

Chemical filtration is the removal of dissolved substances from the water using media such as carbon.