



# Water Quality Test Descriptions

## DISSOLVED OXYGEN (DO)

### **What is it?**

The DO test measures the amount of oxygen dissolved in the water. DO is consumed by both plants and animals during respiration. Different types of fish and other organisms are individually tolerant to different levels of DO. DO is increased by plants during photosynthesis, bubbles, and cold temperatures.

**Sources of Pollution:** A large drop in DO could be the result of introduction of organic matter such as leaf litter, grass clippings, sewage, runoff from feedlots, etc., which requires large amounts of oxygen for decomposition by bacteria.

*Expected Levels:* 4.0 to 12.0 milligrams/liter ( mg/L)

## NITRATE

### **What is it?**

Nitrogen is necessary for growth of all living organisms. In water, nitrogen occurs in many states such as nitrate and combinations with other elements.

**Sources of Pollution:** Human and animal wastes, industrial pollutants and nonpoint source runoff from heavily fertilized croplands and lawns.

**Problem:** Too much nitrate causes an increase in algae growth which can eventually lead to decreases in dissolved oxygen and subsequent fish kills (as the bacteria associated with the decomposition of organic material consumes oxygen from the water).

*Expected Levels:* 0.01 mg/L to 1.0 mg/L

## E. coli

### **What is it?**

*E. coli* is a species of fecal coliform bacteria that is specific to fecal material from humans and other warm-blooded animals. These bacteria are used as indicators of other pathogenic or disease-causing viruses and bacteria in the water.

**Sources of Pollution:** Untreated sewage, leaking sewer lines or septic tanks, application of partially treated wastewater as fertilizer, or animal wastes

**Problem:** causes humans to become sick

*Safe levels for Recreation:* <394 colonies/100 ml (for swimming in Texas waters)

## TOTAL DISSOLVED SOLIDS (TDS)

### What is it?

TDS measures the amount of solids dissolved in water too small to be filtered. An example of a dissolved solid is salt. Included in these dissolved solids are ions that are important to the internal water balance in aquatic organisms.

**Sources of pollution:** High TDS readings can be the result of industrial pollution or of water running off of streets, buildings, and parking lots (urban runoff). Heavy rainfalls can also dilute these solids, resulting in lowered TDS levels.

*Expected Levels:* 300-700 mg/L

## pH

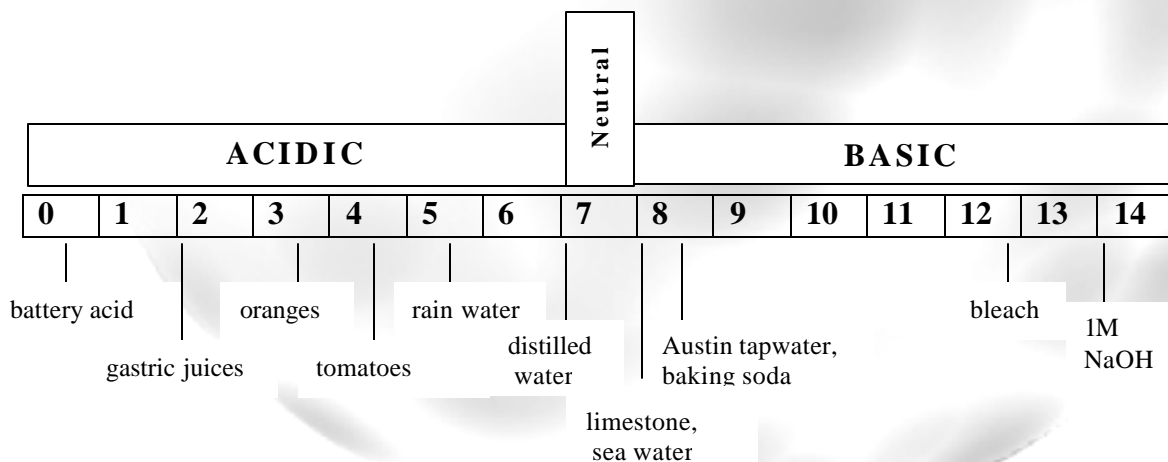
### What is it?

The pH test measures the hydrogen ion (H<sup>+</sup>) and hydroxide ion (OH<sup>-</sup>) concentration of the water on a scale of 0 to 14. A pH of 7 is neutral (ion concentrations are equal), below 7 is acidic (more H<sup>+</sup> than OH<sup>-</sup>), and above 7 is basic or alkaline (more OH<sup>-</sup> than H<sup>+</sup>).

**Sources of Pollution:** Acid rain, human activities such as accidental spills, agricultural runoff (pesticides, fertilizers, animal wastes), and sewer overflows may change the pH. Limestone soils act to neutralize these acids and often result in a more basic pH.

**Problem:** While many insect larvae and young fish are sensitive to a low pH (acidic), extreme values on either end of the scale can be lethal to most organisms.

*Expected Levels:* 6.5-9.0 standard units



## WATER TEMPERATURE

The rates of biological and chemical processes depend on temperature.

Temperature affects the oxygen content of water (oxygen levels become lower as temperature increases); the rate of photosynthesis by aquatic plants; the metabolic rates of aquatic organisms; and the sensitivity of organisms to toxic wastes, parasites, and diseases.

Typical causes of water temperature changes include: water with high levels of suspended particles (see TDS), industries discharging water used to cool machinery, streams with no vegetation to shade them from the hot Texas sun, stormwater running off of hot streets, sidewalks and parking lots.

Thermal pollution is a way that the temperature of water can increase. Thermal pollution is an increase in water temperature caused by adding relatively warm water to a body of water. Thermal pollution can come from stormwater running off warmed urban surfaces (streets, sidewalks, parking lots) and industries that discharge warm water from their facilities that was used to cool machinery.

## EXPECTED VALUES

*for Aquatic life:*

**D.O.** 5-12 mg/L (higher in late afternoon)

**Nitrate Nitrate nitrogen:** <1.0 mg/L- except after heavy rains, then up to 3.0 mg/L

**Phosphorus:** <1.0 mg/l except after heavy rains, then up to 3.0 mg/L

**pH:** 6.5-9.0 standard units

**TDS:** 150-500 mg/L

**Water Temperature:** maximum 32 to 35 °C

*for Recreation:*

**Fecal coliform bacteria** <400 colonies/100ml

***E. coli*** <394 colonies/100 ml (Texas standard for a single sample)