WATER TREATMENT
Glossary of Terms and Definitions

Acid. Chemicals such as muriatic acid or sodium bisulfate used to lower pH for alkalinity.
Acid Demand. A measure of the amount of acid required to reduce pH to a predetermined level. This can be accomplished by use of an acid filtration procedure (Acid Demand Test).
Activated Carbon. Granulated active carbon used to remove tastes, odor, chlorine, chloramines and some organics from water. Carbon is the preferred treatment for a large percentage of water contaminants.
Adsorb. The process by which molecules or colloids physically adhere to the surfaces of solids. Filter carbon adsorbs organic chemicals.
Aeration. The process of adding air to a water supply for the purpose of oxidation. Aeration is frequently used to remove iron and hydrogen sulfide.
Algae. Plant-like organisms which grow in water.
Alkalinity. See **Total Alkalinity**.
Anion. Negatively charged ion.
Aquifer. Any geological formation containing water; one that supplies water for wells, springs, etc.
Backwash. Reverse of a solution's flow through a system. Often used as a cleansing mechanism in sand and dual media filters. Backwashing cleans and resettles the filter bed.
Bacteria. Disease-potential organisms requiring control by sanitizing agents. Any of a class of microscopic plants having round, rod-like spiral or filamentous single cell or noncellular bodies, often aggregated into colonies or mobile by means of flagella. Living in soil, water, organic matter or the bodies of plants and animals and being autotrophic (self-generative), saprophytic (digests chemicals already present in their environment) or parasitic.
Bactericide. Material capable of inhibiting or destroying bacteria.
Balanced Water. Water that is neither corrosive nor scaling (in relation to pH, total alkalinity, calcium hardness, and temperature factors). The Langelier Index for perfectly balanced water equals zero.
Base Demand. A measure of the amount of alkali material required to raise pH to a predetermined level. This can be accomplished by use of a base titration procedure (Base Demand Test).
Blinding. The fouling or plugging of pores in a membrane, usually a gel-like substance.
Bromine. Chemical sanitizer that kills bacteria and algae.
Buffer. Chemical that resists pH change, e.g. sodium bicarbonate.

Calcium Hardness. A measure of the calcium salts dissolved in water.
Cation. Positively charged ion. Sodium and calcium are prominent cations in water.
Chemical Solution Feeder. A pump used to meter chemicals such as chlorine or polyphosphate into a water supply.
Chloramine. A combination of free chlorine and ammonia gas that retains its bactericidal qualities for a longer time than does free chlorine. It is less effective than chlorine as a disinfectant, but is often used because it reduces the harmful by-product chemicals produced by free chlorine. It is becoming more common as the standard disinfectant used by municipal water supplies. In general, it is more difficult to remove from water than free chlorine.
Chlorine. Chemical sanitizer that kills bacteria and algae. A very toxic biocide. A halogen element isolated as a heavy irritating greenish-yellow gas of pungent odor used especially as a bleach, oxidizing agent and a disinfectant in water purification.
Chlorine, Combined. The reaction product of chlorine with ammonia or other pollutants; also known as chloramines.
Chlorine Demand. Amount of chlorine required to react on various water impurities before a residual is obtained.
Chlorine, Free. Chlorine available to kill bacteria or algae. Chlorine that has not combined with other substances in water.
Colloid. Material of very fine particle size, usually between 10-7 cm in diameter.
Colloidal-matter. A gelatinous or mucinous substance suspended in water that can pass through even the finest sediment filter.
Compaction. Decline in flux as a result of applied pressure compressing a reverse osmosis or ultrafiltration membrane.
Concentrate. The portion of a feed stream that retains the ions, organics and suspended particles that were rejected during the crossflow filtration process. (In other words, the rinse water from a reverse osmosis unit.)
Condensate. Water obtained through evaporation and subsequent condensation.
Contaminant. Object that is a source of contamination.
Crossflow. A precise separation of the components of a fluid by semi-permeable membrane through the application of pressure and flow.
Cyanuric Acid. Chemical used to prevent the decomposition of chlorine by ultra-violet (UV) light.
DI (Deionization). Uses ion exchange resin to remove salts from water.
Demineralization. The process of removing minerals from water, e.g. deionization, reverse osmosis and distillation.
Disinfection. Destruction of bacteria in a water supply or distribution system.
Dissolved Solids. Includes colloidal and small suspended particles. Size is less than 1.2 in diameter.

Distillation. Steam from boiling water is condensed on a cool surface, collected and stored. Most contaminants do not vaporize and therefore do not pass to the condensate. Removes nearly 100 percent of salts and those organics that do not have a vaporizing temperature near or below that of water.
Effluent. The output stream exiting the system-often the waste stream.
Element. A basic building block of the system. Often used in reference to membrane element; part of system containing the membrane for use in separations.
Feed. The input solution to a system.
Filter Cube. The accumulate particles on a filter surface.
Filtrate. The portion of the feed stream that has passed through the membrane.
Flocculent Chemical which, when added to water, causes particles to coagulate into larger groupings (flogs), which settle from the water.
Flux. The membrane throughput, usually expressed in volume per unit time, such as "gpd.".
GPD. Gallons per day.
GPG. Grains per gallon. Equal to 17.1 mg/l. This is the most common measurement for hardness.
Ground Water. Water confined in semipermeable rock layers. Well water, in other words.
Hardness. The concentration of calcium and magnesium salts in the water.
Heavy Metals. Metals having a high density or specific gravity. A generic term used to classify contaminants such as cadmium, lead and mercury.
Hydrogen Sulfide. A toxic gas (H2S) that is detectable by a strong "rotten egg" odor.
Hydrologic Cycle. The term used to describe how water travels through the environment by evaporation, condensation and precipitation.
Ion Exchange. A chemical reaction in which ions are exchanged in solution. Water softening and deionization are common applications of ion exchange.
Langelier Index. A mathematically-derived factor obtained from the values of calcium hardness, total alkalinity, and pH at a given temperature. A Langelier Index of zero indicates perfect water balance (i.e., neither corroding nor scaling).
Magnesium Hardness. A measure of the magnesium salts dissolved in water. It is not a factor in water balance.
Membrane. Polymer film utilized as the semipermeable separation mechanism in reverse osmosis, ultrafiltration and microfiltration.
mg/L. Milligrams per liter. Equivalent to parts per million (PPM)
Micron. 10-4 centimeters. 25.4 microns = 0.001 inch = one mm. The most common measurement of filter size.
Microsiemens. Basically, a measurement of water conductivity and therefore a way to state "parts per million" of total dissolved solids. In general terms, 1.4 microsiemens =

1ppm (parts per million) of dissolved solids. However, for calcium carbonate the relationship is 2.0 microsiemens = 1 ppm of calcium carbonate.
Module. The membrane element combined with membrane element housing.
Muriatic Acid. An acid used to reduce pH and alkalinity. Also used to remove stain and scale.
Nominal. When used in reference to micron rating of cartridge filters, refers to an approximate size particle that will not pass through a filter. Thus, a nominal one-micron filter is one that gets most of the particles larger than one micron. See also **Absolute.**
Osmosis. The spontaneous flow of water from a less concentrated solution to a more concentrated solution through a semipermeable membrane occurring until energy equilibrium is achieved.
Osmotic Pressure. Measurement of the potential energy difference between the solutions on either side of a semipermeable membrane.
Oxidizing Filters. Filters that use a catalytic media, such as manganous oxides, to oxidize iron, manganese and other impurities from water.
Ozone. A form of oxygen used to disinfect water.
Particulate. Minute, separate particles.
Permeable. Allowing some material to pass through.
Permeate. The portion of the feed stream that passes through the membrane. This term is applied to the "product water" of a reverse osmosis unit--the finished water that you drink.
pH. A measure of the acidity of water. The pH scale runs from 0 to 14 with 7 being the mid-point or neutral. A pH of less than 7 is on the acid side of the scale with 0 as the point of greatest acid activity. A pH of more than 7 is on the basic (alkaline) side of the scale with 14 as the point of greatest basic activity.
pH of Saturation. The ideal of pH for perfect water balance in relation to a particular total alkalinity level and a particular calcium hardness level, at a particular temperature. The pH where the Langelier Index equals zero.
Phenol Red. Chemical reagent used for testing pH in the range of 6.8 - 8.4.
Polymers. A chemical compound with many repeating structural units.
Pore. An opening in a membrane which allows certain components to pass through, but not others.
Porous. A material which allows certain substances to pass through its pores.
PPB. Parts per billion.
PPM. Parts per million.
PSI. Pounds per square inch (pressure).
Regeneration. Is carried out using either an acid or alkali to remove the accumulated actions or anions, respectively. At the same time, the action exchanger takes on hydrogen ions to restore themselves to the original hydrogen or hydroxide form,

respectively. Regeneration refers to the process by which an ion exchanger (like a water softener) renews its ability to do its job.

Rejection. Material not being allowed to pass through a membrane. This is what a reverse osmosis unit does: it "rejects" contaminants and does not allow them to enter the permeate, or product water.

Resin. Specially manufactured polymer beads used in the ion exchange process to remove dissolved salts from water.

Reverse Osmosis. The separation of one component of a solution from another component by means of pressure exerted on a semipermeable membrane. Utilizes membrane pore sizes from 5A to 20A. Reverse osmosis is a popular and effective drinking water treatment that reduces "dissolved solids" that are often not filterable by other means.

Scale. Crust of calcium carbonate, the result of unbalanced pool water. In general, it refers to calcium buildup in pipes or the interior of appliances like hot water heaters.

Semipermeable. Able to allow certain size material to pass through while rejecting other size material. A reverse osmosis unit uses a semipermeable membrane.

Soda Ash. Chemical used to raise pH and total alkalinity (sodium carbonate).

Sodium Bisulfate. Chemical used to lower pH and total alkalinity (dry acid).

Soft Water. Water containing less than 17 PPM calcium or magnesium.

Solute. Dissolved particles in a solvent.

Stabilizer. See Cyanuric Acid.

Superchorination. Application of large dosages of chlorine to destroy build-up of undesirable compounds in water.

Suspended Solids. Includes settleable particles less than 1.2 in diameter.

Titration. A method of testing by adding a reagent of known strength to a water sample until a specific color change indicates the completion of the reaction.

Total Alkalinity. A measure of the acid neutralizing capacity of water which indicates its buffering ability, i.e., measure of its resistance to a change in pH. Generally, the higher the total alkalinity, the greater the resistance to pH change.

Total Dissolved Solids. The accumulated total of all solids that might be dissolved in water.

Turbidity. Muddy, clouded, stirred-up sediment, silt, clay, etc.

Ultrafiltration Separation of one component of a solution from another component by means of pressure exerted on a semipermeable membrane. Utilizes membrane pore sizes from 1 OA to 0.1.

Ultraviolet Disinfection. The use of ultraviolet light to destroy bacteria.

Zebra. A horse-like animal with stripes. Zebras have nothing to do with water, except that they drink a lot of it, but we felt we had to have something in this list that starts with Z so you would know that this is the end.