ACID
A substance which releases hydrogen ions when dissolved in water. Most acids will dissolve the common metals, and will react with a base to form a neutral salt and water.

ACTIVATED CARBON
A granular material usually produced by the roasting of cellulose base substances, such as wood or coconut shells, in the absence of air. It has a very porous structure and is used in water conditioning for Dechlorination and as an adsorbent for organic matter and certain dissolved gases. Sometimes called "activated charcoal."

ABSORBENT
A substance which has the capacity to adsorb.

ADSORPTION
The process in which matter adheres to the surface of an adsorbent.

ALKALINITY
The quantitative capacity of water or water solution to neutralize an acid. It is usually measured by titration with a standard acid solution of sulfuric acid, and expressed in terms of its calcium carbonate equivalent. A moderate amount of Alkalinity in your water is desirable because it reduces the effect of corrosion. The EPA has not set a level for Alkalinity, but a level greater than 100 ppm is recommended.

ALUMINUM
Aluminum can be found as a natural forming mineral or as a by product of water that is corrosive or aggressive. Aluminum in the water may cause a discoloration or cloudy appearance. The EPA maximum contaminant level for aluminum in water is 0.2ppm.

ANION
A negatively charged ion in solution, such as bicarbonate, chloride, or sulfate.

ANION EXCHANGE
An ion exchange process in which anions in solution are exchanged for other anions from an ion exchanger. In

demineralization, for example, bicarbonate, chloride, and sulfate anions are removed from solution in exchange for a chemically equivalent number of hydroxide anions from the anion exchange resin.

AQUIFER
A layer or zone below the surface of the earth which is capable of yielding a significant volume of water.

ATOM
The smallest particle of an element that can exist either alone or in combination with similar particles of the same element or a different element.

ATTRITION
The process in which solids are worn down or ground down by friction, often between particles of the same material. Filter media and ion exchange materials are subject to attrition during backwashing, regeneration, and service.

BACKWASH
The process in which beds of filter or ion exchange media are subjected to flow opposite to the service direction to loosen the bed and to flush suspended matter (collected during the service run) to waste.

BACTERIA
Unicellular micro-organisms which typically reproduce by cell division. Although usually classified as plants, bacteria contain no chlorophyll.

BASE
A substance which releases hydroxyl ions which when dissolved in water. Bases react with acids to form a neutral salt and water.

BED
The ion exchange or filter media in a column or other tank or operational vessel.

BED DEPTH
The height of the ion exchange or filter media in the vessel after preparation for service.

BICARBONATE ALKALINITY

The alkalinity of a water due to the presence of bicarbonate ions (HCO_3 -).

BIOCHEMICAL OXYGEN DEMAND
The amount of oxygen consumed in the oxidation of organic matter by biological action under specific standard test conditions. Widely used as a measure of the strength of sewage and waste water.

BRINE
A strong solution of salts(s), such as the sodium chloride brine used in the regeneration of ion exchange water softeners; also applied to the mixed sodium, calcium, and magnesium chloride waste solution from regeneration.

CALCIUM
One of the principal elements making up the earth's crust; its compounds, when dissolved, make the water hard. The presence of calcium in water is a factor contributing to the formation of scale and insoluble soap curds which are a means of clearly identifying hard water.

CALCIUM MAGNESIUM
Two of the principal elements making up the earth's crust; its compounds, when dissolved, make the water hard. The presence of calcium and magnesium in water is a factor contributing to the formation of scale and insoluble soap curds which are a means of clearly identifying hard water.

CAPACITY
An expression of the quantity of an undesirable material which can be removed by a water conditioner between servicing of the media (i.e., cleaning, regeneration or replacement), as determined under standard test conditions. For ion exchange water softeners, the capacity is expressed in grains of hardness removal between successive regeneration's and is related to the pound of salt used in regeneration. For filters, the capacity may be expressed in the length of time or total gallons delivered between servicing.

CARBONATE

The CO_3^{2-} ion.

CARBONATE ALKALINITY
Alkalinity due to the presence of the carbonate ion.

CARBONATE HARDNESS
Hardness due to the presence of calcium and magnesium bicarbonates and carbonates in water; the smaller of the total hardness and the total alkalinity.

CARBON DIOXIDE
A gas present in the atmosphere and formed by the decay of organic matter; the gas in carbonated beverages; in water it forms carbonic acid.

CATION
An ion with a positive electrical charge, such as calcium, magnesium and sodium.

CATION EXCHANGE
Ion exchange process in which cations in solution are exchanged for other cations from an ion exchanger.

CAUSTIC
Any substance capable of burning or destroying animal flesh or tissue. The term is usually applied to strong bases.

CAUSTIC SODA
The common name for sodium hydroxide.

CHELATE
To form a complex chemical compound in which an ion, usually metallic, is bound into a stable ring structure.

CHELATING AGENT
A chemical compound sometimes fed to water to tie up undesirable metal ions, keep them in solution, and eliminate or reduce the normal effects of the ion.

CHEMICAL OXYGEN DEMAND
The amount of matter, both organic and inorganic, in a water or waste water which can be oxidized by boiling with a strong oxidizing acid under standard test conditions and expressed as the equivalent amount of

oxygen; often used as a measure of the strength of sewage and waste water; includes materials not oxidized in the BOD test, and thus does not correlate with BOD.

CHLORIDE
Chloride is a natural forming mineral found in water. High levels of chloride can impact taste and also be associated with corrosion or high Sodium content. Water with excessive amounts of chloride can be very toxic to most plants. The EPA maximum contaminant level for chloride is 250ppm.

CHLORINE
A gas, $C1_2$, widely used in the disinfection of water and an oxidizing agent for organic matter, manganese, iron, etc. Chlorine is known to react with organic matter in the water to form Trihalomethanes (THM's), a suspected carcinogen.

CHLORINE DEMAND
A measure of the amount of chlorine which will be consumed by organic matter and other oxidizable substances in a water before a chlorine residual will be found; the difference between the total chlorine fed and the chlorine residual.

COAGULANT
A material, such as alum, which will form a gelatinous precipitate in water, and cause the agglomeration of finely divided particles into larger particles which can then be removed by settling and/or filtration.

COAGULANT AID
A material which is not a coagulant, but which improves the effectiveness of a coagulant, often by forming larger or heavier particles, speeding the reactions, or permitting reduced coagulant dosage.

COAGULATION
The process in which very small, finely divided solid particles, often colloidal in nature, are agglomerated into larger particles.

COLLOID
Very finely divided solid particles which will not settle out of a solution; intermediate between a true dissolved

particle and a suspended solid which will settle out of solution. The removal of colloidal particles usually requires coagulation to form larger particles which may be removed by sedimentation and/or filtration.

COMPENSATED HARDNESS
A calculated value based on the total hardness, the magnesium to calcium ratio, and the sodium concentration of a water. It is used to correct for the reductions in hardness removal capacity caused by these factors in cation exchange water

CONDUCTANCE
A measure of the ability of a solution to carry electricity; the reciprocal of the electrical resistance. The unit of conductance is the mho (reciprocal ohm).

CONDUCTIVITY
The quality or power to carry electrical current; in water, the conductivity is related to the concentration of ions capable of carrying electrical current.

COPPER
Copper in water is a common problem in many households. Copper is present due to the corrosion of plumbing materials from Acidic (low pH) or Aggressive water (low TDS). Common problems associated with copper due corrosion are leaks in the plumbing system or blue-green staining. High copper content can also cause some health concerns by effecting the stomach and intestines. The EPA has set a maximum contaminant level of 1.3ppm.

CORROSION
The destructive disintegration of a metal by electrochemical means.

CYCLE
A series of events or steps which ultimately lead back to the starting point, such as the exhaustion-regeneration cycle of an ion exchange system; sometimes incorrectly used in reference to a single step of a complete cycle.

DEIONIZATION
The removal of all ionized minerals and salts (both organic and inorganic) from a solution by a two-phase

ion exchange procedure. First, positively charged ions are exchanged for a chemically equivalent amount of hydrogen ions. Second, negatively charged ions are removed by an anion exchange resin for a chemically equivalent amount of hydroxide ions. The hydrogen and hydroxide ions introduced in this process unite to form water molecules. The term is often used interchangeably with demineralization.

DEMINERALIZATION
The removal of ionized inorganic minerals and salts (not organic materials) from a solution by a two-phase ion exchange procedure; similar to deionization, and the two terms are often used interchangeably.

D.I. OR DI
Abbreviation for deionization.

DIALYSIS
The separation of components of a solution by diffusion through a semi-permeable membrane which is capable of passing certain ions or molecules while rejecting others.

DIFFERENTIAL PRESSURE
The difference in pressures at two points in a water system; may be due to differences in elevation, or to friction losses or pressure drops due to resistance to flow in pipes, softeners, filters or other devices.

DISINFECTION
A process in which pathogenic (disease-producing) bacteria are killed; may involve disinfecting agents such as chlorine, or physical processes such as heating.

DISSOLVED SOLIDS
The weight of matter in true solution in a stated volume of water; includes both inorganic and organic matter; usually determined by weighing the residue after evaporation of the water at 105 or 1800C.

DISTILLATION
The process in which a liquid, such as water, is converted into its vapor state by heating, and the vapor cooled and condensed to the liquid state and collected; used to remove solids and other impurities from water;

multiple distillations are required for extreme purity.

EFFICIENCY
The ratio of output per unit input; the effectiveness of performance of a system; in an ion exchange system, often expressed as the amount of regenerant required to produce a unit of capacity, such as the pounds of salt per kilograin of hardness removal.

ELECTRODIAYSIS
A process in which a direct current is applied to a cell to draw charged ions through ion-selective semi-permeable membranes, thus removing the ions from the solution.

ENDPOINT
The point at which a process is stopped because a predetermined value of a measurable variable is reached; the endpoint of an ion exchange water softener service run is the point at which the hardness of the softener effluent increases to a predefined concentration, often 1.0 grain per gallon; the endpoint of a filter service run may be the point at which the pressure drop across the filter reaches a predetermined value; the endpoint of a titration is the point at which the titrant produces predetermined color change, pH value, or other measurable characteristic.

EQUIVALENT PER MILLION
A unit of concentration used in chemical calculations, calculated by dividing the concentration in ppm or mg/L by the equivalent weight.

EXHAUSTION
The state of an ion exchange material in which it is no longer capable of effective functioning due to the depletion of the initial supply of exchangeable ions; the exhaustion point may be defined in terms of a limiting concentration of matter in the effluent, or in the case of demineralization, in terms of electrical conductivity.

FILTER
Specifically, a device or system for the removal of solid particles (suspended solids); in general, includes mechanical, adsorptive, oxidizing and neutralizing filters.

FIXTURE UNIT
An arbitrary unit assigned to different types of plumbing fixtures, and used to estimate flow rate requirements and drain capacity requirements.

FLOCCULATION
The agglomeration of finely divided suspended solids into larger, usually gelatinous, particles; the development of a "floc" after treatment with a coagulant by gentle stirring or mixing.

FLOW CONTROL
A device designed to limit the flow of water or regenerant to a predetermined value over a broad range of inlet water pressures.

FLUORIDATION
The quantity of water or regenerant which passes a given point in a specified unit of time, often expressed in gallons per minute.

FLUORIDE
Fluoride can be found in water as natural mineral or as an additive to public or municipal supplies. Fluoride can cause a discoloration or teeth known as Fluorosis when in excessive levels in water. The EPA maximum contaminant level for Fluoride in water is 2.0ppm.

FLUSH TANK
A tank or chamber in which water is stored for rapid release to flush a toilet or water closet.

FLUSH VALVE
A self-closing valve designed to release a large volume of water when tripped, to flush a toilet or water closet.

FOULING
The process in which undesirable foreign matter accumulates in a bed of filter media or ion exchanger, clogging pores and coating surfaces, thus inhibiting or retarding the proper operation of the bed.

FREE AVAILABLE CHLORINE
The concentration of residual chlorine present as dissolved gas, hypochlorous avid or hypochlorite, not combined with ammonia or in other less readily

available forms.

FREEBOARD
The vertical distance between a bed of filter media or ion exchange material and the overflow or collector for backwash water; the height above the bed of granular media available for bed expansion during backwashing; may be expressed either as a linear distance or a percentage of bed depth.

GPG
Abbreviation for grains per gallon.

GRAIN
(gr.) A unit of weight equal to 1/7000th of a pound, or 0.0648 gram.

GRAIN PER GALLON
(gpg) A common basis for reporting water analyses in the United States and Canada; one grain per U.S. gallon equals 17.12 milligrams per liter (mg/L) or parts per million (ppm). One grain per British (Imperial) gallon equals 14.3 milligrams per liter or parts per million.

GRAM
(g) The basic unit of weight (mass) of the metric system, originally intended to be the weight of one cubic centimeter of water at $4^{o}C$.

GREENSAND
A natural mineral, primarily composed of complex silicates, which possesses ion exchange properties.

HARDNESS
A characteristic of natural water due to the presence of dissolved calcium and magnesium; water hardness is responsible for most scale formation in pipes and water heaters and forms insoluble "curd" when it reacts with soaps. Hardness is usually expressed in grains per gallon, parts per million, or milligrams per liter, all as calcium carbonate equivalent.

HARDNESS CONTENT
Hardness is a measurement of naturally occurring dissolved minerals Calcium and Magnesium, hard water can inhibit the sudsing of detergents and soaps. Hard

water can scale pipes and decrease the life of appliances such as washing machines, dishwashers, coffee makers. Hardness can also cause spotting of fixtures, tiles, dishes, or glassware. The EPA has not set a limit for hardness, but if your hardness is greater than 7 grains per gallon (gpg) then you should consider installing a water softener.

HARDNESS LEAKAGE
The presence of a consistent concentration of hardness in the effluent from an ion exchange water softener, often due to high concentrations of hardness or sodium in the water being treated (see Leakage).

HARD WATER
Water with a total hardness of one grain per gallon or more, as calcium carbonate equivalent.

HEAD
A measure of the pressure at a point tin a water system: expressed in pounds per square or in the height of a column of water which would produce the pressure.

HEAD LOSS
See Pressure Drop.

HYDRAULIC
Referring to water or other fluids in motion.

HYDRAULIC CLASSIFICATION
A process in which particles of the same specific gravity may be graded according to size by backwashing or other relative upward flow of water; the smallest particles tending to rise to the top of the bed, and the largest particles tending to sink to the bottom, due to variations in weight to surface area ratios.

HYDROGEN CYCLE
The cation exchange cycle in which the cation exchanger is regenerated with acid, and cations are removed from the solution treated in exchanged for hydrogen ions.

HYDROGEN ION CONCENTRATION
The concentrations of hydrogen ions in moles per liter

of solution; often expressed as pH (see pH).

HYDROLOGIC CYCLE
The water cycle, including precipitation of water from the atmosphere as rain or snow flow of water over or through the earth, and evaporation or transpiration to water vapor in the atmosphere. (see Transpiration).

HYDROLYSIS
The reaction of a salt with water to form an acid and a base.

HYDROXIDE
A chemical compound of an element or elements with the hydroxyl (OH) anion. (see Hydroxyl).

HYDROXYL
The chemical group or ion (OH) which is neutral or positively charged.

HYPOCHLORITE
The "OC1" anion; calcium and sodium hypochlorites are commonly used as bleaches and disinfecting agents.

ION
An atom or group of atoms which functions as a unit, and has a positive or negative electrical charge, due to the gain or loss of one or more electrons. (see Ionization).

ION EXCHANGE
A reversible process in which ions are released from an insoluble permanent material in exchange for other ions in a surrounding solution; the direction of the exchange depends upon the affinities of the ion exchanger for the ion present, and the concentrations of the ions in the solution. (see Base Exchange).

ION EXCHANGER
A permanent, insoluble material which contains ions that will exchange reversibly with other ions in a surrounding solution. Both cation and anion exchangers are used in water conditioning.

IONIZATION
The process in which atoms gain or lose electrons and

thus become ions with positive or negative charges; sometimes used as a synonym for dissociation, the separation of molecules into charged ion in solution.

IONIZATION CONSTANT
A constant, specific for each partially ionizable chemical compound to express the ratio of the concentration of ions from the compound to the concentrate of un-ionized compound.

IRON
An element often found discolored in ground water (in the form of ferrous iron) in concentrations usually ranging from zero to 10ppm (mg/L). It is objectionable in water supplies because it can effect water taste and cause unsightly colors produced when iron reacts with tannins in beverages such as coffee and tea. Iron causes staining after oxidation and precipitation, as ferric hydroxide (yellow, brown, and red on clothing, dishes, fixtures, and bathroom tile). Iron can also be found in a bacterial form which will appear as black or brown slime and can effect the odor of your water. Iron is a common water problem throughout the United States, it can be found in well water and municipal water. The EPA has set a maximum level for Iron of 0.3ppm in water, iron concentrations at this level or higher can cause staining.

IRON BACTERIA
Organisms which are capable of utilizing ferrous iron (either from the water or from steel pipe) in their metabolism and precipitating both ferric hydroxide in their sheaths and gelatinous deposits. These organisms tend to collect in pipe lines and tanks during periods of low flow, and to break loose in slugs of turbid water to create staining, taste, and odor problems.

JACKSON TURBIDITY UNIT (JTU)
A quantitative unit of turbidity originally based on the comparison of a liquid (such as water) with a suspension of a specify type of silica, using the turbidity measure in a Jackson Candle Turbidimeter.

KILO: A prefix used to indicate 1000 of the succeeding unit. (Kilo is also sometimes used as an abbreviation for

kilogram.)

KILOGRAIN (Kgr)
One thousand grains.

KILOGRAM (Kg)
One thousand grams.

LANGELIER'S INDEX
A calculated number used to predict whether or not a water will precipitate, be in equilibrium with, or dissolve calcium carbonate. It is sometimes erroneously assumed that any water which tends to dissolve calcium carbonate is automatically corrosive.

LEAD
Lead in drinking water is a common problem; it comes from lead pipes, solder, and brass fittings. Water that has a low pH or Total Dissolved Solids will provide corrosive properties that can leach from your plumbing system. Lead can cause learning and physical disabilities in children and also Hypertension in adults. The EPA action level for Lead is 0.015ppm.

LEAKAGE
The amount of contaminant or hardness remaining in water after filtering or other treatment.

LIME
The common name for calcium oxide (Ca); hydrated lime is calcium hydroxide [$Ca(OH)_2$].

LIME SCALE
Hard water scale containing a high percentage of calcium carbonate.

LIMESTONE
A sedimentary rock, largely calcium carbonate, usually also containing significant amounts of magnesium carbonate.

LITER
The basic metric unit of volume; 3.785 liters = one U.S. gallon. One liter of water weighs 1000 grams.

MAGNESIUM

One of the elements making up the earth's crust. Magnesium compounds, when dissolved in water, make the water hard. The presence of magnesium in water is a factor contributing to the formation of scale and insoluble soap curds.

MANGANESE
An element sometimes found in ground water, usually with dissolved iron but in lower concentrations. Manganese is a typical natural occurring mineral found in municipal and well water. Manganese effects the taste and the color or water. Manganese can also cause staining of clothes and dishware and black stains and other problems similar to iron. The EPA has determined that concentrations greater than 0.05ppm can cause these asethic problems.

MANGANESE GREENSAND
Greensand which has been processed to incorporate in its pores and on its surface the higher oxides of manganese. The product has a mild oxidizing power, and is often used in the oxidation and precipitation of iron, manganese and/or hydrogen sulfide, and in their removal from water.

MEDIA
The selected materials in a filter that form the barrier to the passage of certain suspended solids or dissolved molecules.

MEDIUM
Singular form of media.

MG/L
The abbreviation for milligrams per liter.

MICRON
A linear measure equal to one millionth of a meter.

MICRON RATING
The term applied to a filter to indicate the particle size of suspended solids that will be removed. As used in industry standards, this is an "absolute" not nominal rating.

MILLIGRAM PER LITER (mg/L)

A unit concentration of matter used in reporting the results of water and waste water analyses. In diluted water solutions it is practically equal to the part per million, but varies from the ppm in concentrated solution such as brine. As most analyses are performed on measured volumes of water the mg/L is a more accurate expression of the concentration, and is the preferred unit of measure.

MILLIMICRON
A unit of length equal to one thousandth of a micron, often used to express the wavelengths of colors of visible light in colorimetric analytical procedures. The symbol for the millimicron is "mu".

MINERAL
A term applied to inorganic substances (such as rocks and similar matter) found in the earth strata, as opposed to organic substances such as plant and animal matter. Minerals normally have definite chemical composition and crystal structure. The term is also applied to matter derived from minerals, such as the inorganic ions found in water. The term has been incorrectly applied to ion exchangers, even though most of the modern materials are organic ion exchange resins.

MOLE
The molecular weight of a chemical compound expressed in grams.

MOLECULE
The simplest combination of atoms that will form a specific chemical compound; the smallest particle of a substance which will still retain the essential composition and properties of that substance, and which can be broken down only into atoms and simpler substances.

MOST PROBABLE NUMBER (MPN)
The term used to indicate the number of organisms which, according to statistical theory, would be most likely to produce the results observed in certain bacteriological tests; usually expressed as a number in 100 ml of water.

NEGATIVE CHARGE

The electrical charge on an electrode or ion in solution due to the presence of an excess of electrons.

NEUTRAL
In electrical systems, the term used to indicate neither an excess nor a lack of electrons; a condition of balance between positive and negative charges. In chemistry, the term used to indicate a balance between acids and bases; the neutral point on the pH scale is 7.0, indicating the presence of equal numbers of free hydrogen (acidic) and hydroxide (basic) ions.

NEUTRALIZATION
In general, the addition of either and acid or a base to a solution as required to produce a neutral solution. The use of alkaline or basic materials to neutralize the acidity of some waters is a common proactive in water conditioning.

NITRATE NITROGEN
Nitrates are commonly found in well water from agricultural areas. It comes from fertilizers, industrial wastes, septic systems, and animal wastes. High amounts of nitrate effect the bloods ability to carry oxygen. Most susceptible are infants where nitrate poisoning can cause death by a health diagnosis known as "The Blue Baby Syndrome." The EPA has a set maximum contaminant level of 10ppm for Nitrate Nitrogen.

NONCARBONATE HARDNESS
Water hardness due to the presence of compounds such as calcium and magnesium chlorides, sulfates or nitrates; the excess of total hardness over total alkalinity.

OPERATING PRESSURE
The range of pressure, usually expressed in pounds per square inch, over which a water conditioning device or water system is designed to function.

OSMOSIS
A process of diffusion of a solvent (such as water) through a semi-permeable membrane which will transmit the solvent but impede most dissolved substances. The normal flow of solvent is from the

dilute solution to the concentrated solution.

OXIDATION
A chemical process in which electrons are removed from an atom, ion or compound. The addition of oxygen is a specific form of oxidation. Combustion is an extremely rapid form of oxidation, while the rusting of iron is a slow form.

PARTICLE SIZE
As used in industry standards, the size of a particle suspended in water as determined by its smallest dimension, usually expressed in microns.

PARTS PER MILLION (ppm)
A common basis for reporting the results of water and waste water analyses, indicating the number of parts by weight of a dissolved or suspended constituent, per million parts by weight or water or other solvent. In dilute water solutions, one part per million is practically equal to one milligram per liter, which is the preferred unit.

PATHOGEN
An organism which may cause disease.

PERMANENT HARDNESS
Water hardness due to the presence of the chlorides and sulfates of calcium and magnesium, which will not be precipitated by boiling. This term is largely replaced by "noncarbonate hardness."

pH
The reciprocal of the logarithm of the hydrogen ion concentration. The pH scale is from zero to 14, and 7.0 is the neutral point, indicating the presence of equal concentrations of free hydrogen and hydroxide ions. pH values below 7.0 indicate increasing acidity, and pH values above 7.0 indicate increasing base concentrations.

PORTABLE EXCHANGE
A term applied to water softeners and filters which are designed for connection to a water system with special fittings, and disconnection and transport to a central

station or plant for regeneration or servicing.

POSITIVE CHARGE
The electrical charge on an electrode or ion in solution due to the removal of electrons.

PPM
The abbreviation for part per million.

PRECIPITATE
To cause a dissolved substance to form a solid particle which can be removed by settling or filtering, such as in the removal of dissolved iron by oxidation, precipitation, and filtration. The term is also used to refer to the solid formed, and to the condensation of water in the atmosphere to form rain or snow.

PRESSURE DIFFERENTIAL
The difference in pressure between two points in a system due to differences in elevation and/or pressure drop due to flow.

PRESSURE DROP
A decrease in water pressure during flow due to internal friction between molecules of water, and external friction due to irregularities or roughness in surfaces past which the water flows.

RATED CAPACITY
The basis for calculating the number of gallons delivered by a water softener between regeneration's, or amount of time between servicing of a filter, as determined under specific test conditions.

RATED PRESSURE DROP
The pressure drop of a freshly regenerated and/or backwashed water softener or filter at the rated service flow, with clean water at a temperature of 60 F, as determined under standard test conditions.

RATED SERVICE FLOW
The manufacturer's specified maximum flow rate at which a water softener will deliver soft water, or a filter will deliver quality water (as specified for its type) as determined under standard test conditions. A manufacturer may also specify a minimum flow rate or

a range of service flows.

RATED SOFTENER CAPACITY
A water softener capacity rating based on grains of hardness removed while producing soft water between successive regeneration's, and related to the pounds of salt required for each regeneration as determined under standard test conditions.

RAW WATER
Untreated water, or any water before it reaches a specific water treatment device or process.

REDUCTION
A chemical process in which electrons are added to an atom, ion or compound.

RED WATER
Water which has a reddish or brownish appearance due to the presence of precipitated iron and/or iron bacteria.

REGENERANT
A solution of chemical compound used to restore the capacity of an ion exchange system. Sodium chloride brine is used as a regenerate for ion exchange water softeners; acids and bases are used as regenerants for the cation and anion resins used in demineralization.

REGENERATION
In general, includes the backwash, brine, and fresh water rinse steps necessary to prepare a water softener exchange bed for service after exhaustion. Specifically, the term may be applied to the "brine" step in which the sodium chloride solution is passed through the exchanger bed. The term may also be used for similar operations relating to demineralizers and certain filters.

REGENERATION LEVEL
The quantity of regenerant used in regeneration of an ion exchange unit or system, usually expressed in pounds per regeneration and/or pounds per regeneration per cubic foot of ion exchange.

RESIDUAL
The amount of a specific material remaining in the water following a water treatment process. May refer to

material remaining as a result of incomplete removal (see Leakage) or to material meant to remain in the treated water (see Residual Chlorine).

RESIDUAL CHLORINE
The amount of chlorine found in the water after treatment.

RESIN
Synthetic organic ion exchange material, such as the high capacity cation exchange resin widely used in water softeners.

REVERSE DEIONIZATION
The use of the anion exchange resin ahead of the cation exchange resin (the reverse of the usual order) in a deionization system.

REVERSE OSMOSIS
A process for the removal of dissolved ions from water, in which pressure is used to force the water through a semi-permeable membrane, which will transmit the water by reject most other dissolved materials.

SALINE WATER
Water containing an excessive amount of dissolved salts, usually over 10,000 mg/L.

SALT
The common name for the specific chemical compound sodium chloride, used in the regeneration of ion exchange water softeners. In chemistry, the term is applied to a class of chemical compounds which can be formed by the neutralization of an acid with a base.

SEQUESTER
A chemical reaction in which certain ions are bound into a stable, water soluble compound, thus preventing undesirable action by the ions.

SEQUESTERING AGENT
A chemical compound sometimes fed into water to tie up undesirable ions, keep them in solution, and eliminate or reduce the normal effects of the ions. For example, polyphosphates can sequester hardness and

prevent reactions with soap.

SILICA
Silica can be found in water as a natural forming mineral or an additive to public water supplies. Silica is not regulated by the EPA and does not cause any health concerns. However, silica can cause spotting of glassware, fixtures, and automobiles during the cleaning process.

SOAP
One of a class of chemical compounds which possesses cleaning properties, formed by the reaction of a fatty acid with a base or alkali. Sodium and potassium soaps are soluble and useful, but can be converted to insoluble calcium and magnesium soaps (curd) by the presence of these hardness ions in water.

SODA ASH
The common name for sodium carbonate, a chemical compound used as an alkaline builder in come soap and detergent formulations; to neutralize acid water,; and in the lime-soda ash water treatment process.

SODIUM
An ion found in natural water supplies, and introduced to water in the ion exchange water softening process. Sodium compounds are highly soluble, and do not react with soaps or detergents. The effects of Sodium are not clearly understood. A high sodium intake can effect your blood pressure and cause stress. The EPA has set a maximum contaminant level of 20 ppm for people who have a sodium restricted diet.

SODIUM CHLORIDE
The chemical name for common salt, widely used in the regeneration of ion exchange water softeners.

SOFT WATER
Any water which contains less than 1.0 fpf (17/1 mg/L) of hardness minerals, expressed as calcium carbonate.

SOFTENED WATER
Any water that is treated to reduce hardness minerals to 1.0 gpg (17/1 mg/L) or less, expressed as calcium

carbonate.

SOLUTE
The substance which is dissolved in a solvent. Dissolved solids, such as the minerals found in water, are solutes.

SOLVENT
The liquid, such as water, in which other materials (solutes) are dissolved.

SPECIFIC GRAVITY
The ratio of the weight of a specific volume of a substance to the weight of the same volume of pure water at 4 C.

SULFATE
Sulfate is a natural forming mineral found in water. Sulfate effects the taste of water, and when combined with bacteria or heated (water heater) may effect the odor. High levels of Sulfate may impact the digestion system causing a laxative effect. The EPA maximum contaminant level for sulfate in water is 250 ppm.

SULFATE-REDUCING BACTERIA
A group of bacteria which are capable of reducing sulfates in water to hydrogen sulfide gas, thus producing obnoxious tastes and odors. These bacteria have no sanitary significance, and are classed as nuisance organisms.

SULFUR
A yellowish solid element. The term is also used as a slang expression to refer to water containing hydrogen sulfide gas.

TANNIN
Tannin is a common natural occurrence in well water. Tannin is produced by decaying vegetation in the well system. It causes the water to have a yellow of light brown color and can provide a bitter taste. There is currently no EPA regulatory level for tannin in water.

TDS
The abbreviation for total dissolved solids.

THRESHOLD

A very low concentration of a substance in water. The term is sometimes used to indicate the concentration which can just be detected.

TITRATION
An analytical process in which a standard solution in a calibrated vessel is added to a measured volume of sample until an endpoint, such as a color change, is reached. From the volume of the sample and the volume of standard solution used, the concentration of a specific material may be calculated.

TOTAL ACIDITY
The total of all forms of acidity, including mineral acidity, carbon dioxide, and acid salts. Total acidity is usually determined by titration with a standard base solution to the phenolphthalein endpoint (pH 8.3).

TOTAL ALKALINITY
The alkalinity of a water as determined by titration with standard acid solution to the methyl orange endpoint (pH approximately 4.5); sometimes abbreviated as "M alkalinity." Total alkalinity includes many alkalinity components, such as hydroxides, carbonates, and bicarbonates.

TOTAL DISSOLVED SOLIDS (TDS)
The weight of solids per unit volume of water which are in true solution; usually determined by the evaporation of a measured volume of filtered water and determination of the residue weight. Total Dissolved Solids is a measurement of any minerals or salts in the water. Bicarbonate, Chloride, Sulfate, Calcium, Magnesium, Sodium are the major components of dissolved solids in water. High amounts of these salts provide the major cause of water taste problems. High TDS can cause the water to appear inappropriate to drink, and spotting of glassware, fixtures, or painted surfaces such as automobiles. Also high dissolved solids can diminish the life of home appliances. The EPA has set a maximum contaminant level of 500 ppm.

TOTAL HARDNESS
The sum of all hardness constituents in a water, expressed as the equivalent concentration of calcium carbonate. Primarily due to calcium and magnesium in

solution, but may include small amounts of metals such as iron which can act like calcium and magnesium in certain reactions.

TOTAL SOLIDS
The weight of all solids (dissolved and suspended, organic and inorganic) per unit volume of water; usually determined by the evaporation of a measured volume of water at 105 C in a pre-weighed dish.

TURBIDITY
A measure of the amount of finely divided suspended matter in water, which causes the scattering and adsorption of light rays.

ZINC
Zinc is a product of a corrosive or aggressive water that is in contact with a galvanized plumbing system. Zinc can effect the taste and color of the water. The EPA maximum contaminant level for zinc is 5.0 ppm.

SALINE
Consisting of, or containing, salt.

SALINITY
The relative concentration of dissolved salts, usually sodium chloride, in a given water. A measure of the concentration of dissolved minerals substances in water.