

GLOSSARY

Glossary of Terms

A.

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- Absolute Purity Water Water with a specific resistance of 18.3 megohm-cm at 25° C.
- Absorption..... Process by which one substance is taken up by another, either chemically or physically, as when a sponge “soaks up” a liquid or one substance dissolves into another.
- Accumulator A pulsation damper installed on the suction and/or discharge lines of pumps, generally plunger type, to minimize pressure surges.
- Acid Feed Injecting sulfuric acid into a water stream to make it less alkaline (pH adjustment).
- Acid Mine Drainage Acidic water encountered in some mine excavations.
- Activated Carbon..... Specially treated carbon used to remove Cl_2 and organic matter.
- Adsorption..... Adhesion of the molecules of a gas, liquid or dissolved substance to a surface because of chemical or electrical attraction. Typically accomplished with granular activated carbon to remove dissolved organics.
- Agglomerate When suspended solids cluster together to form larger clumps or masses, which are easier to remove by filtration or settling.
- Alkalinity..... The quantitative capacity of aqueous media to react with Hydrogen ions, "M" alkalinity is that which will react with acid as the pH of the sample is reduced to the methylorange endpoint about 4.2. "P" alkalinity is that which reacts with acid as the pH of the sample is reduced to 8.2.
- Alum..... Aluminum sulfate, $\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$.
- Ambient Temperature The temperature of the air or water (or other surrounding cooling medium) which, when coming into contact with the heated parts of a motor, carries off its heat. Commonly known as "room temperature" in connection with air cooled apparatus not provided with artificial ventilation.
- Ampere (amp) The standard unit of electrical current. The current is produced by a pressure of one volt in a circuit having a resistance of one ohm.
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- Ampere Turns..... Magnetic force equal to the product of the number of turns in a magnetic coil multiplied by the current strength in amperes. One ampere turn is equal to one ampere flowing through one turn.
- Amphoteric..... The ability to act as either an acid or a base.
- Angstrom..... One ten-thousandth of a micron
- Anion..... A negatively charged ion.
- Anion Exchange Resin..... An ion exchange material that removes anions from solution by exchanging them with hydroxyl ions.
- Anisotropic Layer..... A membrane layer that has an increase in porosity from the surface to the base.
- Annealing..... A post-treatment in which a membrane is exposed to water at elevated temperature to improve salt rejection.
- Anthracite..... A granular hard coal used as a filtration medium.
- Anti-Telescoping Device (ATD)..... A plastic cover, resembling a wheel with spokes, attached to the ends of a spiral wound cartridge to prevent movement of the cartridge leaves in the feed flow direction, due to high differential pressure.
- Aquifer..... Underground layer of permeable rock, sand or gravel that supplies water for wells or springs.
- Aramid..... A aromatic polyimide. (See *Aramid* in the Spanish Glossary)
- Argon Blanket..... A covering of Argon over water used to prevent absorption of CO₂ from the air. Other inert gases can be substituted for Argon such as Nitrogen.
- Array..... The arrangement of pressure vessels (or shells) described by the number of vessels in the first stage and the number of vessels in the second stage, e.g. 4x2 means 4 vessels in the first stage and 2 vessels in the second stage.
- ASTM..... The American Society of Testing and Materials.
- Atomic Absorption Spectrophotometry..... A highly sensitive instrumental technique for identifying and measuring trace elements in water. About 68 different elements can be determined by AA analysis, some down to the level of parts per trillion.
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- Autopsy The dissection of a membrane to investigate causes of unsatisfactory performance or failure.
- Average Brine..... The arithmetic average of the feedwater and final reject flow rates = 1/2 (feed rate + brine rate).

B.

- Background Contamination... Contamination introduced accidentally in reagents, dilution water, solvents, rinse water, etc., which can be confused with constituents in sample being analyzed.
- Backwash To reverse the flow of water through filtration media to clean filters.
- Baseline In some analytical procedures the sample is dissolved in water or combined with other reagents for analysis. A “blank” or standard consisting of the same reagents may be analyzed without sample present. This provides a comparative reference point or baseline, so it’s clear what test results can be attributed solely to the sample itself.
- Bank A grouping of membrane, membrane shells or pressure vessels. (See Train & Control Block)
- Baumé Scale, °Bé..... A measure of the density of a solution relative to water. (°Bé) = 145/specific gravity
- Bed Column of carbons and or ion exchange resins through which the water passes during treatment.
- Bed Depth..... The depth of the filter medium or ion exchange resin in a vessel or tank.
- Bed Expansion..... The expansion of the filter medium or ion exchange resin that occurs during back-washing.
- Biochemical Oxygen Demand BOD The amount of oxygen utilized by natural agencies in stabilizing organic matter at specified test conditions.
- Biological Impurities..... Impurities resulting from living matter (bacteria, virus, algae, protozoa, microfungi) and their by-products, including pyrogens.
- Biopure Water Water that is sterile, pyrogen free and has a total solids contents of less than 1 ppm.
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- Blank A preliminary analysis omitting only the sample to provide an unbiased reference point or baseline for comparison.
- Body Feed..... The continuous addition of filter medium (e.g., diatomaceous earth) to sustain the efficacy of the filter.
- Boiler..... The vessel used in distillation systems to convert water into steam.
- Brackish Water..... Saline waters, less than 20,000 mg/l TDS.
- Breakdown Torque The maximum amount of torque a motor can achieve with rated voltage, applied at rated frequency, without a sudden drop in speed.
- Breakthrough..... The point at which ions can be detected downstream of an ion exchange bed, indicating that the resin capacity is depleted.
- Brine (Concentrate: blowdown: reject).....Normally, the waste stream from reverse osmosis which contains most of the dissolved solids in the feed in a concentrated form. Calcium Carbonate Equivalents (mg/l CaCO₃) — A method for expressing mg/l ion as a ratio of calcium carbonate. Concentrate in calcium carbonate equivalents is calculated by multiplying the concentration in mg/l of the ion by the equivalent weight of calcium carbonate (50) and dividing by the equivalent weight of the ion. (See Table 1)
- Brine Seal A rubber lip seal on the outside of a spiral wound cartridge which prevents feed by-pass between the cartridge and the inside pressure vessel wall.
- Brine Spacer See Feed Channel Spacer.
- Buffer A solution that is capable of opposing small changes in chemical composition, particularly in pH.

C.

- Calcium A metallic element always found combined in water, usually as calcium carbonate (CaCO₃). Soluble in water, it causes hardness and subsequent scaling.
- Calcium Carbonate Equivalents (mg/l CaCO₃) A method for expressing mg/l ion as a ratio of calcium carbonate. Concentrate in calcium carbonate equivalents is calculated by multiplying the concentration in mg/l of the ion by the equivalent weight of calcium carbonate (50) and dividing by the equivalent weight of the ion. (See Table 1)

- Carbonate Hardness..... Hardness in water caused by bicarbonates and carbonates of calcium and magnesium.
- Capacitor A device which stores electric energy.
- Capacity..... The total flow of permeate produced in a 24-hour period at the standard conditions specified in the warranty. The capacity shall be normalized to the standard conditions according to the ASTM D4516-85, or other similar method submitted by the membrane manufacturer and approved by the engineers.
- Cartridge..... See Spiral Wound Cartridge / Element.
- Cation A positively charged ion.
- Cation Exchange Resin A synthetic organic ion exchange material which exchanges cations with the bulk solution.
- Cationic Polyelectrolyte A polymer containing positively charged groups used for coagulation/flocculation.
- Cellulose Acetate (CA) A polymer obtained by treating cellulose with acetic acid, acetic anhydride, and sulfuric acid. CA was used extensively as the original membrane in spiral wound elements.
- Cellulose Tri-Acetate (CTA). A more Acetylene version of CA having higher salt rejection and greater chemical stability with a wider operating pH range.
- Channeling Unequal flow distribution in a membrane element or filter bed media.
- Chemical Oxygen Demand (COD) ... The amount of oxygen required under specific test conditions for the oxidation of water-borne organic and inorganic matter.
- Chemical Potential A thermodynamic property of solutions which is a function of the molar concentrations of all dissolved species as well as temperature and pressure.
- Chelating Agents Organic compounds that can withdraw ions from solution, forming insoluble complexes.
- Chemical Oxygen Demand (COD) ... The amount of oxygen needed to completely oxidize all oxidizable organic and inorganic substances in water.

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- Chloramine..... A chlorine compound formed by reaction with organic amines or ammonia.
- Chlorination..... Adding chlorine or chlorine compounds to water for disinfection.
- Chlorine Residual..... Portion of free or combined chlorine that remains active after specified contact period.
- Clark Degree..... Number of grains of substance per one British Imperial gallon of water expressed as CaCO_3 . Concentration in Clark or English degree is calculated by dividing concentration in calcium carbonate equivalents by 14.3. One grain weighs 1/7,000 pound and one British Imperial gallon of water weighs 10 pounds. (See Table 1)
- Closed End Plug..... The closed end plug is used to plug the open end of the product tube of the element farthest from the product removal end of the pressure vessel when product water removal is from only one end of the vessel. It is also used in retrofit situations where there is space between the upstream element and the pressure vessel end cap. Common materials are PVC or Celcon.
- Coagulation Adding insoluble compounds to water that neutralize the electrical charge on colloids, causing them to coalesce to form larger particles that can be removed by settling. Also referred to as flocculation.
- Coliform Bacteria..... A group of bacteria found mainly in man's intestines and are therefore a useful measure of fecal pollution in water.
- Colloid..... A system of which one phase is made up of particles (colloidal materials) having dimensions of 10 to 10,000 angstroms and which is dispersed in a different phase (dispersion medium). When a colloid is dissolved in water or other liquid, it diffuses very little or not at all through a membrane.
- Colony Forming Units (CFU) Unit used in the measure of Total Bacterial Count (TBC).
- Compaction The tightening of a membrane structure due to compressive stress of operating pressure.
- Concentrate..... The portion of the feed stream which does not pass through the membrane. Contains retained solutes at a concentration higher than the feed.
- Concentrate Control Valve.... The valve on the concentrate water line that controls the flow of the concentrate water out of the unit and hence the feed pressure to stage 1.
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- Concentrate Pressure The pressure at the outlet of the last stage, but ahead of the concentrate control valve
- Concentrate Stream (In the past called Brine Stream.) The concentrate stream from a membrane. The portion of the feed stream which does not pass through the membrane.
- Concentration Factor (CF)..... The degree to which the feed salts are concentrated in the concentrate stream. $CF = 1/(1-Y)$ where the conversion (Y) is expressed between 0 & 1.
- Concentration Polarization.... The increased salt concentration versus the bulk solution which occurs in a thin boundary layer at the membrane surface on its high pressure side during reverse osmosis. The coefficient of the last element in a pressure vessel is known as “Beta”.
- Conductivity..... The reciprocal of the resistance in ohms measured between opposite faces of a centimeter cube of aqueous solution at a specific temperature.
- Control Block A group of membranes having a common piping and control system. See Train or Bank.
- Conversion (Y)..... Permeate water flow rate divided by feedwater flow rate, expressed as a percentage.
- Conversion Control Preventing salts from precipitating on the membrane by selection of a conversion at which their solubility is not exceeded.

D.

- Deadman..... An element within a tube which does not alter the flow nor the recovery. Used a space filler within a tube.
- Decarbonator A device to remove carbon dioxide from water. Also called a Degasifier.
- Diatom..... Single-celled marine animal having a coating consisting principally of silica.
- Diatomaceous Earth (DE) Filtration..Filtration using a fine, siliceous earth medium consisting mainly of diatomites.
- Diatomate A light friable siliceous material derived chiefly from diatom skeletal remains.

- Deionization Removing dissolved ions from solution by passing it through a bed of ion exchange resins, consisting of polymer beads that exchange hydrogen ions for cations and hydroxyl ions for anions in solution. The ionic impurities remain bound to the resins and the hydroxyl ions combine with each other to form water.
- Demineralization Sometimes used interchangeably with deionization, it refers to the removal of minerals and mineral salts using ion exchange.
- Desalination..... The removal of dissolved salts from brine to produce potable water.
- Diffusion..... Random thermal motion of particles which cause them to flow from a region of higher concentration to one of lower concentration until they're uniformly distributed.
- Dilution Lowering the concentration of a solution by adding more solvent.
- Disinfection To destroy most (but not necessarily all) of the harmful or objectionable microorganisms by means of chemicals, heat, ultraviolet light, etc. Also referred to as sanitization.
- Draw-back The reverse flow of permeate water across the membrane as a result of osmosis (permeate to feed flow).
- Dual Media Filter Filter with a bed consisting of two separate filter media, the coarse low density at the top, the fine high density at the bottom.

E.

- Efficiency The ratio between the useful work performed and the energy expended in producing it.
- Effluent..... The output or discharge from a water treatment process.
- Element..... See Spiral Wound Element.
- English Degree Number of grains of substance per one British Imperial gallon of water expressed as CaCO₃. Concentration in Clark or English degree is calculated by dividing concentration in calcium carbonate equivalents by 14.3. One grain weighs 1/7,000 pound and one British Imperial gallon of water weighs 10 pounds. (See Table 1)

Equivalent per Million (EPM)..... A unit chemical equivalent weight of solute per million unit weights of solution. Concentration in equivalents per million is calculated by dividing concentration in ppm by the equivalent weight of the substance or ion. Equivalent weight is the atomic weight of the substance divided by the valance of the substance.

Expansion Joint..... A section of the spiral wound cartridge fiber-reinforced plastic overwrap which is not wound with fiber-reinforced plastic but is taped to allow expansion or swelling of the fiber wrap.

F.

Feed..... Raw or pretreated solution entering a membrane system. Could be sea water, industrial waste water, brackish waters, tap water, or any number or industrial/food products.

Feed Channel Spacer..... A plastic (usually polypropylene) netting between membrane leaves which increases the turbulence of the feed-brine stream.

Feed Distributor..... The plastic mesh cylinder at the core of the hollow fiber bundle which distributes the feed evenly.

Feed Pressure..... The pressure of the feed water at the entrance to the pressure vessels containing the membrane.

Feed Temperature..... The temperature of the feed water measured at the inlet manifold to the membranes. This temperature is to be used for normalization of capacity.

Feed Water Valve..... (Also known as a pump throttle valve) The valve between the high pressure pump and the membrane bank on the feed used to control the flow to the membranes.

Fiber Bundle..... The heart of a permeator consisting of HFF aramid or CTA polymer membrane, epoxy tube sheet, nub and feed distributor.

Fiber Dehydration..... Loss of water from the fiber caused by high temperatures, high osmotic draw back solution pressure or drying of the fiber.

Filter AG®..... A non-hydrous aluminum silicate used as a filtration medium.

Flat Sheet Membrane..... A reverse osmosis or ultra filtration membrane coated onto a fabric substrate.

Flocculation..... Addition of one or more chemicals to produce a floc, which is an insoluble compound that absorbs colloidal matter and readily settles.

- Flow Balancing..... The use of an imposed pressure drop (flow balance tube or orifice), to minimize conversion differences of permeators operating in parallel. Also known as a “Pigtail”.
- Flow Balancing Tube See Flow Balancing.
- Flux The average rate of permeate, in gallons permeated across one square foot of the installed membrane surface in one day, with units of GFD (gallons per square foot per day).
- Flux Decline Coefficient..... The slope of the graph of time vs. flux normally expressed as a negative exponential coefficient
- Foot-Pound..... Energy required to raise a one-pound weight against the force of gravity the distance of one foot.
- Fouling When gelatinous coatings, colloidal masses or dense bacterial growth form a compacted crust on membrane or filter surfaces which blocks further flow.
- French Degree Calcium carbonate equivalents expressed in parts per hundred thousand. Concentration in French degree is calculated by dividing concentration in calcium carbonate equivalents by 10. (See Table 1)
- Frequency Alternating electric current frequency is an expression of how often a complete cycle occurs. Cycles per second describes how many complete cycles occur in a given time increment. Hertz has been adopted to describe cycles per second as that time as well as number of cycles if specified.
- Fuse A piece of fusible metal, connected in the circuit to be protected, which melts and interrupts the circuit when an excess current flows.

G.

- Generator..... Any machine by which mechanical energy is changed into electrical energy.
- German Degree..... Calcium oxide equivalents expressed in parts per hundred thousand. Concentration in German degree is calculated by dividing concentration in calcium carbonate equivalents by 17.8. (See Table 1)
- Glass Transition Temperature Temperature at which there is an abrupt change in physical properties of a polymer.
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GPD..... Gallons per Day.

Grains per US Gallon (GPG) Number of grains of substance per one US gallon of water. Concentration in GPG is calculated by dividing concentration in ppm of the ion by 17.1. One grain weighs 1/7,000 pound and one US gallon of water weighs 8.3 pounds.

Gravity Filter A filter in which water flows through it by gravity.

Greensand..... A mineral, glauconite, used as a filtration medium and for iron removal.

H.

Hardness The polyvalent-cation concentration of water, generally calcium and magnesium.

Hertz Preferred terminology for "cycles per second".

Hollow Fine Fiber, HFF Physical form of the aramid or CTA membrane.

Horsepower (HP)..... A measure of the rate of work. Torque and RPM may be used in relating to the horsepower of a motor.

Hydrolysis of CA Membrane The reaction of CA membrane with water whereby acetyl groups are replaced by hydroxyl groups occurring most rapidly at very high or low pH.

I.

Impedance The total opposition in an electric circuit which flows as a result of an alternating current.

In-Line Coagulation..... A coagulation process performed by continually adding a coagulant to the raw feedwater and then immediately passing the water through a media filter to remove the micro floc which has been formed.

Insulation Non-conducting material separating the current carrying parts from each other and from the core.

Interconnector..... A plastic tube with "O" Rings which is inserted into the product tubes of adjacent cartridges to connect them in series and to seal the product channel from the feed-brine channel.

Interstage Pressure..... The pressure at the outlet of the first stage and at the inlet to the second stage.

Ionic Strength Measure of the overall electrolytic potential of a solution.

J.

Jackson Turbidity Unit (JTU) Unit of measure used with the Jackson candle turbidity meter.

K.

Kilowatt..... A unit of power equal to 1000 watts and approximately equal to 1.34 horsepower.

L.

Langelier Saturation Index (LSI)..... An index calculated from total dissolved solids, calcium concentration, total alkalinity, pH, and solution temperature that shows a tendency of a water to precipitate or dissolve calcium carbonate. LSI is used primarily for brackish water MS/RO applications.

Leaf..... The layer of flat-sheet membrane/product channel spacer/flat-sheet membrane, glued together on the sides and across the outer end and connected on one side to the product tube.

Load..... The work required of a motor to drive attached equipment. Expressed in Hp or torque at a certain RPM.

M.

Macromolecule..... A very large molecule as of protein, cellulose, rubber or other natural or synthetic high molecular weight polymer.

Magnetic Polarity Distinction of location of North and South poles of a magnet. Magnetic lines of force emanate from the North pole of a magnet and terminate at the South pole.

Membrane..... A thin, soft, pliable layer that forms a limiting surface or interface. The membrane governs the selection and passage of chemicals in microfiltration processes. Membrane Compaction — Increased density of the membrane caused by such factors as temperature and pressure.

MFRC..... Membrane Flux Retention Coefficient.

MGD..... Million Gallons per Day.

Micron (μ) 1×10^{-6} meters or 0.000001 meters.

Milliequivalent Per Liter (meq/l)..... A weight-volume measurement obtained by dividing the concentration expressed in milligrams per liter by the equivalent weight of the substance or ion. If specific gravity is unity, meq/l is the same as EPM.

Milligram per Liter (mg/l) A weight-volume measurement which expresses the concentration of a solute in milligrams in a liter of solution. When specific gravity is unity, mg/l = ppm. When specific gravity is not unity, mg/l divided by the specific gravity of the solution equals ppm.

Mixed Bed Ion Exchange A demineralization process where the anion and cation exchange resins are in the same vessel.

Module See Spiral Wound Element or Train.

Molar Concentration See Molality and Molarity.

Molality (m) Moles of solute per 1000g of solvent.

Molarity (M)..... Moles of solute per liter of total solution.

N.

NaHMP..... Sodium Hexametaphosphate. Also known as SHMP.

Nub An epoxy casting on the feed end of the HFF bundle.

O.

Ohm..... The unit of electrical resistance equal to the resistance of a circuit in which an electromotive force of one volt maintains a current of one ampere.

Open Circuit A break in an electrical circuit preventing normal current flow, but which may still maintain a voltage drop across the circuit.

Operating Pressure The pressure at which feedwater enters the permeator or membrane element.

ORP Oxidizing reduction potential.

Osmosis The diffusion of a solvent through a semipermeable membrane from a less concentrated solution to a more concentrated solution.

- Osmotic Pressure..... The pressure required to prevent spontaneous flow of solvent (water) into a solution when separated by a semi-permeable membrane.
- Oxidant..... A chemical substance the oxidizes another species as by accepting electrons
- Oxidant Free..... Absence of oxidants.
- Oxidize To change (a compound) by increasing the proportion of the electronegative part or change (an element or ion) from a lower to a higher positive valence. To combine with oxygen.

P.

- Parts per Million (ppm)..... A measure of proportion by weight, equivalent to a unit weight of solute per million unit weights of solution.
- PCF..... Pressure Correction Factor.
- Permeate The high purity water which passes through the semi-permeable membranes and exits from the pressure vessel. Distinguished from “product water” or “finished water” which may have been blended with raw water or received additional post treatment.
- Permeate Back Pressure Additional pressure supplied against the permeate to reduce the flux in the lead elements. Usually a throttling valve or a restricting orifice is used to create the back pressure.
- Permeate Pressure The pressure of the permeate at the exit of the pressure vessels containing the membranes.
- pH..... The negative logarithm of the effective hydrogen-ion concentration. Used in expressing acidity and alkalinity on a scale of 0 to 14
- Phase..... Number of individual voltages applied to an AC motor. A single phase motor has one voltage in the shape of a sine wave applied to it. A three phase motor has three different sine wave voltages applied to it.
- Polarity As applies to electric circuits it indicates which terminals are positive and which are negative.
- Polyelectrolyte..... Water soluble polymers containing ionizable groups as part of their structure; often useful in causing agglomeration of fine suspended solids.

- Polymer Creep..... The long term deformation of the physical structure of a polymer under the influence of an applied stress.
- Polymer Degradation..... Loss of strength or integrity of a polymer caused by decrease in molecular weight.
- Precipitator See Solids Contact Clarifier.
- Precoat..... The initial coating of the septum in a diatomaceous earth filter to provide initial straining medium.
- Pressure Filtration Filtration aided by imposing a pressure drop across an enclosed filter vessel to minimize re-pumping of the filter effluent.
- Product Channel Spacer The knit fabric through which permeate water flows after it passes through the flatsheet membrane.
- Product End Adapter The product end adapter is used to connect the product tubes of the first and last elements to the product ports of the pressure vessel end caps. Common materials are polysulfone, PVC, and Celcon.
- Product Tube The plastic tube at the center of the spiral wound cartridge which collects permeate water.
- Product Water (permeate) The water permeating the membrane surface of the composite module, collected at a port provided on the module end-plate.
- Productivity Flow rate of permeate water.
- PT-A..... Post treatment A, treatment of the aramid membrane with PVME, polyvinyl methyl ether.
- PT-B Post treatment B, treatment of the aramid membrane with tannic acid.
- Pyrogens Fever producing substances.

R.

- Rack..... See Control Block or train.
- Ranney Collector or Well..... An underground hub and lateral type water collection system.
- Raw Water..... Water which has not been treated for any application.
- Recirculation The fractional recycling of the concentrate to the feed in order to improve the recovery of the system.
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- Recovery..... The ratio of permeate produced divided by the amount of feed water used to produce the permeate.
- Reemay..... Non-woven polyester fabric used to confine the Dupont HFF's.
- Reject Stream Brine or concentrate stream from the membrane element or permeator.
- Relay..... A device having two separate circuits and so constructed that a small current in one of the circuits controls a large current in the other circuit. A motor starting relay opens or closes the starting circuit under predetermined electrical conditions in the main circuit.
- Resistor..... A device which resists the flow of electrical current for the purpose of operation, protection or control. There are two types of resistors, fixed and variable. A fixed resistor has a fixed value of resistance while a variable resistor is adjustable.
- Reverse Osmosis Forced flow of solvent (water) from a solution through a semi-permeable membrane by means of pressure in excess of the osmotic pressure.
- R.O. Unit Consists of membranes, pressure vessels, piping headers, pump(s), control panel, feed water valve, concentrate valve and instruments.
- RPM Revolutions per minute.

S.

- Sailcloth..... Fabric used as the Spiral Wound Membrane substrate or the material upon which the membrane is cast.
- Salt Increase Factor Percentage increase of salt that will bypass the membrane due to fouling, scaling, hydrolysis or other membrane degradation
- Salt Passage (SP)..... $SP = C_p/C_f \times 100$ The ratio of product salt and feed concentrations expressed as a percent.
- Salt Rejection (SR)..... 100 minus the salt passage (100-SP), expressed as a percent.
- Scale Inhibitor A chemical which inhibits the growth of micro-crystals (inhibits precipitation of sparingly soluble salts.) Also known as Anti-Scalant.
- SDI Silt Density Index.

- Sludge Blanket Suspended bed of solids in a solids contact clarifier or precipitator.
- Solids Contact Clarifier..... Water treating device used in lime softening and coagulation processes.
- SPCF Salt Passage Correction Factor.
- Spiral Wound Element The heart of the spiral wound permeator consisting of the product tube, membrane leaves, feed channel spacers, anti-telescoping devices and brine seal.
- Spiral Wound Membrane See flat sheet membrane.
- Standard Test Conditions See membrane manufacturer's test conditions for NaCl or other substances, pressure (psig), temperature and recovery.
- Stage A group of pressure vessels in parallel.
- Stiff & Davis Stability Index (S&DSI)An index calculated from total dissolved solids, calcium concentration, total alkalinity, pH and solution temperature that shows the tendency of a water solution to precipitate or dissolve calcium carbonate. S&DSI is used primarily for seawater MS/RO applications.

T.

- TCF..... Temperature Correction Factor.
- TDS Total Dissolved Solids, expressed as parts per million (ppm).
- Telescoping The movement of the outer layers of a spiral wound element in the direction of the feed flow, caused by excessive differential pressure through the feed channel spacer to the concentrate.
- Thrust Block or Collar..... A plastic cylinder placed between the last spiral wound element and the vessel end plate to transfer the column load from the product tube to the last element's anti-telescope . It has almost the same outside diameter as the pressure vessel's inside diameter.
- TOC..... Total Organic Carbon.
- Total Bacteria Count (TBC).. The total number of viable micro-organisms present in the sample, excluding anaerobic organisms.
- Train A group of membranes controlled independently from others in the system.

Transformer..... An apparatus in which both primary and secondary windings are usually stationary and are wound on a common magnetic core. Commonly used to isolate line voltage from a circuit or to change voltage and current to lower or higher values.

Tricot..... A type of knit used in this context as the permeate channel spacer fabric in a spiral wound element.

TSS..... Total Suspended Solids, expressed as parts per million (ppm).

Tube Sheet..... An epoxy casting on the product end of the hollow fiber bundle.

Turbidity..... A suspension of fine particles that obscures light rays.

V.

Visible Organism Count (VOC)..... A measure of biological activity in seawater.

W.

Watt..... The amount of power required to maintain a current of 1 ampere at a pressure of 1 volt when the two are in phase with each other. One horsepower is equal to 746 watts.

Y.

Y..... Conversion or recovery. Permeate water flow rate divided by feedwater flow rate, expressed as a percentage.

TABLE 1 CONVERSION FACTORS

mg/l as Ion	mg/l as CaCO ₃	Clark or English Degree	Grain per U.S. Gallon	French Degree	German Degree	EPM or MEQ/L	Atomic Weight
Ca ⁺⁺	2.495	0.175	0.0583	0.250	0.140	0.0499	40.08
Mg ⁺⁺	4.112	0.255	0.0583	0.411	0.231	0.0823	24.32
Na ⁺	2.175	0.152	0.0583	0.218	0.122	0.0435	22.99
K ⁺	1.279	0.089	0.0583	0.128	0.072	0.0256	39.10
Sr ⁺⁺	1.141	0.080	0.0583	0.144	0.064	0.0288	87.63
Ba ⁺⁺	0.728	0.051	0.0583	0.073	0.041	0.0146	137.36
Fe ⁺⁺	1.791	0.125	0.0583	0.179	0.101	0.0358	55.85
HCO ₃ ⁻	.0819	0.057	0.0583	0.082	0.046	0.0164	61.02
SO ₄ ⁼	1.041	0.073	0.0583	0.104	0.058	0.0208	96.07
Cl ⁻	1.410	0.098	0.0583	0.141	0.079	0.0282	35.46
F ⁻	2.632	0.184	0.0583	0.263	0.148	0.0526	19.00
NO ₃ ⁻	0.806	0.056	0.0583	0.081	0.045	0.0161	62.00
CO ₃ ⁼	1.666	0.117	0.0583	0.167	0.094	0.0323	60.01
PO ₄ ⁼	1.579	0.110	0.0583	0.158	0.089	0.0316	94.98

To convert from mg/l as ion to any other unit multiply by factor.

To convert to mg/l as ion from any other unit divide by factor.