

Problem Solving

Technical Resources

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Glossary for Water Treatment Systems, Equipment, Service and Supplies >>



As a leader in commercial and industrial water treatment systems, Res-Kem is pleased to provide this glossary of terms relating to our business.

The purpose of this glossary is to familiarize users of water treatment equipment with the language that industry people commonly use. We often take for granted that our customers know what we're talking about when they may not. Some of the alternate terms can be considered water treatment slang; for example, some people refer to a distributor tube as a "spear" because it is shaped like one. Sometimes customers bring us new words as a description for the part they are trying to replace, such as calling a cartridge a capsule. In this day and age most cartridges are the things we put in printers, not the water treatment cartridges all of us in the industry think of when we hear that word.

If you know of a word that we've missed we'd be happy to add it to our list.

Term	Alternate Terms	Definition and or Use *
Activated Carbon	GAC, carbon, activated coal, charcoal, activated charcoal	A widely used water treatment medium commonly used for dechlorination, organics removal and other specialty processes. Base products include but not limited to bituminous coal, coconut and lignite.
Adsorption	Adsorbent, Adsorb, absorb, Absorbtion	A physical process that occurs when liquids, gases or suspended matter adhere to the surfaces or in the pores of an adsorbent media such as activated carbon.
Alkalinity	Dealkalizer, Alkaline Water, M-alkalinity, P-Alkalinity	The quantitative capacity of water to neutralize an acid; that is, the measure of how much acid can be added to a liquid without causing a significant change in pH. Alkalinity is not the same as pH because water does not have to be strongly basic (high pH) to have high alkalinity. In the water industry, alkalinity is expressed in mg/L of equivalent calcium carbonate.
Anion Resin	White Stuff, SBA, Strong Base Anion, WBA, Weak Base Anion, tannin resin, Type 1 Anion, Type II Anion, Type 2 Anion, organic scavenger resin	An ion with a negative charge. Anion Exchange is an ion exchange process in which anions in solution are exchanged for other anions from an ion exchanger.
Anthracite	Coal, filter coal, Anthrafilt(r), Philtrkol	A filter medium produced from crushed anthracite and screened to specific mesh sizes.
Backwash		The upflow or countercurrent flow of water through a filter medium or ion exchange medium for the purpose of thoroughly expanding the media bed to remove foreign particulate matter accumulated during the service cycle and to flush it down the drain.

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General Water

Bed	Resin Bed, Filter Bed, Softener Bed, Softner Bed	The mass or volume of ion exchange resin or other media through which the water passes in the process of water treatment.
Bed Depth		The height of the resin or other media (excluding support material) in a bed, usually expressed in inches or centimeters.
Bed Volume	BV	A term used as a measurement of a volume of incoming (feedwater) in gallons or liters, equal to (in cubic feet or liters) the volume of ion exchange or filter media in a tank-including voids. Example: one bed volume for a cubic foot bed would be equal to 7.48 US gallons or 28.3 liters.
Birm		The trade name for a manganese dioxide-coated volcanic aluminum silicate (pumicite) used as an oxidizing-catalyst filter for iron and manganese reduction.
Breakthrough	Silica Breakthrough, Sodium Breakthrough, Hardness Breakthrough, Chlorine Breakthrough, Organics Breakthrough	The first appearance in the product water of an amount of the contaminant which exceeds the design performance criteria.
Brine	Salt Solution, Saturated Brine	A strong solution of salt(s), usually sodium chloride and other salts too...Potassium or sodium chloride brine is used in the regeneration state of cation and or anion exchange water treatment equipment. Sodium chloride brine saturation in an ion exchange softening brine tank is about 26 percent NaCl by weight at 60 degrees F.
Brine Collector	Brine Distributor, Interface Collector, Brine Valve, Brine Well	A device used to gather and retrieve brine from a brine tank or ion exchange bed.
Brine Tank	Trash Can, Salt Bale, Brine Keeper, Salt Tank, Brine Maker, Brine Holding Tank, Brine Measuring Tank,	A Brine Tank hold the brine solution used in conjunction with water treatment equipment. The brine is used to regenerate the resin.
Brine Tank Grid	Brine Shelf	A perforated platform in the bottom section of a brine tank of a water softener which creates a zone where water can come in contact with the lower side of the dry salt stored above. As the water reaches up to the salt layer, it creates the brine makeup for regeneration.
Calcium	Scale	One of the principal elements making up the earth's crust. Calcium compounds, when dissolved, make 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 Carbonate	Calcite, GA Marble, Georgia Marble, Limestone	A chemical coumpound found in nature as calcite (in limestone, marble and chalk) and aragonite (in pearls) and in plant ashes, bones and many shells. Used to raise the pH reading (reduce the acidity) of low pH (acidic) water and to filter out sediment.
Cartridges	Capsules, Element, Filter Tubes, String Filter, Pleated Filter, Big Blue (r) Filter	Any removable preformed or prepackaged component containing a filtering medium, ion exchange, membrane, or other treatment material which fits inside a housing to make up a cartridge filter.

Catalyst	Catalytic	A substance that changes the speed or yield of a chemical reaction without being consumed or chemically changed by the chemical reaction.
Catalyst Media		Those filter media which can cause certain reactions to occur in water treatment, such as activated carbon, calcite, manganese greensand, magnesium oxides, and dissimilar metal alloys.
Cation Resin	SAC, Strong Acid Cation, Softener Resin, WAC, Weak Acid Cation, Zeolite, Softener Beads, Softner Beads, Softner Resin	An ion with a positive charge. Cation Exchange is an ion exchange process in which cations in solution are exchanged for other cations from an ion exchanger.
Channelling		The higher and unbalanced flow of water or regenerant through a limited number of passages in a filter or ion exchanger bed, as opposed to an evenly distributed flow through all passages in the bed. Channeling results in the greater flow of liquid through passages of lower resistance which can occur in fixed beds or columns of media particles due to nonuniform packing, irregular sizes and shapes of the particles, gas pockets, wall effects, fouling of the bed and resulting plugging of many passages, poor distributor design, low flow rates, faulty operations procedures, insufficient backwash and other causes.
Clumping	Resin Clumping, Mixed Bed Clumping	The formation of media agglomerations or resin clumps within an operating filter or ion exchange bed due to organic fouling or electrostatic charges. May occur in mixed beds as a result of improper conditioning of the resin prior to installation
Condensate	Boiler Water Condensate	Condensed excess or waste steam which is returned to the boiler. Often treated with a condensate polisher for conditioning prior to re-use. Also, water obtained by condensation of steam or water vapor.
Conductivity	Conductance, Microsiemens, Micromho	The property of a substance to conduct (carry) heat or electricity; the unit of measure is the siemens (formerly called mho), which is the reciprocal of resistivity (1 divided by resistivity).
Contact Time	Retenetion, EBCT, Empty Bed Contact Time	1. The time in minutes the water is in contact with an ion exchange medium or filter medium such as activated carbon. 2. The time the brine or other ion exchange regenerant is in intimate contact with the resin. 3. (Disinfection) The time the water is allowed to contain the disinfectant to assure potability.
Core Sample		A sample of the medium obtained to represent the entire bed depth when the bed is being analyzed for capacity or usefulness. A hollow tube is sent down through the bed to extract the sample.
Decationize	Descationized Water	The exchange of cation for hydrogen ions by a strong acid cation exchanger operated in the hydrogen form.

Degasifier	Degasify, Degassing, Decarbonator, Forced Draft Degasifier, VOC Tower, Air Stripper	The removal of dissolved gasses such as carbon dioxide, methane, hydrogen sulfide, and oxygen by: 1) subjecting the water to a pressure below atmospheric pressure (vacuum degassing) or 2) passing large amounts of air thoroughly through the water at atmospheric pressure (air stripping)
Deionizer	Demineralizer, Demin, DI	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 removed by a cation exchange resin in exchange 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. This process is also called demineralization by ion exchange.
Desilicizer		An ion exchange process designed for reduction of silica from a water supply. Typically a strong base anion exchanger operated in the OH- form is used.
DI Exchange Tanks	DI Bottles, SDI, Service DI, PE, Portable Exchange, PEDI, Exchange Bottles	Tanks that are leased or rented to a facility lacking the means to regenerate the medium, usually ion exchange resin.
Distributor	Distributor Tube, Spear, Stand up Tube, Riser, Riser Pipe, Distributors, Diffuser	A fitting, usually installed at the top and bottom of the tank in a loose media system, which is designed to produce even flow through all sections of an ion exchanger or filter media bed and to function as a retainer of the media in the tank.
Effective Size	Mesh Size, Average Size	A measure of the diameter of particles in a media bed or resin bed. Effective size is that mesh size which will permit 10 percent of the bed's particles to pass and will retain the remaining 90 percent; in other words, that size for which 10 percent of the media grains or particles are smaller and 90 percent are larger.
Ejector	Eductor, Venturi, Injector, Inductor, Educator (sic)	A device used to disperse a chemical solution into water being treated.
Endpoint	Desired Endpoint, Breakpoint, Regeneration Point	The point at which a process or cycle is completed because a predetermined measurable value has been reached. Example: When the hardness in the product water reaches a set endpoint showing excessive hardness leakage, the resin bed is considered to be exhausted and in need of regeneration; when a certain predetermined color endpoint is reached during chemical titration, the process is complete.
Exhaustion	Exhausted resin, Spent Resin, Spent Carbon, Depleted Bed	The state of an ion exchanger or other adsorbent that is no longer capable of useful ion exchange due to the depletion of the initial supply of available exchangeable ions. A unit that is "exhausted" requires regeneration to restore its capacity to treat water.
Feedwater	Boiler Feedwater, Makeup Water, Boiler Makeup Water	The water to be treated that is fed into a given water treatment system.

Ferric Iron	Precipitated Iron	Small solid iron particles containing trivalent iron, usually as gelatinous ferric hydroxide [Fe(OH) ₃], which are suspended in water and visible as "rusty water". Ferric iron can normally be removed by filtration.
Ferrous Iron	Clear Water Iron	A divalent iron ion, usually as ferrous bicarbonate [Fe(HCO ₃) ₂] which, when dissolved in water, produces a clear solution. It is usually removed by cation exchange water softening.
Filter Sand	Torpedo Sand, Fine Sand, Washed Sand, Filter Sand, Silica Sand, Pool Sand	Sand particles between 0.05 and 2.0 mm in diameter. Used in two or more grades for turbidity removal in sand or multi-media filters
Fine Mesh		The smaller end of the size spectrum for water treatment media such as ion exchange resin beads. Fine mesh typically is 30-50 mesh (0.3-0.6 millimeters). Fine mesh media contains a higher percentage of reaction sites (e.g., for ion exchange or adsorption) on the media surface or closer to the surrounding water, therefore, fine mesh media or resins characteristically exhibit faster water treatment kinetics and lower necessary water contact times. Fine mesh media, however result in higher pressure drop for equivalent bed depth.
Fines	Particulate, Particles	Extremely small particles which are smaller than the specified size (in millimeters) for the medium. Fines may be formed in the manufacturing process, may result from breakdown of medium particles (ion exchange resins or activated carbon) during service, or may result from the dissolving of a medium such as calcite. An excess of fines in a filter, softener, or deionizer can create undesirable qualities in the filter effluent.
Flowrate	GPM, Gallons Per Minute, M ³ /Hr, Feet Per Second	The quantity of water or regenerant which passes a given point in a specified unit of time, often expressed in US gpm (orL/min). In filters, flow rate is usually measured in gpm/sq.ft. of bed area. In ion exchangers, it is expressed in gpm/cu.ft. of resin. Flow rate is a critical design parameter by which the effectiveness of the water treatment unit is measured.
Fouling	Foulant, Dirty Resin, Contaminant, Contaminated Resin	The accumulation of undesirable foreign matter in a filter or ion exchange media bed causing clogging of pores or coating of surfaces and inhibiting or limiting the proper operation of the bed and the treatment system.
Freeboard	Void Space, Backwash Space, Backwash Void	The vertical distance between the top of a filter media bed (or ion exchange resin bed) and the overflow or collector. This space allows for bed expansion during backwashing. The distance may be expressed in linear measurement or as a percent of the bed depth.
Garnet		A group of hard, reddish, glassy, mineral sands made up of silicates of base metals (calcium, magnesium, iron, and manganese). Garnet has a higher density than sand.

Grain	Grains Per Gallon, GPG	A unit of weight equal to 0.0648 grams or 0.000143 pounds or 1/7000th of a pound. Grain per gallon is a common method of reporting water analysis results in the United States and Canada. One grain per gallon equals 17.1 parts per million (ppm) or 17.1 milligrams per liter. Grains per Imperial gallon equals 14.3 mg/L (or ppm).
Gravel	Pea Gravel, Rock, Flint, Pebbles, Stone, Coarse Sand, Filter Gravel, Gravel Support Bed	Various layers of different sized gravel and/or coarse sand are placed above the underdrain network to support filter media or ion exchange resin beds. The gravel support bed contributes greatly to the distribution and collection of product water and the even dispersal of the backwash water flow.
Groundwater	Well Water	Water found beneath the surface of the ground. Groundwater is primarily water which has seeped down from the surface by migrating through the interstitial spaces in soils and geologic formations.
Hardness	Hard Water	A common quality of water which contains dissolved compounds of calcium and magnesium and, sometimes, other divalent and trivalent metallic elements. The term hardness was originally applied to waters that were hard to wash in, referring to the soap wasting properties of hard water. Hardness prevents soap from lathering by causing the development of an insoluble curdy precipitate in the water; hardness typically causes the buildup of hardness scale (such as seen in cooking pans and in boilers). Dissolved calcium and magnesium salts are primarily responsible for most scaling. Hardness is usually expressed in grains per gallon (or ppm) as calcium carbonate equivalent.
Hydrogen Sulfide	H ₂ S, Sulfur, Rotten Egg Smell, Sulfur Water, Sulphur	A corrosive and flammable gas often found dissolved in well water and often accompanied by iron and low pH values. The odor of water with as little as 0.5 milligrams per liter (mg/L) of hydrogen sulfide concentration is detectable by most people. Concentrations less than one mg/L gives the water a "musty" or "swampy" odor. Over one mg/L hydrogen sulfide concentration gives the water a very disagreeable "rotten egg" odor and makes the water corrosive to plumbing.
Inert Media	Inert Beads, Buffer Beads, Poly Beads	Synthetic resin beads or water treatment materials that are nonreactive. Inert media are used as a neutral nonreactive layer to more effectively separate the cation resin from the anion resin in mixed bed deionizers in order to regenerate each separately.
Internals	Nozzles, Strainers, Laterals, Distributors, Hub & Laterals, Interface, Internal Piping, Header Lateral, Collectors, underdrains, Distribution Nozzles, Diffusers, Filter Nozzles, Backwash Collectors, Backwash Distributor, Inlet Distributor, Air Scour, Sub-surface Wash	A term that encompasses the various internal means used to collect and disperse the processed product water, regenerant or backwash water.

KDF	Redox Alloy	A trade name for a patented medium composed of high purity copper and zinc granules. KDF is capable of removing chlorine, soluble heavy metals, and other inorganic contaminants from water through the chemical reduction/oxidation (redox) process.
Leakage	Slippage	The presence in the effluent of the type of ions, present in the feedwater to be treated, which the ion exchange process was supposed to remove. Incomplete removal of the ions may be caused by incomplete regeneration, excessive service rates, low temperatures, high concentrations of sodium, or interfering TDS in the water being treated, and other factors.
Makeup Water	Boiler Makeup Water	Treated water added to the water loop of a boiler circuit or cooling tower to make up for the water lost by steam leaks or evaporation.
Manganese Greensand	Greensand	Greensand which has been processed to incorporate the higher oxides of manganese into its pores and onto its surface. Manganese greensand has a mild oxidizing power and is often used in the oxidation, precipitation and removal of iron, manganese, and/or hydrogen sulfide. It is regenerated by solutions of potassium permanganate (KmnO4).
Mineral		Term used in the water treatment industry to refer to naturally-occurring inorganic cation exchangers formerly used in water softeners-as opposed to the synthetic organic resins used today for water softening.
Mixed Bed	Mixed Bed Resin, Mix Bed, Dual Layer,	The intermix of two or more filter or ion exchange products in the same vessel during a service run.
Neutralizer	Neutralize	An alkaline substance such as calcium carbonate (calcite) or magnesium oxide (magnesia) used to neutralize acidic waters or an acidic substance such as acetic acid or dilute hydrochloric acid used to neutralize alkaline waters. The term "neutralizer" is commonly used to refer to calcite or magnesia acid-neutralizing filters used to neutralize acidity and/or reduce free carbon dioxide in water and thereby raise the pH of acidic water.
Operating Cycle	Service Cycle	The cycle of service run, backwash and regeneration, slow rinse, fast rinse and return to service.
Organic Iron	Heme Iron, Tannin, Complexed Iron, Pink Iron	Iron that is bound or complexed with organic compounds, such as naturally occurring humic and fulvic acids. In waters laden with a high level of these vegetation decay products, iron is sometimes present in an organic form. The decaying process of vegetation produces humic and fulvic acids. Iron will react with these naturally complexation or chelating agents to form either an insoluble colloid with humic acid and humin, or a soluble complex chelate with fulvic acid and tannin. Organic iron can be present in a colorless form, but most often occurs as a yellow, yellowish-brown, or pink color. The humic acid and humin colloids developing the color seem to be permanently suspended in the water due to their particle size, normally less than 0.1 micron.

Polisher	Polishing Bottle, Polishing Tank, Condensate Polisher	A treatment stage placed at the end of other treatment to bring the water to a more highly conditioned and more perfect state. For example, a mixed bed of ion exchange media installed as the final treatment step in the deionization process to remove last traces of undesirable ions.
Re-bed	Rebed, changeout , Media Change Out, Resin Change Out	Complete removal and replacement of the media or resin from a tank is considered a rebed. Adding to a resin bed that may have lost resin is considered "topping off".
Regeneration	Regenerant, Salt dosage, Rejuvenate, Rejuvenation, Condition, Recharging	The use of a chemical solution (regenerant) to displace the contaminant ions deposited on the ion exchange resin during the service runs and replace them with the kind of ions necessary to restore the capacity of the exchange medium for reuse.
Resin	Rosin, IX Resin, Zeolite, Zeolitic, beads, white stuff, ball bearings, ion exchange, Stratified bed, Dual Bed, Multi-layered Bed, Monobed, Packed Bed, Stratabed (r), Macroporous, Macro, Softner resin, Softener Resin	As used in the water processing industry, this term refers to ion exchange resin products which are usually specifically-manufactured organic polymer beads used in softening and other ion exchange processes to remove dissolved salts from water.
Rinse	Slow Rinse, Fast Rinse, Flow Rate	The step in the regeneration process in which fresh water is passed through the bed of resin to remove any excess or spent regenerant prior to placing the system into service.
Service Run	Run Length	That portion of the operating cycle of a water processing system during which the water is actually being treated. The other portion of the cycle is regeneration. For example, that portion of the cycle in which the hard water supply is passed through a regenerated and rinsed bed of ion exchange material, thereby producing soft water.
Side Stream	Side Stream Filter	Filtration system used to filter just part of a total stream rate and capacity. For instance, in the case of a cooling tower with a recycle flow rate of 700 gpm and a 100,000 gallon capacity, a typical side stream filter is used to filter just 10 percent of the flow rate. With a 100,000 gallon capacity in the system, the water will be turned over in approximately 24 hours.
Support Bed	Subfill	Material of a specific graded particle size (such as gravel) used as subfill to support the primary medium bed. In larger diameter systems (tanks), this bed improves the collection of processed water and promotes more uniform distribution of the backwashing water.
Tank	Vessel, Column, Bottles, Mineral Tank, Portable Exchange (PE) Tank, Softener Tank, Softner Tank	That part of a water treatment system that contains the filter medium or ion exchange resin.

Tannin		Any group of water soluble, natural organic phenolic compounds that are produced by metabolism in trees and plants, and are part of the degradation-resistant fulvic acid materials formed during the decomposition of vegetation. Tannins occur in water in almost any location where large quantities of vegetation have decayed. Tannins can impart a faintly yellowish to brown color to water. Tannin molecules tend to form anions in water above pH 6 and can then be treated with anion exchange resins. Below pH 5, tannins are better treated with activated carbon.
UV Light	Ultraviolet Light, UV	Radiation (light) having a wavelength shorter than 3900 angstroms, the wavelengths of visible light, and longer than 100 angstroms, the wavelengths of x-rays. This wavelength puts ultraviolet light at the invisible violet end of the light spectrum. Ultraviolet light is used as a disinfectant.
Water Softener Salt	Solar Salt, Salt Pellets, Salt Block, Bay Salt, Marine Salt, Sodium Chloride, Potassium Chloride, Rock Salt, Water Softner Brine Tank	Water treatment sodium chloride (NaCl) or potassium chloride (KCl) both of which are used in solution form to regenerate cation exchange resin water softeners and sometimes dealkalizers.
Water Softener	Water Softner, Softner, Resin Water Softner	The reduction/removal of calcium and magnesium ions, which are the principal cause of hardness in water. The cation exchange resin method is most commonly used for residential and commercial water treatment. In municipal and industrial water treatment, the process can be lime softening or lime-soda softening.
Zeolites		Hydrated sodium, alumina silicates, either naturally-occurring mined products or synthetic products, with ion exchange properties. Zeolites were formerly used extensively for residential and commercial water softening but have been largely replaced by synthetic organic cation resin ion exchangers of polystyrene divinylbenzene substrate. Modified zeolites such as manganese greensand and synthetic manganese zeolites are still used as catalyst/oxidizing filters for the removal of iron, hydrogen sulfide, and manganese.

* All definitions were taken from the WQA Glossary of Terms, Fourth Edition, Joseph F. Harrison, P.E., CWS-VI, Wes McGowan, ©2000.

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