

USFilter
Taking care of the world's water.

**ION EXCHANGE
FOR WATER RECYCLE**

Ion exchange is a proven cost effective method of recycling selected manufacturing wastewaters. USFilter's ion exchange system utilizes real time system monitoring to maximize system performance and efficiency. The ion exchange process treats dilute wastewater from almost any manufacturing process by producing high purity deionized water for reuse. Only premium ion exchange resins are used. Automatic controls monitor the performance of both the cation and anion resin systems to quickly determine when regeneration is required. Independent regenerations ensure optimum resin performance and

countercurrent regeneration is utilized to minimize chemical requirements. The net result is that high purity deionized (DI) water produces significant paybacks in the form of reduced water and sewer charges and, most important, improved product quality.

Each ion exchange application is evaluated on an individual basis. USFilter's staff of experienced applications engineers and a fully equipped process treatability lab provide comprehensive testing for new applications. In this manner, your company is assured the process works - guaranteed by USFilter in writing.

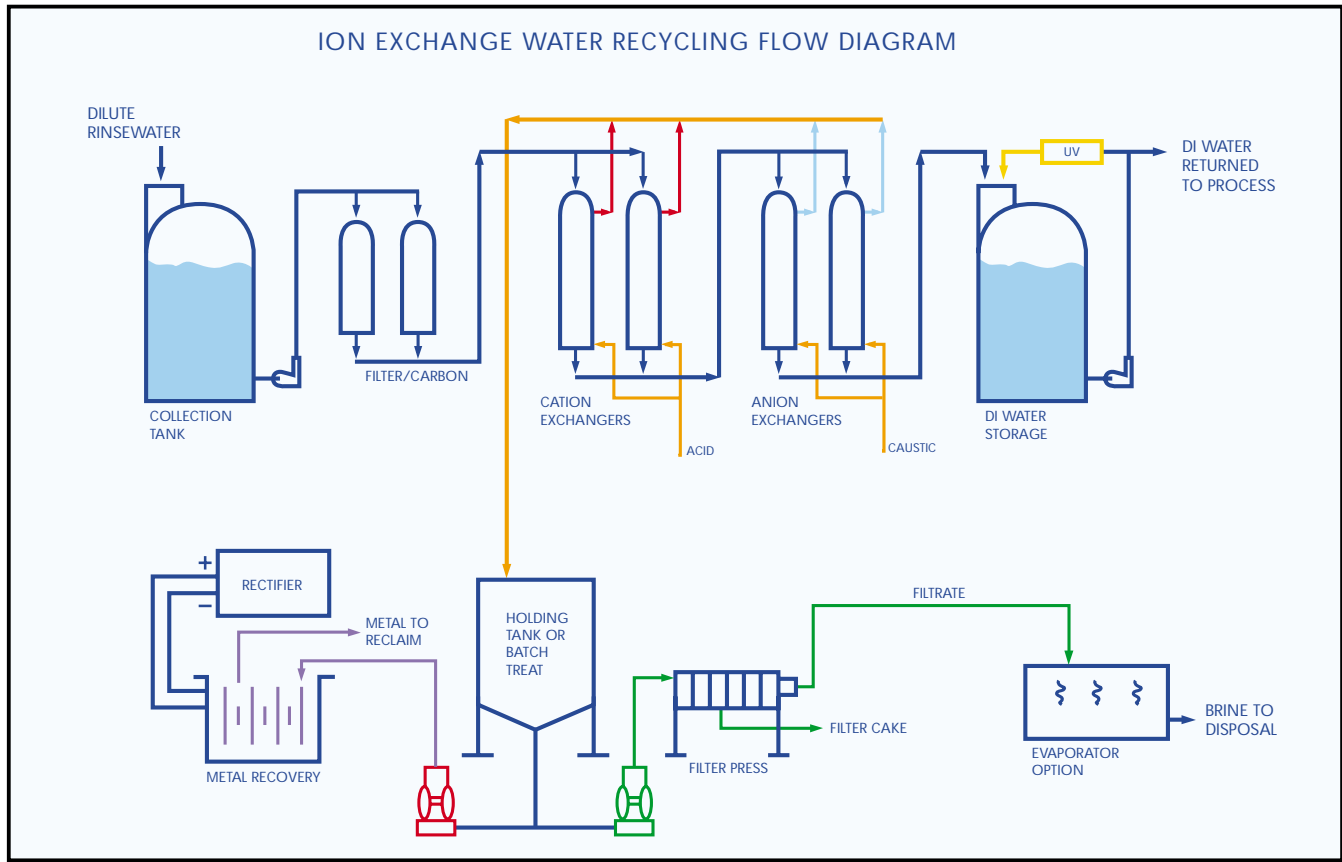
Typical Markets

- Printed Circuit Board
- Semiconductor
- Microelectronics
- Metal Finishing / Electroplating
- Anodizing
- Aerospace

PROCESS DESCRIPTION (see flow diagram)

Ion exchange resins are engineered to remove specific ionic contaminants from dilute solutions. Each resin has a fixed contaminant removal capacity. When the capacity is exhausted, the contaminants are chemically removed using either dilute acid or caustic. Ion exchange is specified only after USFilter's applications engineers determine the application is compatible. Our engineers are intimately familiar with the various resins available and they work closely with the resin manufacturers to ensure that only the best resins are specified.

Feature	Benefit
Up to 95% of process rinsewater is reclaimed	Reduces water purchase cost and reduces (or eliminates) disposal costs
High quality DI rinsewater	Improves product quality and reduces rejects (increased profitability)
Automatic controls and monitoring	Minimizes operator involvement and reclaims approximately 95% of the process water
Packed resin beds	Superior quality DI water
Countercurrent regeneration	Requires up to 50% less chemicals, minimizes waste, and reduces operating costs
Duplex resin tank systems	Minimizes DI storage requirements
Venturi chemical ejectors	Eliminates chemical dilution tanks and minimizes space requirements
Compact modular designs	Minimizes space requirements
Skid mounted equipment	Simplifies installation and reduces cost
Premium uniform particle size resins	Consistent performance and reduced pressure drops through system
Independent cation & anion regenerations	Optimizes resin performance and minimizes chemical requirements
PLC microprocessor controls	Optimum flexibility for future expansions
High speed modem	Provides remote diagnostics and programming for quick & efficient troubleshooting



A typical water recycling design collects wastewater in an equalization tank. The solution is then filtered (if required) to remove suspended solids and directed to activated carbon filters for removal of trace amounts of organic contamination. Particulate filtration removes the final traces of suspended solids prior to the cation/anion exchangers. The resulting DI product water is normally stored in a holding tank to provide a ready inventory for use on demand such as when new process solutions must be prepared.

The regenerant waste is comprised of dilute acid and caustic along with the contaminants removed by the resin system. Heavy metals in this waste can be recovered using a USFilter electrowinning cell. After metal recovery the residual waste can be concentrated for off-site disposal or directed to a waste treatment system.

Ion Exchange Water Recycling Model Numbers

	IX-15	IX-30	IX-50	IX-75	IX-100	IX-150	IX-300
Maximum Flow Rating, GPM	15	30	50	75	100	150	300
Resin Tank Sizes, diameter x height	18" x 65"	24" x 72"	30" x 72"	36" x 72"	42" x 72"	48" x 72"	63" x 86"
Approximate Skid Dimensions, L x W x H - Alternate layouts available	90" x 36" x 96"	114" x 42" x 96"	138" x 48" x 96"	162" x 54" x 96"	186" x 66" x 96"	210" x 72" x 96"	270" x 90" x 120"
Outlet Water Quality	500,000 micro-mhos (typical)						
Regeneration Requirements/Specifications (typical)							
Acid	3.5-4.0 lbs/Ft ³ HCl or 5.0 lbs/Ft ³ H ₂ SO ₄						
Caustic	2.5-3.0 lbs/Ft ³ NaOH						
Backwash	<i>Not Required*</i>						
Elution Volume (Bed Volumes)	1.0-1.5						
Slow Rinse (Bed Volumes)	1.0-1.5						
Fast Rinse (Bed Volumes)	1.0-4.0						

*Note: Backwash not required for most applications.



OPTIONAL EQUIPMENT

USFilter can provide all ancillary equipment necessary to integrate a water recycling system into a production process. Typical examples of these components are:

- Holding/Equalization Tanks
- Feed Transfer Pump Skids
- Multimedia Filtration
- Activated Carbon Filtration
- Particulate Filtration
- Evaporators
- Electrowinning Plate Out Cells
- UV Sterilization Lamps
- Regeneration Waste Treatment Systems

Contact USFilter for additional details.

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