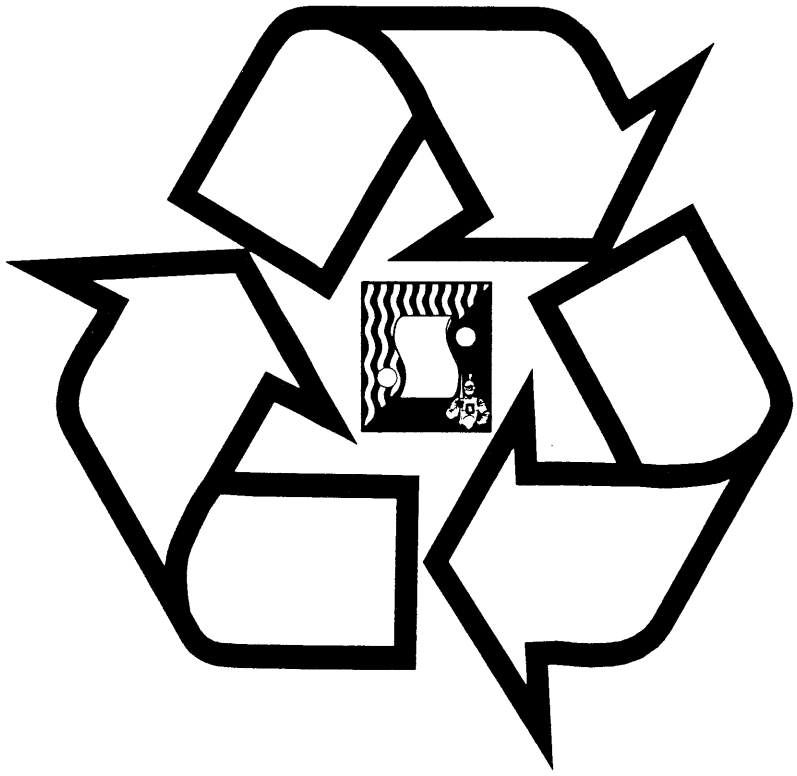
SERFILCO®

SERIES 'HM' DEIONIZER PROGRAM

TECHNICAL BULLETIN TF-137

Refer to Product Bulletin R-206

RECYCLE



Zero Discharge

DEIONIZATION AND THE REGENERATION PROCESS

What is Deionization?

It is a method of producing pure water by removal of dissolved solids by special ion exchange process. The dissolved solids are removed by using cation resin, which removes positive charged ions, replacing them with hydrogen, and anion resin which removes negative charged ions and replaces then with hydroxide. The hydrogen and hydroxide combine to form pure water.

What is TDS?

The letters TDS refer to Total Dissolved Solids in water. Hardness minerals are only a part of the total dissolved solids. TDS is measured in parts per million. Some raw water supplies contain as little as 40 parts per million of total dissolved solids. Sea water has as much as 30,000 parts per million of TDS.

The amount of TDS in the water changes the capacity of the resin. The higher the TDS, the less capacity the resin has.

What is the Difference Between Dissolved and Suspended Solids?

Dissolved solids are just that...solids that dissolve and disappear in the water. They are still there, but they actually become a part of the water. One way to remove dissolved solids is through the ion exchange process that takes place in deionization.

Suspended solids remain separated and do not become part of the water. The effective way to remove suspended solids is through filtration. Filtration must always take place before the Silex deionizer because the resin is not meant to be used as filter media. When proper filtration is not maintained, the resin beads become clogged and cannot be regenerated back to capacity.

In the plating industry, it is recommended that a five micron filter be used.

How Does the Regeneration Process Work?

We are dealing with two types of resin for plating - one type of resin deionizes the tap water (Model 9101), and the other type of resin removes the metals (Model 8101). Each resin is dealt with separately.

FACT SHEET

The Handling of Spent Resin

Q. Should spent resin be dried out before shipping?
A. No. Allowing the resin to dry will cause the beads to crack and break which causes a loss of capacity. After the resin pack has been removed from the housing, the excess water can be drained for a few minutes, but the pack should not be left to dry out completely. Note: when draining the pack, be sure to drain the water back into the deionizer housing...not down the drain!

Q. What EPA waste category does the spent heavy metal removal resin fall under?
A. Spent metal removal resin (Model 8101) is considered a "characteristic sludge" A characteristic sludge that is reclaimed is not considered a waste as specified in Rule 3745-51-01 of the Ohio Administrative Code.

Q. Is the plater responsible for manifesting the spent heavy metal removal resin to the regeneration facility?
A. No. The spent resin, being a characteristic sludge is not subject to the listing requirements that must be met by treatment, storage, or disposal facilities. In other words, as long as the metals remain contained in the resin, it is considered a characteristic sludge...not a hazardous waste, and does not have to be handled as such.

Q. Since spent heavy metal removal resin is not a hazardous waste, can it be thrown out, rather than regenerated?
A. No. As long as the spent resin is stored, it is not considered hazardous... there are no health hazards or side effects of having it around; but if it is thrown away, it will eventually become an environmental hazard, so it must be regenerated and/or properly disposed of through an EPA approved facility.

Q. When is it necessary to manifest the waste metals?
A. The regeneration facility takes care of this, because it is the water that is generated by cleaning the spent resin that is considered a hazardous waste. The water contains the metals that cannot go down the drain, and it is this product that has to be listed and manifested.

Q. What happens to the metals in spent heavy metal removal resin?
A. The regeneration facility sends it to Inmetco...a treatment facility that smelts the copper and nickel to be used again. The regeneration facility manifests the water with these metals to Inmetco.

The resins are dealt with in the following manner.

Model 9101 - Tap Water Resin

When the customer's resin is exhausted and they return it to our regeneration center (along with their regeneration coupon), the following procedure takes place.

1. The packs are emptied and the resin is pumped into separate tanks for regeneration.

2. The individual resins are then regenerated - the cation resin with acid, and the anion resin with caustic.

3. The resin is then rinsed out completely and pumped into a special measuring cell that assures each pack has the proper cation/anion mix.

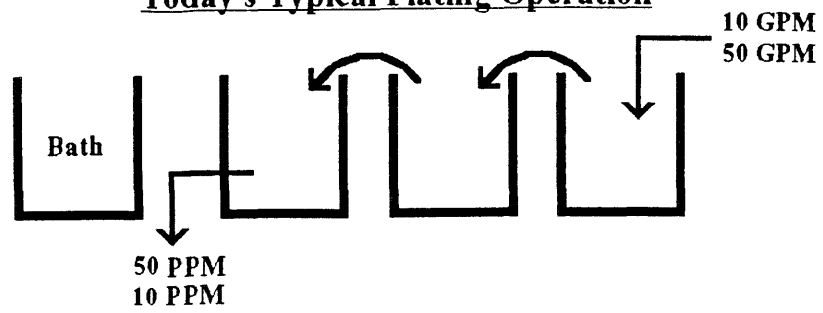
Model 8101 - Metal Removal Resin

1. The packs are emptied and the resin is pumped into separate tanks for regeneration.

2. The individual resins are then regenerated - the cation resin with acid, and the anion resin with caustic.

3. The waste water is collected in hazardous waste storage containers. The waste water is manifested to Inmetco, where it is smelted into alloys.

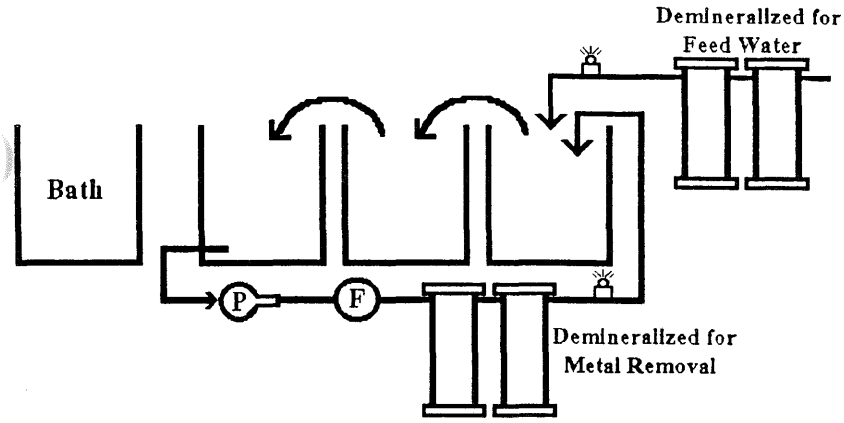
Today's Typical Plating Operation



DILUTION IS NOT THE SOLUTION TO POLLUTION!

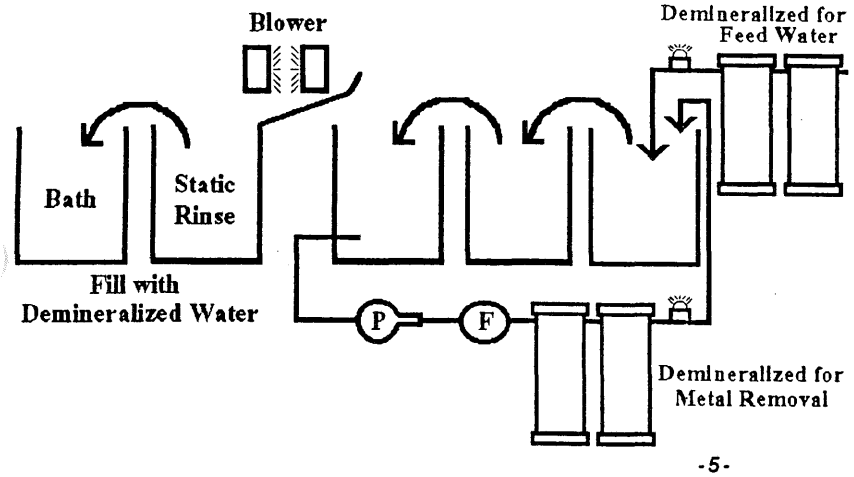
Trying to meet todays requirements for the minimum amount of metals down the drain is sometimes dealt with by increasing the amount of water to dilute the metals. This not only continues to pollute the environment with metals, but it also increases your cost of excess water, and your liability.

Typical Plating Operation with closed Recirculation Loop for Zero Discharge



By closing the loop, you can achieve zero discharge. The make up water is deionized to decrease the load of solids on the second metal removal deionizer. Also, by deionizing your make up water, your product will be cleaner and spot free. The second deionizer removes the metals, and recirculates the water through the rinse baths. Each deionizer is equipped with a water quality light to help you determine when to exchange the resin pack.

Typical Plating Operation with Zero Discharge Recirculation Loop and Provision for Static Rinse & Blower to Reduce Dragout Before Rinse



A static rinse can be installed between the plating bath and rinse tanks. In addition, a car wash type blower can be installed to remove drag out and blow it back into the static rinse tank. This has two benefits: 1) it reduces the load on the rinse tanks (and thus on the metal removal packs), and 2) in many cases, it's a valuable resource for make up to the plating bath. Th water that makes up the static rinse should be deionized.

WHY CHOOSE OUR REGENERATION SYSTEM?

- No disposal costs or responsibilities
- Zero discharge - no manifesting
- Spot free rinse
- Environmentally safe
- No high capital investment
- No expensive chemicals
- No per gallon fee
- No service/delivery fee
- No monthly rent
- Very little maintenance - only exchanging the pack
- Continuous supply of deionized water
- Anyone can exchange the resin pack in minutes
- Designed specifically for the plating industry
- Backed by a company with over 50 years of experience in the water treatment industry
- Simple coupon system saves time and eliminates confusion
- Takes up very little floor space
- Fast, efficient return on exchange of resin packs. A fresh resin pack is sent out the day after we receive the customers' exhausted pack

SERFILCO®

SERIES 'HM' DEIONIZER PROGRAM QUESTIONNAIRE

TECHNICAL BULLETIN TF-122A

Refer to Product Bulletin R-206.

Questionnaire No. Q - _____

Customer _____ Contact _____ Phone _____

Dealer _____ Contact _____ Phone _____

1. Type / Name of plating bath _____

2. Composition of plating bath (If known) _____ oz./gal.

   _____ oz./gal. _____ oz./gal.

   _____ oz./gal. _____ oz./gal.

3. Plating bath: Volume _____ gal. Temperature _____ °F

   Evaporation per day _____ gal. Surface _____ sq.ft.

   Typical items being plated _____ Suspended solids possible _____

4. Dragout:

   Method of dragout minimization (i. e.: drip, heat, blow, shake) _____

   Hangers per hour _____ Work hours per day _____ Dragout per hanger _____ ml.

5. Static rinse: Tank volume _____ gal. TDS _____ PPM

6. Counter flow rinse:

   Number of tanks _____ Rinse flow _____ GPM

   Tank volume _____ gal. each TDS _____ PPM

7. Raw tap water analysis (If bath is not D.I. water):

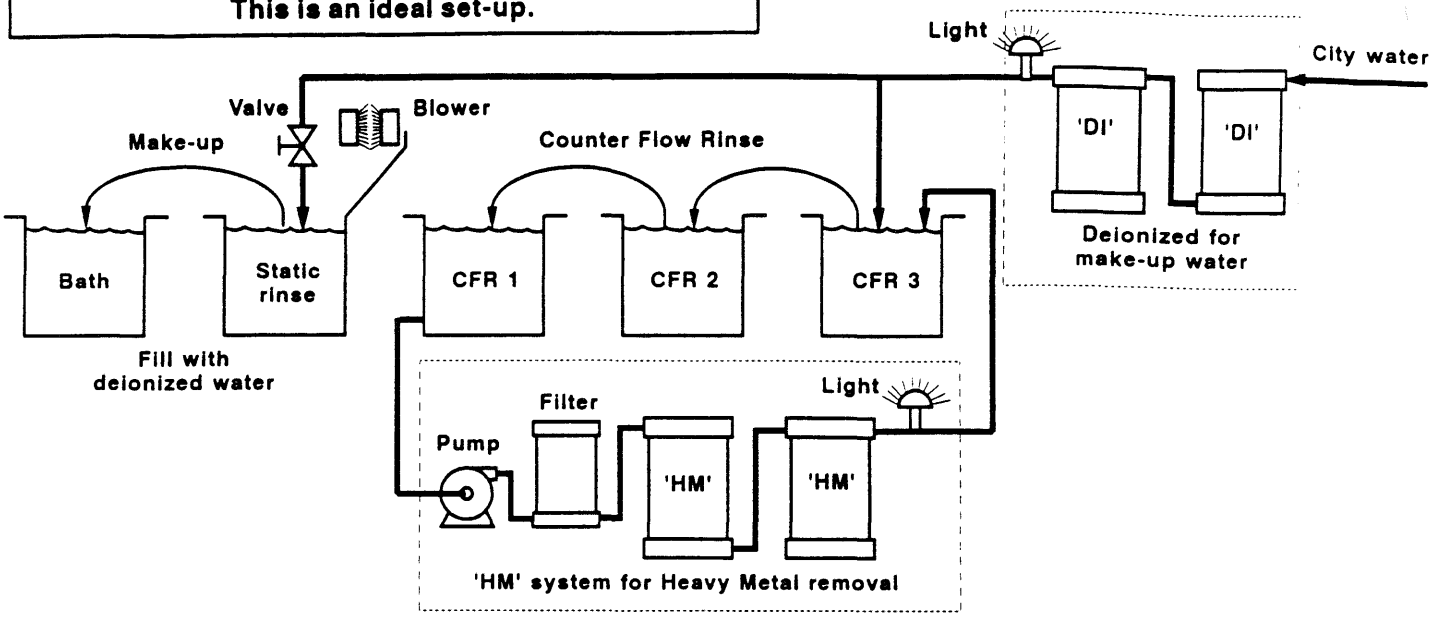
Calcium _____ PPM	Silic acid _____ PPM	Nitrate _____ PPM
Sodium _____ PPM	Iron _____ PPM	Free carbon dioxide _____ PPM
Sulphate _____ PPM	Magnesium _____ PPM	Organic matters _____ PPM
Bicarbonate _____ PPM	Chloride _____ PPM	Manganese _____ PPM

8. Customer signature _____ Date _____

Sketch layout on back.

NOTE: **Due to the regeneration process and related health hazards, all exhausted resin packs being returned for recycling must NOT contain any cyanide.**

Typical plating operation with zero discharge recirculation loop and provision for static rinse & blower to reduce dragout before rinse. This is an ideal set-up.



9. Existing water conservation / treatment method, if any: _____

_____

_____

10. Miscellaneous application notes: _____

_____

_____

Thank you for the above information. This will allow **SERFILCO** to correctly match your application needs to the proper size and type of **SERFILCO Deionizer System.**

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DISTRIBUTED BY

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