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TECHNICAL
BULLETIN
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FILTRATION OF VARIOUS SOLUTIONS FOR ANODIZING

Solutions requiring continuous or periodic filtration are hot water or nickel acetate seals, bright dip, hard coat or the anodizing solution itself, and possibly some rinse and dye tanks.

USE PROPER FILTER TUBE

Filtration with 15 micron polypropylene or cotton filter tubes at flow rates providing at least twice per hour tank turnover should be used. Cleanable sleeves used with precoat and then backwashed if desired may be used in place of filter tubes.

WHEN TO USE CARBON

Carbon with filter aid may be used and also backwashed, but if severe discoloration of the nickel acetate or hot water seal takes place from the various dyes, it cannot be removed economically and the seal solution cannot be used indefinitely. A quick check of treatment feasibility may be made by adding one-half ounce (14g) of activated carbon to a one gallon sample after any given period of use. Filter the carbon from the solution in the laboratory and observe the color. If the seal is greenish black in color, it will very likely require over five pounds of carbon per hundred gallons, costing more than the replacement of the seal solution.

If no dyes are used, it is likely that the seal tank can be run with periodic make-up for a year or more. Usually, the agitation required can be provided by the pump used with the filter. Certain chemical additives, when added to a new seal tank, may load the filter requiring more frequent backwashing or cartridge change. This condition disappears after the solution is stabilized and balanced with use.

Generally, a separate filter should be used on each seal tank with at least one unit being portable. CPVC filter chambers, with either a magnetic seal-less or CPVC horizontal pump, can be selected according to the size of the tank. The latter should have a water lubricated seal to prolong seal life. A

portable unit will also serve in a dual capacity as a transfer pump and, when needed, as filter for the anodizing and bright dip solutions, and possibly for the dye tanks.

NICKEL ACETATE SEAL APPLICATION DATA (AUTOMOTIVE AND AIRCRAFT)

Field data for this severely corrosive and high temperature (208-210°F) service indicates the average dirt load of dry solids to be removed to be on the order of .01% (100 ppm TSS) of the weight of the solution after 3 days of heavy operation (1 lb/1200 gallons). We recommend our Guardian and Sentry filter systems with the inclusion of the slurry tank with backwash piping and valves for several significant reasons:

1. The tank can be used to introduce sodium acetate to buffer the water in the seal tank to about pH 5.5, following which a nickel acetate solution of pH 3 can be prepared and added to the tank to prevent precipitation of the nickel at the time of introduction. The filter will remove any solids prior to their entering the seal tank.
2. The pressure gauge indicates the end of the filtration cycle due to solids loading of the depth tubes. The precoat tank is charged with 5-10% nitric acid to dissolve these solids, which consist of aluminum hydroxide, nickel hydroxide...carbonate or phosphate. This feature provides in-place cleaning in less than 1/2 hour and allows reuse of the filter tubes after water flushing.
3. This precoat tank will allow for precoating and carbon addition for organic or dye purification, if desired, since tank life is extended.
4. These filters offer flow rates of up to two tank turnovers per hour, and any floating scum is rapidly picked up before depositing on parts.
5. The tank can be used to prime the pump.

The SERFILCO Admiral series with in-tank pumps can also be recommended, but they do not incorporate

the precoating and backwashing features of an external system. They do, however, provide strong rinse tank agitation, if this is important.

ANODIZING SOLUTION AND BRIGHT DIP

These solutions are generally not filtered on a constant basis although some filtration at fairly regular intervals would be helpful to both. Filtration can be accomplished at the time solution is transferred during tank inspection.

DICHROMATE APPLICATION DATA

With regard to the potassium dichromate filtration, the solids to be removed will be aluminum or nickel hydroxides and silica, due to the pH variations. The dirt load will usually be slight.

DYE SOLUTIONS

Continuous or intermittent filtration of these solutions will remove solids which may spot the parts being finished and require additional cleaning. Some dyes generate an insoluble breakdown product which can be removed by filtration.

HARD COAT SOLUTIONS

Because of the critical nature of the finish required, it is best to both agitate and filter the solution. An intake pump will do both efficiently.

DEIONIZED WATER

The incoming water for solution make-up or rinsing should be prefiltered to remove any solids before ion exchange treatment. Cities having average filtration plants will provide a water which should be filtered ahead of the deionizer with 5 to 10 micron range media. Other sources of water which contain larger amounts of solids should have a second filter, as a pre-filter to the one above, using 20, 30 or 50 micron media or an inline precoat backwash system may be employed. The ion exchange column may be added in series, since prefiltration will help to maintain the effectiveness of the resin by eliminating the sludge which would otherwise coat the surface of the resin.