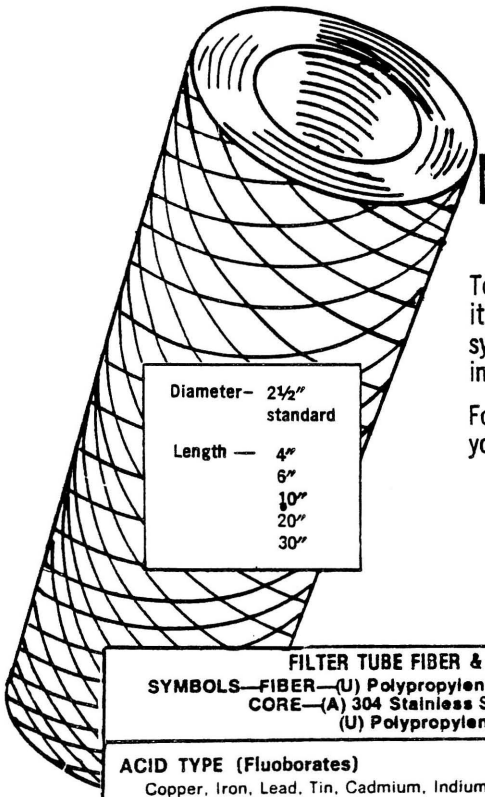
TECHNICAL BULLETIN

TM-103A



FILTER TUBE SELECTION CHART FOR ELECTROPLATING SOLUTIONS

HOW TO SELECT THE PROPER FILTER TUBE

To be assured of trouble-free filtering, clearer solutions and better plating at lower cost, it is important that the proper filter tube be selected and installed in your filtration system. The choice of fiber material—the core material—and the porosity of the windings, must be compatible with the solution to be filtered and the dirt load involved.

Follow these three steps to make the proper selections for the particular type of solution you are planning to filter.

1. **Select fiber that is compatible with the solution to be filtered.**
2. **Select core material that is compatible with the solution to be filtered.**
3. **Select porosities which vary from 1 micron, which is extra dense, to 100 microns which would be extra coarse.***

FILTER TUBE FIBER & CORE SELECTION GUIDE

SYMBOLS—FIBER—(U) Polypropylene, (C) Cotton, (M) Modacrylic, (R) Rayon
CORE—(A) 304 Stainless Steel, (S) 316 Stainless Steel, (U) Polypropylene, (T) Tinned Steel

	FIBER	CORE
ACID TYPE (Fluoborates)		
Copper, Iron, Lead, Tin, Cadmium, Indium, Nickel, Tin-lead alloys, Zinc	Polypropylene or Mod.	U
ACID TYPE (Not Fluorborates)		
Copper—Less than 8 oz./gal. sulfuric acid Electroless Baths, Chromium, Nickel, Copper, Gold	Polypropylene, Cotton or Dynel	U or S
Tin—Over 8 oz./gal. sulfuric acid	Polypropylene or Mod.	U
Chromium (Hard, Decorative or Black)	Polypropylene or Mod.	U
Gold, Indium, Rhodium, Palladium	Polypropylene or Mod.	U
Iron (Chloride—190°F) Iron—Ammonium Sulfate or Sulfamate	Polypropylene or Mod.	U
Nickel (Watts type and Bright)	Polypropylene or Cotton	U
Nickel (Hi-Chloride)	Polypropylene or Cotton	U
Nickel (Sulfamate), Electropolishing, Tin-Nickel	Polypropylene or Mod.	U
Electrotype Copper & Nickel (Low acid type)	Polypropylene or Cotton	U or S
Zinc	Polypropylene or Cotton	U or S
ALKALINE TYPE		
Tin (Stannate), Palladium, Zinc	Polypropylene or Cotton	U or T
CYANIDE TYPE		
Brass, Cadmium, Copper, Zinc, Bronze	Polypropylene or Cotton	U or T
Brass, Cadmium when operated as high speed baths at temperatures above 140° F	Polypropylene or Mod.	U or T
Gold, Indium, Platinum, Silver, Arsenic, Tin-copper alloys, Tin-zinc alloys	Polypropylene or Cotton	U or T
PYROPHOSPHATE TYPE		
Copper, Iron, Tin, etc.	Polypropylene or Cotton	U or S

FILTER TUBE POROSITY CHART

Tube Porosity	Micron	Winding No.
Extra Coarse	100	8R
Very Coarse	75	10R
Coarse	50	11R
Medium	30 (25)	13R
	20	15R
Fine	15	17R
Extra Fine	10	19R
	7	21R
	5	23R
Dense	3	27R
Medium Dense	2	—
Extra Dense	1	39R

*(When selecting the porosity of depth type cartridges, bear in mind that the coarser the cartridge, the more dirt it will retain before replacement is necessary. The coarser the cartridges, the lower the pressure drop will be and the higher the flow rate will be from the given pump, making it possible to get the dirt into the filter quicker. This in turn often makes it possible to use even coarser cartridges to accomplish the same degree of clarity that was before thought only possible with a dense cartridge.)

A—50, 75 or 100 micron cartridges should be used during initial cleanup of a dirty tank where no filter-aid is to be used with the filter.

B—15 and 30 micron cartridges are average porosity and most commonly used where continuous filtration will be employed. The 30 micron would more likely be used on an alkaline solution and the 15 micron on an acid solution. Again, much depends on the dirt load encountered by the filter on a day to day basis.

C—15 micron cartridges may also be used as the support membrane for any commercially available filter-aid (see precoating instructions). This cartridge after precoating may be manually washed and re-coated for re-use. In some cases, depending upon the type of contaminant and ability of the filter-aid to retain it, backwashing of this cartridge may be successful.

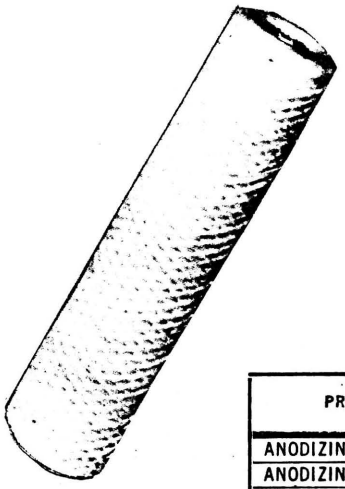
D—3 micron cartridges may be used where light dirt load exists making them economical to use for the particular application. They may also be precoated and backwashed as necessary using preferably a coarse filter-aid (usually non-fibrous) for best backwashing results. They too will have to be eventually replaced as some filter-aid and dirt and even carbon may become trapped in them, gradually increasing the pressure differential.

NOTE:

Normal sizing of the filter chamber for electroplating solutions requires one cartridge for each 50 gallons of solution or only 30 gallons on the more difficult to filter solutions such as zinc. Life expectancy would average approximately six 40 hour work weeks. This long life can be expected even on zinc, since the coarser cartridge has compensated for the slimyness of the sludge to achieve a greater dirt holding capacity. Each cartridge when operated without filter-aid, has the depth dirt holding capacity of 3½ sq. ft. of equal porosity surface and requires very little labor and no solution loss at the time of change.

Any Serfilco Electroplating Filtration System using 15 micron cartridges or denser may be precoated. Systems containing 12 or more cartridges are offered with either backwash piping or integral piping with slurry tank and backwash piping, greatly adding to the convenience in the operation of the filter. Filter chambers having only 1, 2, 3 or 6 cartridges are not provided with valve, piping or slurry tank since we feel that the cost of these additional items would not be warranted for the size of the tank. The cartridges can more easily be removed manually for cleaning.

Powdered carbon may be used with filter aid. Granular carbon may be used with separate chambers mounted downstream of filters handling only clean solution with suitable trap filters provided.



ELECTROPLATING SOLUTIONS

SELECT THE PROPER FILTER TUBE

It's vital in assuring trouble-free filtering, clearer solutions and better plating at lower cost. Choice of fiber, core material and the porosity of the windings must be compatible with the solution to be filtered and the dirt load involved.

PROCESS	pH	°F TEMPERATURE	FILTRATION	TURN-OVERS*/ HOUR	FILTER TUBES*/ 100 GAL.	FIBER/ CORE	MICRON POROSITY	CARBON TREATMENT
ANODIZING	1	60-90	Optional	1	1	U/U	15	No
ANODIZING Ni seal	5.5	200	Desirable	2	2	U/S	15	Batch
BRASS, BRONZE	10	100-200	As Required	1	1	U/U	15	As Needed
CADMIUM	12	100	As Required	2	2	U/U	30	No
CHROMIUM Hexavalent	1	110-130	Optional	1-2	1-2	M or U/U	15	No
CHROMIUM Trivalent	2-3.5	75	Continuous	2	3	U/U	1-5	No
COPPER Acid	1	20-120	Continuous	2-3	3	U/U	15	Periodic
COPPER Cyanide	11-13	120†	Continuous	2-3	3	U/U	15	As Needed
COPPER Electroless	14	100-140	Continuous	1-2	2	C/U	3	No
COPPER Fluoborate	1	70-85	As Required	1	1	U/U	15	As Needed
COPPER Pyrophosphate	8-9	110-130	Continuous	2-3	2	U/U	10-20	As Needed
GOLD Acid	3-5	80-125	Continuous	2	2	U/U	1-5	Periodic
GOLD Cyanide	7-12	75	Continuous	2	2	U/U	5	Periodic
LEAD Fluoborate	1	100	As Required	1	1	U/U	15	No
NICKEL Bright	3-5	125-150	Continuous	2-3	2-3	C/U	15	Yes
NICKEL Semibright	2-5	130	Continuous	2-3	2	C/U	15	Yes
NICKEL Chloride	2	120-150	Continuous	2-3	2	U/U	15	Yes
NICKEL Electroless	4-11	100-200	Continuous	2-3	2	C/U	15	As Needed
NICKEL Sulfamate	3-5	100-140	Continuous	2-3	2	C/U	15	Yes
NICKEL Watts	4	120-160	Continuous	2-3	2	C/U	15	As Needed
NICKEL-IRON	3.5-4	135	Continuous	2-3	2-3	U/U	15	Yes
IRON Chloride	1	195	Continuous	2-3	2	U/U	15	Yes
RHODIUM Acid	1	100-120	As Required	—	—	U/U	5	Periodic
SILVER Cyanide	12	70-120	Continuous	2	2	C/U	5	Periodic
TIN Acid	0.5	70	As Needed	—	—	U/U	15	As Needed
TIN Alkaline	12	140-180	As Needed	2	3	C/U	30	No
TIN-LEAD (solder)	0.5	100	As Needed	—	—	U/U	15	Periodic
TIN-NICKEL	2.5	150	Continuous	1-2	2	U/U	15	Yes
ZINC Acid	3-5	70-140	Continuous	2	3	U/U	15	Optional
ZINC Alkaline	14	75-100	As Needed	2-3	3	C/U	30-50	Optional
ZINC Cyanide	14	75-90	Continuous	2-3	3	C/U	30	No

*of tank volume with good cleaning cycle. With high dirt load, increase by 50-100%.

C = Bleached White Cotton
M = Mod-Acrylic
U = Polypropylene

*FILTER TUBE POROSITY GUIDE

POROSITY	MICRON
Extra Coarse	100
Very Coarse	75
Coarse	50
Medium	30 (25)
	20
Fine	15
Extra Fine	10
	7
	5
Dense	3
Medium Dense	2
Extra Dense	1

*In selecting the porosity of "depth .type" tubes, the coarser tube will hold more dirt before needed replacement. Provides lower pressure drop, higher flow rate from pump, getting dirt into filter faster. It's often possible to use a coarser tube to get the same degree of clarity thought only possible with a dense tube.

SUGGESTED TUBE USE BY MICRON RATING

A—50, 75 or 100 micron tubes should be used during initial cleanup of a dirty tank where no filter-aid is to be used with the filter.

B—15 & 30 micron tubes are average porosity and generally used with continuous filtration. The 30 micron is more applicable for alkaline solution, the 15 for acid solution. Again, much depends on the dirt load handled by the filter on a day to day basis.

C—15 micron tubes may also be used as the support membrane for any commercially available filter-aid (see precoat instructions). After precoating, this tube may be manually washed & re-coated for re-use. Depending upon the type of contaminant and ability of the filter-aid to retain it, backwashing of this tube may be successful.

D—3 micron tubes are economical to use where light dirt loads exist. They can be precoated & backwashed as necessary. For best backwashing results, use a coarse non-fibrous filter-aid. Dirt, filter-aid & even carbon may build up over a period of time creating increased pressure differential, requiring eventual tube replacement.

NOTE: Normal sizing of filter chamber for electroplating solutions require one tube per 50 gal. of solution or 30 gal. for more difficult to filter solutions as zinc. Life expectancy averages about 240 work hours. This long life even applies to zinc, coarser tubes compensate for sliminess of sludge, achieves greater dirt holding capacity. Operating without filter-aid, filter tube has depth holding capacity of 3½ sq. ft. of equal porosity surface. Fast, easy tube change . . . no solution loss.

Any Serfilco Electroplating Filtration System using 15 micron tubes or denser may be precoated. Systems with 12 or more tubes are offered with slurry tank and backwash piping, greatly adding to the filter operation. Filter chambers having only 1, 2, 3 or 6 tubes are not provided with valve, piping, or slurry tank. Cost of these added items are not warranted for this size of tank. Tubes are easily removed for manual cleaning.

Powdered carbon may be used with filter-aid. Granular carbon may be used with separate chambers mounted downstream of filters handling only clean solution with suitable trap filters provided.