FILTRATION

CONTINUOUS OR BATCH CLARIFICATION INLINE OR RECIRCULATORY INSTALLATION .

SERFILCO

OFFERS A VARIETY OF FILTERS . . . EACH SIZED FOR ANY CAPACITY

SUITABLE FOR ALL SOLUTIONS

SERFILCO offers you a complete line of filtration systems engineered to provide economical removal of foreign solids or organic impurities from a wide range of chemical solutions. Corrosion resistance, both internally and externally, is made possible through the use of a combination of compatible components in accordance with the needs of the application. Completely non-metallic systems feature materials of construction of such plastics as CPVC or polypropylene, or PVDF. Systems using steels or all stainless steel components are also available.

Choice of pumps available - from magnetic coupled seal-less type for completely leak-proof operation, or pumps with water-lubricated mechanical seals are also available.

Basic system is available with pump, motor and filter and possibly several flow control valves, or additional piping is available to bypass the filter and add convenience for venting of air from the filter chamber or draining. Other piping arrangements offer recirculation to a mixing tank or make it possible to backwash the filter media, prime the pump or add chemicals more easily.

TWO METHODS OF FILTRATION MAY BE USED AS NEEDED TO KEEP YOUR SYSTEMS CLEAN.

SERFILCO filters are designed so that you may choose according to your application either throw-away depth type cartridges which are available in different porosities or cleanable sleeve-type filter media.

1. THROW-AWAY DEPTH CARTRIDGES of various porosities offer the highest flow rate and maximum solids holding capacity. Although some cleaning and re-use may be possible, the basic advantage is that they are meant to be thrown away without solution loss and with only a minimum amount of labor required. If necessary, cartridges could be precoated with filter aid, making it possible to rinse and re-use the cartridges.

Throw-away depth cartridges consist of a series of fibrous layers each progressively denser and capable of stopping finer and finer particles as the liquid passes through. Therefore, the summation of solids retention area is equal to more than 3-1/2 sq. ft. of surface area. Depth type cartridges are available in different porosities, capable of removing particles down to the sub-micron range, or coarse enough to be used in slimy, difficult-to-filter solutions.

2. CLEANABLE SLEEVES are re-usable surface type synthetic fiber cloths which may be used with or without filter aids for finer filtration, and/or carbon as might be required.

Other filter media such as activated carbon cartridges pleated cellulose, porous ceramic or stainless may be used interchangeably. Consult factory for assistance in the selection of the proper media for you requirements.

* *

Filter cartridge dirt holding capacity is increased if flow rate velocity through each cartridge is decreased. Therefore, it reduces the number of filter cartridges required to handle a given dirt load.

Oversizing by a factor of 4 doubles the dirt holding capacity per cartridge. If a chamber is selected which holds 4x the number of cartridges, the filter is opened only 1/8 as often, reducing the labor by 87-1/2% for cartridge changing.

ECONOMICS OF FILTER CHAMBER OVERSIZING

Oversizing Factor	Number of Cartridges in Chamber*	Dirt Holding Factors per Cartridge	Time Between Cartridge Change	Cartridge Consumption/cost reduced by:	Labor Cost Downtime Solution loss reduced by:
1	C	D	T	0	0
2	2 X C	1.4D	3T	29%	67%
3	3 X C	1.7D	5T	42%	80%
4	4 X C	2 D	8T	50%	87-1/2%

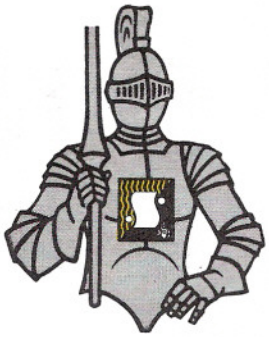
*Based on average sizing (i.e. 1x10" (25cm) cartridge per 50 gallons (200 L).

For example -

using a 12 cartridge filter	instead of a 9 cartridge filter	reduces cartridge consumption by -	13
" 9	" 6	"	18
" 6	" 3	"	29
" 9	" 3	"	42
" 12	" 3	"	50
" 15	" 3	"	55

Increasing the size of your filter chamber is particularly worthwhile since most filter chambers are offered in larger sizes at only a slight increase in cost -

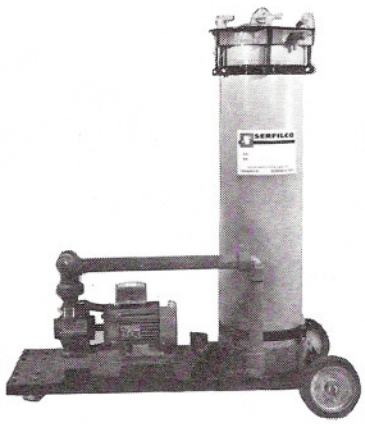
. . . . . . *plus savings in time and prevention of solution loss!*



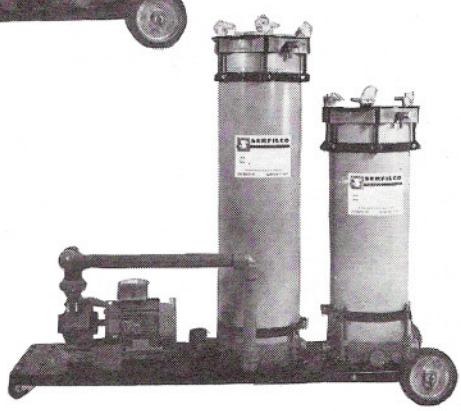
GUARDIAN or SEN

Pump & Filter Systems

These systems designed for compactness, yet offering maximum functional ability from a combination of filter chambers capable of retaining maximum solids capacity through the use of various filter media, yet providing for the lowest pressure drop to allow the highest possible flow rate from the various pumps which are available.



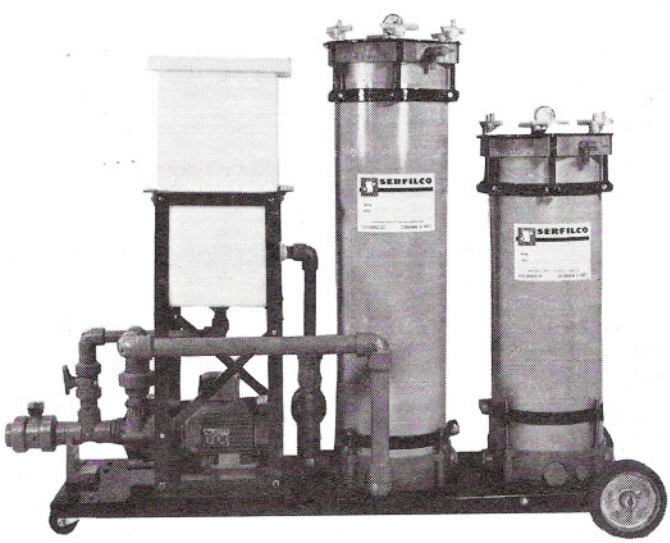
Each combination of pump and filter provides for different chemical compatibility requirements, such as all-iron, all-stainless or all-plastic.

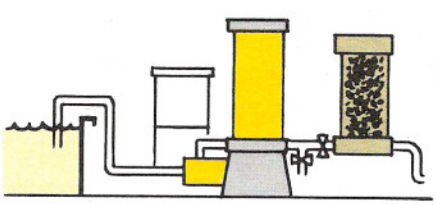


Various combinations of piping are offered from the simplest pump-filter combination to those which include drain, vent or bypass valves or tank for mixing, priming or slurry addition. Units feature magnetic coupled centrifugal pumps for leakproof operation or other pumps with mechanical or stuffing box seals.

However, when the filter is to be operated as a surface type, a tank is provided for the mixing and addition of the filter aid and carbon. Additional piping is also provided so that the filter media may be cleaned by backwashing. Both cartridges or sleeves could be used . . . the sleeves are easier to clean whereas the cartridges provide for their own trap filtration.

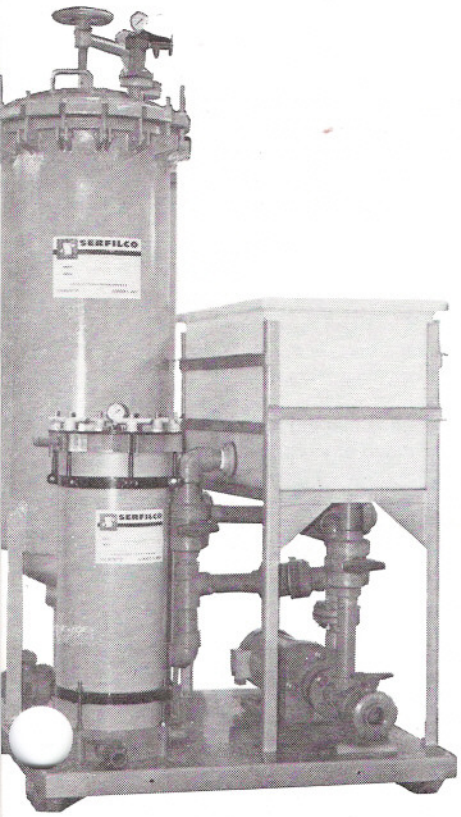
At times it might be desirable to operate with two filtration systems on an individual tank . . . one equipped with depth type cartridges for maximum solids removal while the other has been precoated or carbon packed for purification of the solution, or a separate carbon canister chamber may be used in series with the filter for organic impurity removal on a bypass basis.

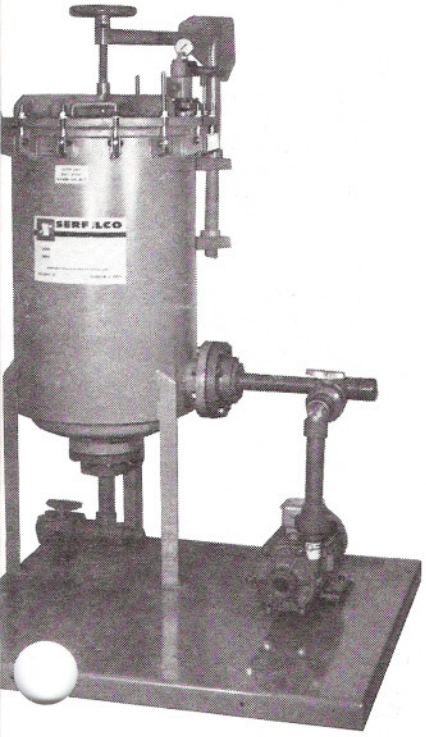




Guardian out-of-tank filter w/carbon purification chamber

TRY

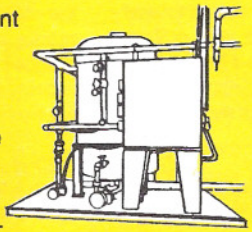




SERFILCO ALSO OFFERS:

FINAL EFFLUENT CLARIFICATION

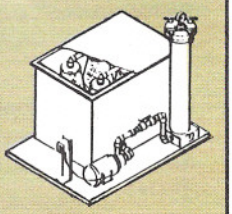
SENTINEL 'BWM' FILTER



Many waste treatment systems designed in the past are not meeting today's standards. Because of increased loading or stricter requirements, a final polishing filter is required on the clarifier discharge.

COOLANT CLARIFICATION

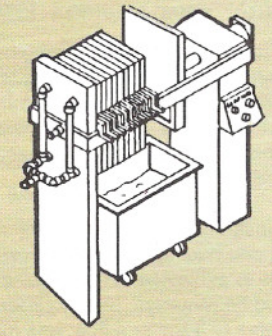
CARTRIDGE/BAG FILTRATION SYSTEM



. . . consisting of a tank with hanging, washable primary bags and a chamber with a disposable final trap filter removes all particulate matter from water used for cleaning of printed circuit boards.

PLATE & FRAME FILTER PRESS

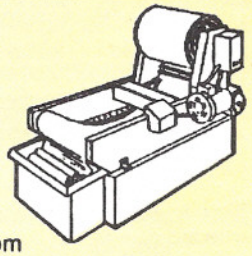
FOR DEWATERING WASTE SOLIDS - FOR DRIEST SLUDGE



High pressure compaction of treated neutralized plating waste, provides for driest sludge with only a minimum of labor for operating cost. Saves haulage disposal charges.

GRAVITY or VACUUM FILTERS

w/AUTOMATIC INDEXING DISPOSABLE FABRIC

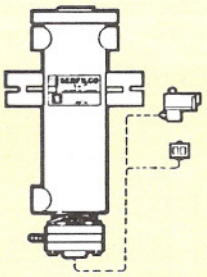


. . . designed for separating solids from industrial waste water, treated plating and chemical waste and fume scrubbers or parts washers. Unit features automatic indexing of various filter fabrics when retained solids prevent gravity flow of the liquid. Float actuated gear motors eliminate manual attendance with the exception of occasional replacement of roll type filter media. Unit is a valuable tool as part of any pollution control.

COMPRESSED AIR FILTER-DRYER

PROTECT INSTRUMENTS, AIR TOOLS, PAINT SPRAYING, etc.

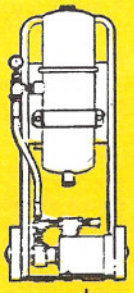
Offers effective removal of unlimited quantities of water, oil, dirt and even vapors from compressed air. Unit consists of cyclone for basic water separation followed by a desiccant for adsorption and the trap filter media . . . with lifetime guarantee of customer satisfaction.



"3-in-1"

TRANS-O-FILTER

KEEP HYDRAULIC FLUIDS CLEAN



Hand-carried or mounted on portable base featuring self-priming pumps for clarification of hydraulic fluids, chemical processing or paints and lacquer. Filter media is capable of removing abrasive fines which would otherwise damage valves and cylinders in a hydraulic system or cause rejects on a painted surface or otherwise plug up spray nozzles, etc.

. . . call today for complete information

RECIRCULATORY FILTRATION AND ITS EFFECT ON CLEAN-IN-PLACE

A NEW APPROACH TO AN OLD PROBLEM
. . . . . FOR THE CHEMICAL MANUFACTURER

Question **- How to achieve the solution clarity desired at the lowest possible cost without leaving a residue in the process tank?**
Answer **- Recirculate the liquid through the filter and back to the process tank until all particulates are retained in the filter media.**

This approach will prevent solids from settling in the tank from which you are drawing the unfiltered liquid. Your goal now is to end up with a clean"dirty" tank and a tank full of clean liquid, plus a filter filled with the retained solids. This can be accomplished if you direct filtered solution back to the "dirty" tank and recirculate until all the particles are in the filter, leaving the so-called "dirty tank for the next batch.

Recirculation has other benefits. Let's say a certain type of filter media stops most of the solids I want to retain, but not all. Thereafter, a second, third, or fourth pass through the filter may produce the desired result.

For instance . . . if a filter media having an efficiency of 90% retention of 5 micron particles is used, it also is removing some lower percentage of finer particles, let's say 50% of 3 micron. Therefore, if the porosity of the media didn't change, you could expect to pick-up an additional 50% of the 3 micron particles on the second pass, now leaving 25% left. (50% of 100 = 50, 50% of 50 = 25). Therefore, with constant recirculation, it is possible that all of the 3 micron particles could be retained in the media.

achieved, at which time the valves (see diagram) are moved to direct the clean liquid to the clean storage tank until flow ceases. The filter media is then replaced with coarse media and the recirculation commenced again until all of the liquid is transferred. (Additional recirculation of the clean tank may also be done and a second trap filter using denser media may also be used).

Will it work?
Well, it is already being done and has been for years by many other industries. Swimming pools, hydraulic and lubricating systems, plating and other types of finishing processes usually don't have a 'dirty' tank and 'clean' tank and therefore rely on continuous recirculation of the liquid passing over the filter media until the desired results are achieved. The difference is that the application allows for some solids to be present in a limited amount until removed. This presence of solids could not be tolerated in the finished product such as beer, whiskey, soft drinks, food oils and syrups, chemicals, etc., hence the need to either do a good job of filtering the first time, or recirculate until the desired clarity is achieved.

As an increased amount of solids are picked up by the filter as a result of turnover, clarity is improved.

There is, of course, the affect of increased density caused by the collected particles on the media which may speed up or increase the percentage of retention, or their presence may hinder the flow and slow down the flow rate. This would suggest that a media which may have been too dense was used.

Filter media with a broad range of porosities lends itself to recirculatory applications. Consider the possibility of using coarse filter media instead of fine on any of your applications. Permanent or throw-away media, with or without filter aids or various types of cartridges can all be applied with various degrees of success.

Often the filtration process may be started even during the mixing or dissolving of ingredients, providing that the porosity of the media is not too dense. The velocity of the liquid passing across the retained solids will cause them to dissolve quicker, if not, it becomes a filter aid assisting in the stoppage of finer particles.

A significant benefit of using less dense media to achieve the desired particle retention is the increased solids holding capacity offered by coarser media. Coarse media may provide up to five times the solids holding retention before flow is reduced to an unacceptable rate, or if monitored, recirculation may be used until a desired clarity is

We are aware of many examples of success with coarse media. For instance, 30 micron cartridges will keep hydraulic oil looking like new, will change a neglected swimming pool from green to clear overnight and turn a slimy-oily alkaline zinc solution from milky to clear. It all depends on the number of passes which dictates the flow rate required.

For instance, a 1000 gallon batch being transferred at 10 GPM would take one hour and forty minutes, but if we turned the tank over 10 times to achieve 100% contact with the filter, a pump of 160 GPM would be required. One hour for turnover recirculation, plus only forty minutes to transfer if flow was reduced to 25 GPM. Result, the 'dirty' tank would be clean, the solids would be in the filter, and the desired results would be achieved.

Therefore, if you are interested, discuss it with your supplier of filtration equipment or media. Find out what coarser media is available, determine how recirculation will affect your process, be sure there are no harmful side effects. Increase the size of your filter to hold the total amount of solids. Select the coarsest media possible by trial to get the maximum solids holding capacity, yet dense enough to achieve the desired retention. (Do it in stages if necessary. Coarse - then fine, etc.)

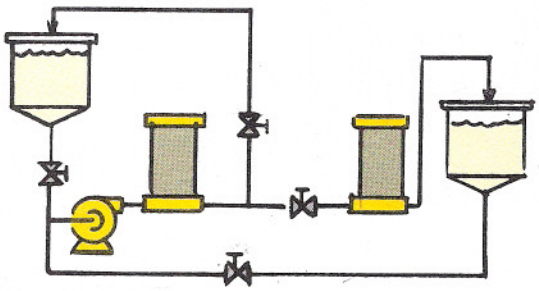
You will achieve Clean-In-Place at the lowest possible cost.

Single Pass vs. Multipass Applications

Retention ratings, by convention, are for single pass applications. Many applications involve recirculating systems. In recirculating systems, the filter media has several opportunities to capture the contaminant. For example, in a 4.0 gallon system circulating at 2.0 GPM, the fluid passes through the filter cartridge 5.0 times in ten minutes. Thus, the effective retention of a filter cartridge is much finer. Specifically, a cartridge rated at 0.5 μm (nominal) on a single pass is an effective 0.2 μm (nominal) filter on a recirculation basis.

Summary of Nominal Retention Ratings

Single Pass	Multi Pass
.5 μm	.2 μm
1 μm	.5 μm
3 μm	1 μm
10 μm	3 μm
25 μm	10 μm



SERFILCO, LTD.
1777 Shermer Road
Northbrook, IL 60062-5360 U.S.A.
708-559-1777
800-323-5431
FAX: 708-559-1995
EASTERN
717-656-2161
FAX: 717-656-0477
WESTERN
213-588-0801
FAX: 213-588-6826