SERFILCO®, LTD.

Pumps | Filters | Systems | Purification Media | Accessories

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VOL
28

Your Guide to Liquid Processing and Purification for ...

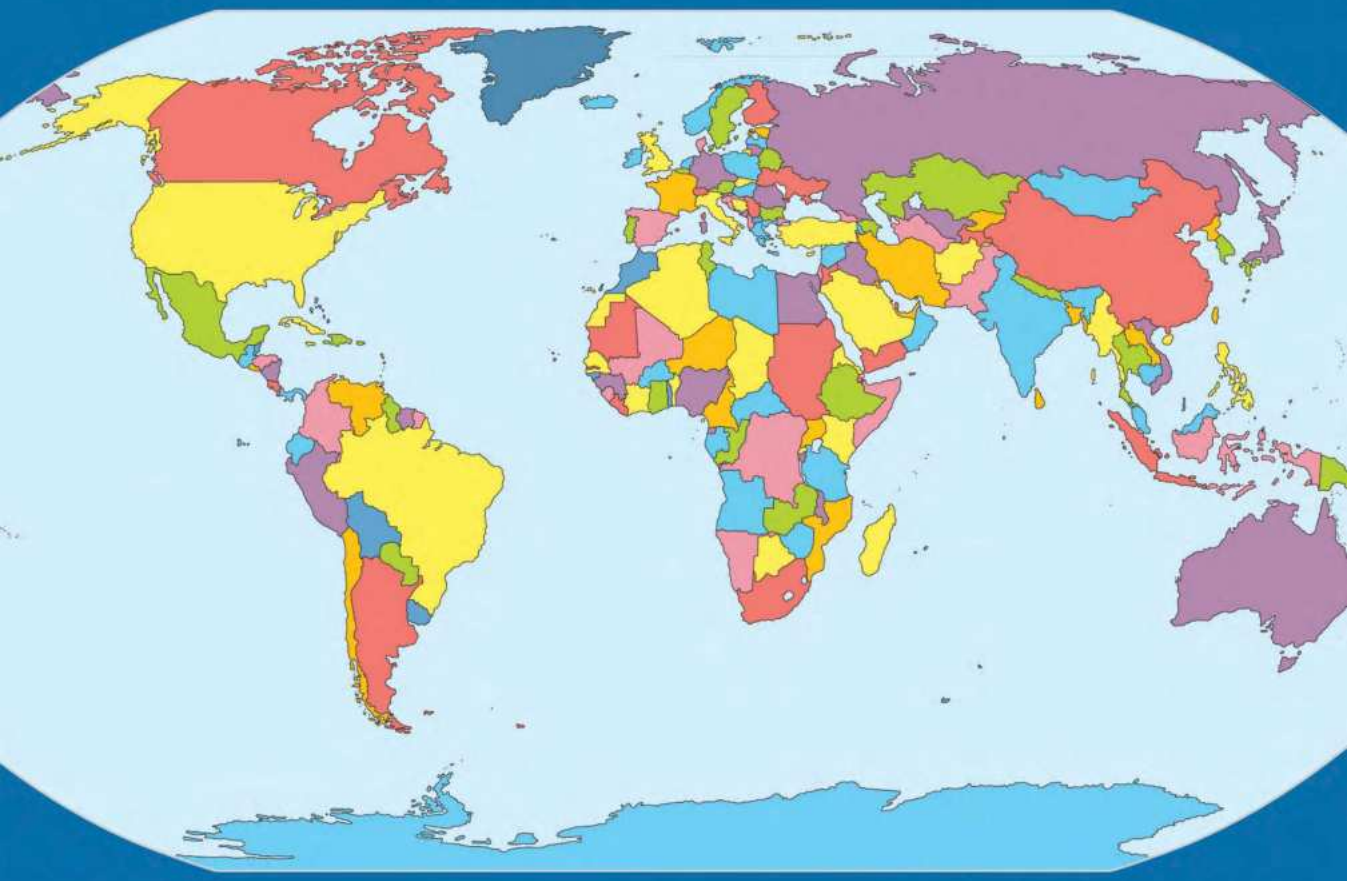
50 years

SERFILCO®

SERVING INDUSTRY WORLDWIDE

"SIR FILCO"
Protector of Industry & Environment

for over 50 years



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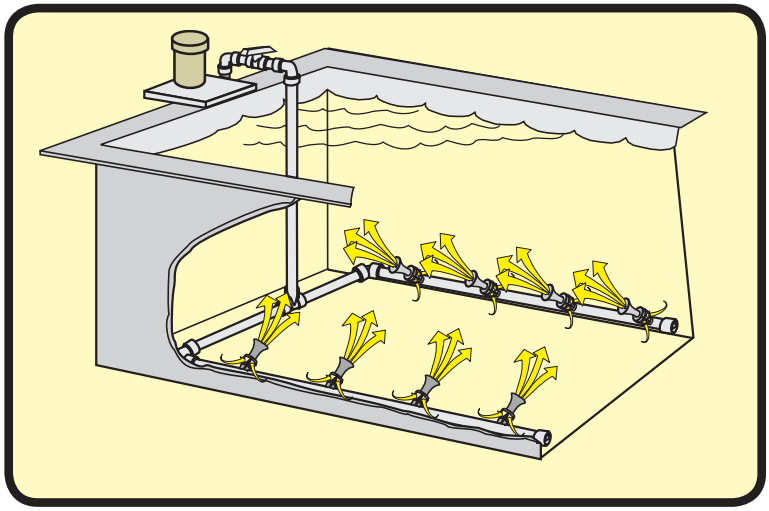
SER-DUCTOR®
PUMPED AGITATION

2900 MacArthur Blvd. Northbrook, IL USA 60062 **WWW SERFILCO COM** (800) 323 - 5431

Efficient agitation and mix ng of:
CLEANING / RINSING / PLATING / WASTE TREATMENT
and OTHER PROCESS SOLUTIONS



A SER-DUCTOR system provides solution agitation with a centrifugal pump by drawing liquid from a tank and returning it to the tank through a sparger system, similar to that used for air agitation, with eductors strategically placed along the sparger pipe.

SER-DUCTOR agitation delivers 5 times the pump output at each nozzle. It effectively distributes the desired level of agitation to critical areas in your process tank. The system is driven by your choice of vertical, magnetic drive, self-priming or mechanical seal pump.

With SER-DUCTOR systems, solutions are agitated without the introduction of foreign matter such as airborne dirt or compressor oil, as is often the case with air agitation. Whether the solution is a cleaner, a rinse, a plating bath or other process solution, it is only this fluid that is recirculated by the SER-DUCTOR system.

SER-DUCTOR agitation in a process tank keeps particulate from settling to the tank bottom where it can form a layer of sludge that shortens the life of the solution, requires expensive dumps, new make-ups and costly downtime in between for manual cleanout of the tank bottom. By effectively keeping the "dirt" in suspension, the SER-DUCTOR system makes it easier for a filtration system on the tank to remove particles. This extends the life of the bath and greatly reduces the possibility of contamination being carried to other tanks in the process cycle where it can lead to costly rejects and even product failure.

PROVEN BENEFITS OF SERDUCTOR SYSTEMS IN PLATING APPLICATIONS

- Reduces airborne fume emissions by 90%
- Saves heating costs up to 25%
- Reduces brightener consumption 20%
- Saves metal as a result of more uniform brightness and thickness distribution
- Improves throw and deposit thickness in blind and through holes and recesses
- Permits increased current density, especially compared to air or cathode rod agitation, for faster plating rate
- Reduces carbonates in alkaline processes
- Reduces or eliminates gas-pitting
- Provides constant agitation because SER-DUCTOR systems don't clog

SER-DUCTOR® AGITATION SYSTEMS APPLICATIONS

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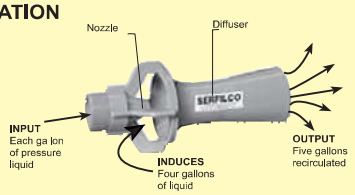
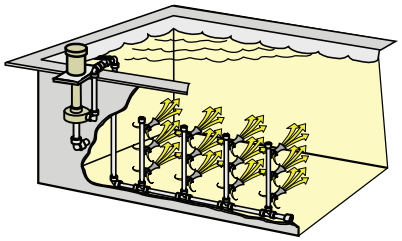
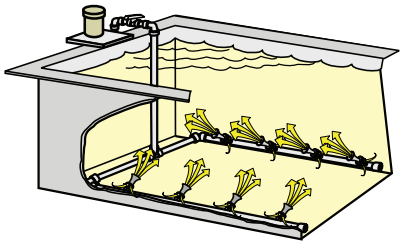
PRINCIPLE OF OPERATION

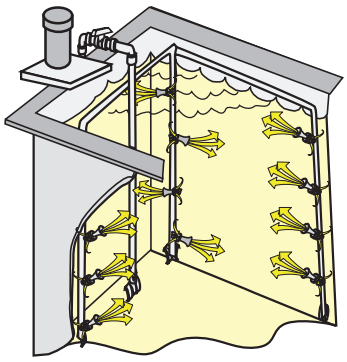
Liquid pumped into the eductor nozzle exits at high velocity, drawing an additional flow of the surrounding solution through the eductor. This additional flow (induced liquid) mixes with the pumped solution and multiplies its volume five-fold. The source of the pumped liquid (input) can be a pump or filter chamber discharge.



TYPICAL APPLICATIONS







FOR PRINTED CIRCU T BOARDS AND RACK PLATING

SER DUCTOR agitation in p inted circuit boa d manufactu - ing and rack plating applicat ons nhances pla ing s lution flow ac oss the boa d surface Carefully engi eered clusters of eductor nozzles sweep away cathode films swiftly allow- ing faster plating at lower voltages with much higher current densities. More even plating and significantly lower metal usage result. (The horizontal direction of eductors stationed along ver ical distributor pipes i a typical SER-DUCTOR configuration for these applications.)

FOR PARTS CLEANING IN BASKETS OR ON RACKS

SER-DUCTOR agitation for bulk parts clean ng in baskets or for racked work improves solut on flow through the wo k and assures greater impingemen of fresh solution on he par s.

Additionally, in cleaner tank applicati ns SER DUCTOR agitation prevents temperature strat fication. It also keeps solids in suspension so they can be more easily removed by filtration This extends bath life and reduces chemical make- up costs (The moderately upward angle of these eductors along “wishbone” distributor piping provides the proper di- rection of solution flow)

FOR MIXING

Vigorous SER-DUCTOR agitation within the tank creates sufficient solution movement to eliminate solution strati-fica- tion This movement lends itself to mixing two or more liquids or to mixing a liquid and a powder (A more extreme angle of eductor positioning is helpful in mixing bath components and assuring continuing uniformity of the solution.)

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TO ORDER, use Price Code Number

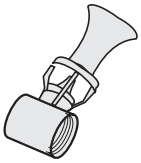
SER-DUCTOR NOZZLES

CONN	POLYPROPYLENE		CPVC		PVDF		ECTFE		316 STAINLESS STEEL		IRON	
MN PT	MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN
1/4"	ME 1/4	33-1930	MEC 1/4	33-1930 C	MEK 1/4	33-1930 K	MEH 1/4	33-1930 H	—	—	—	—
3/8"	ME 3/8"	33-1732	MEC 3/8"	33-1732 C	MEK 3/8"	33-1732 K	MEH 3/8"	33-1732 H	MESS 3/8"	33-1732 S	MES 3/8"	33-1732 F
3/4"	ME 3/4"	33-1733	MEC 3/4"	33-1733 C	MEK 3/4"	33-1733 K	MEH 3/4"	33-1733 H	MESS 3/4"	33-1733 S	MES 3/4"	33-1733 F
1-1/2"	ME 1-1/2"	33-1734	—	—	MEK 1-1/2"	33-1734 K	—	—	MESS 1-1/2"	33-1734 S	MES 1-1/2"	33-1734 F

NOZZLE DIMENSIONS

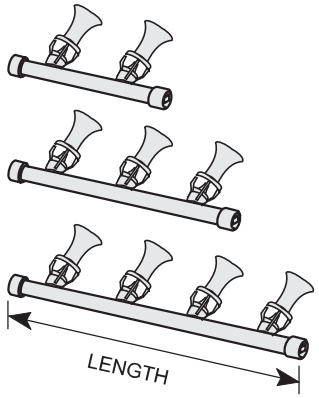
CONNS	DIMENSIONS	
MNPT	Length	Diameter
1/4	2-3/4"	1-1/4"
3/8"	4-1/4"	2-1/8"
3/4	6-3/8"	3"
1-1/2"	9-7/8"	4-5/8"

SER DUCTOR COUPLING/NOZZLE ASSEMBLY



COUPLING	1/4" PP	3/8" PP	3/4" PP
FNPT	PCN	PCN	PCN
3/4"	33-7003	33-6098	—
1"	33-7004	33-6022	—
1-1/4"	33-7005	33-6099	33-6024
1-1/2"	—	33-7000	33-6025
2"	—	33-7001	33-6026

PRE-ENGINEERED SYSTEM



PIPE SIZE	EDUCTORS		LENGTH		PP/CPVC		PVDF/PVDF	
MNPT	No.	Size	Inches	Meters	Model	PCN	Model	PCN
1"	2	3/8"	24	.6	S-E1	33-6006	S-E1K	33-6006 K
	3		36	.9	S-E2	33-6007	S-E2K	33-6007 K
	4		48	1.2	S-E3	33-6008	S-E3K	33-6008 K
1-1/4"	2	3/8"	24	.6	S-E4	33-6009		
	3		36	.9	S-E5	33-6010	—	—
	4		48	1.2	S-E6	33-6011		
1-1/4"	2	3/4"	24	.6	S-E7	33-6012		
	3		36	.9	S-E8	33-6013	—	—
	4		48	1.2	S-E9	33-6014		
1-1/2"	2	3/8"	24	.6	S-E16	33-6081	S-E16K	33-6081 K
	3		36	.9	S-E17	33-6082	S-E17K	33-6082 K
	4		48	1.2	S-E18	33-6083	S-E18K	33-6083 K
1-1/2"	2	3/4"	24	.6	S-E10	33-6015	S-E10K	33-6015 K
	3		36	.9	S-E11	33-6016	S-E11K	33-6016 K
	4		48	1.2	S-E12	33-6017	S-E12K	33-6017 K
2"	2	3/8"	24	.6	S-E19	33-6084	S-E19K	33-6084 K
	3		36	.9	S-E20	33-6085	S-E20K	33-6085 K
	4		48	1.2	S-E21	33-6086	S-E21K	33-6086 K
2"	2	3/4"	24	.6	S-E13	33-6018	S-E13K	33-6018 K
	3		36	.9	S-E14	33-6019	S-E14K	33-6019 K
	4		48	1.2	S-E15	33-6020	S-E15K	33-6020 K

All SER-DUCTOR systems can be connected to achieve extended length assemblies.

PROCESS MIXERS

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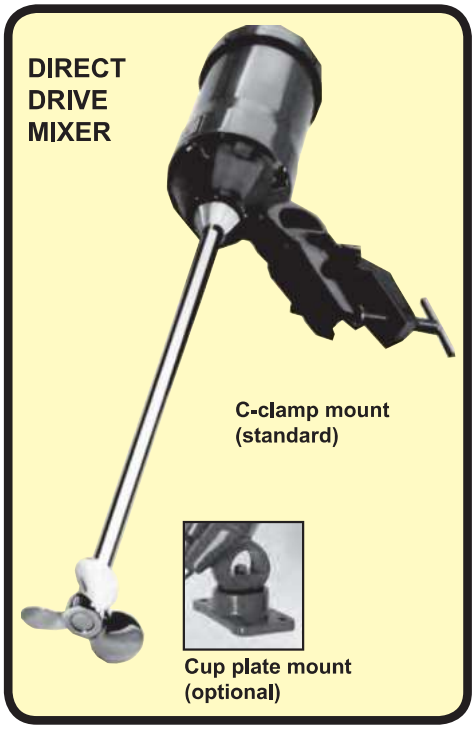

GEAR DRIVE and DIRECT DRIVE

For waste treatment neutralization, blending two or more liquids, or mixing liquids with solids

TYPICAL APPLICATIONS:

WASTE TREATMENT
FOOD PROCESSING
COSMETICS
CHEMICAL MANUFACTURING
PHARMACEUTICALS
PAINTS AND INKS

- **For tank sizes to 4500 gallons Pumping rate to 4500 GPM**
- **Single or dual propeller configurations**
- **Variable speed drive available for shear sensitive liquids**
- **Mixers for special applications available. Consult Sales Department**

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SPECIFICATIONS

Motor: 1750 RPM, TEFC electric or air operated
Gear housing: Heavy wall A-356-T6 heat-treated cast aluminum - polished before painting.
Mounting: Universal C-clamp (standard) or rigid cup plate mount.
Shaft: 5/8" - 1 1/2" diameter 316L stainless steel, center-less ground and polished for vibration-free operation.
Dual chuck set screws allow for shaft removal without disassembling mixer.
Propellers: Square pitch, 3 blade marine propellers or high efficiency impeller — 316L stainless steel.

Do not use on flammables or in a combustible atmosphere.
Consult Sales Dept. for mixers designed for this purpose.

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SERFILCO DIRECT DRIVE MIXERS utilize a precision-bored shaft chuck connected directly to a 56C frame motor. Permanently lubricated chuck support bearing and elastomeric lip seal with garter spring means no contamination from lubricants and no maintenance. Operating RPM is 1750.

SPECIFICATIONS

MODELS	PUMPING RATE[1] (GPM)	APPROX. TANK SIZE (GAL)	PROPELLER			SHAFT			MOTOR
			TYPE	DIAMETER (IN)		DIA (IN.)	STD LGTH (IN.)	OPT. LGTH (IN.)	HP
				SINGLE	DUAL				
SMD1025	230	up to 250	JP3	4.0	3.5	5/8”	42”	-	0.25
SMD1050	325	200-400	JP3	4.5	4.0	5/8”	42”	54”	0.5
SMD1010	445	250-500	JP3	5.0	4.5	5/8”	30”	-	1.0
SMD3010	445	300-600	JP3	5.0	4.5	1”	38”	50”	1.0
SMD3015	590	500-800	JP3	5.5	5.0	1”	38”	50”	1.5
SMD3020	770	600-1000	JP3	6.0	5.0	1”	38”	50”	2.0

[1] Data based on 100 CPS viscosity and specific gravity approximately equal to 1.0.

TO ORDER, use Price Code Number

FOR DIRECT DRIVE MODEL, SELECT MIXER, SINGLE OR DUAL PROPELLER AND MOTOR FROM TABLES BELOW.

EXAMPLE:	Mixer	+	Propeller	+	Motor	=	Model	=	Price Code No.
	SMD3010	+	1	+	1 PHASE	=	SMD3010-1-G1.0	=	50-1241G

BASIC MODEL		PROPELLER				MOTOR					
MODELS	PRICE CODE NO	SINGLE PROP		DUAL PROP		115-230/1/60		230-460/3/60		AIR	
		MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN
SMD1025	50-121	-1	1	-2	2	-G.25	G	-H.25	H	-AIR	R
SMD1050	50-122					-G.50		-H.50			
SMD1010	50-123					-G1.0		-H1.0			
SMD3010	50-124					-G1.0		-H1.0			
SMD3015	50-125					-G1.5		-H1.5			
SMD3020	50-126					-		-H2.0			

Direct Drive motor height -17½” Air Drive height - 12”

OPTIONAL	ADD TO MODEL	PCN
Cup Plate Mount	-C	O-CM
Optional Length - Direct Drive	-OL	O-LD

NOTE: When the tank height is greater than 1¼ times the tank diameter, dual propellers should be used to assure complete mixing. The second propeller is generally located midway between the bottom propeller and the liquid surface.
See Technical Bulletin TA-105 for selection guidelines.

GEAR DRIVE MIXERS

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SERFILCO DOUBLE REDUCTION HELICAL GEAR DRIVE MIXERS, AGMA quality 8, provide smooth, quiet performance. Mixer operating speed is 350 RPM. Heavy duty design offers more mixing capability than any other portable mixer. SMG40 models have integral motor / gear reducer. SMG50 models have separate motor and gear reducer.

SPECIFICATIONS

MODELS	PUMPING RATE[1] (GPM)	APPROX. TANK SIZE (GAL)	PROPELLER			SHAFT			MOTOR
			TYPE	DIAMETER (IN)		DIA (IN.)	STD LGTH (IN.)	OPT. LGTH (IN.)	HP
				SINGLE	DUAL				
SMG4012	1230	750-1200	JP3	12.0	—	1”	38”	62”	1.0
SMG4013	1564	1200-1750	JP3	13.0	—	1”	38”	62”	1.0
SMG4014	1954	1500-2500	JP3	14.0	12.0	1”	38”/62”[2]	62”/74”[2]	1.0
SMG5015	2713	2000-3000	SC3	14.3	—	1.5”	68”	80”	1.5
SMG5020	3632	3000-4000	SC3	16.5	—	1.5”	68”	80”	2.0
SMG5030	4445	3500-4500	SC3	17.1	14.3	1.5”	68”	80”	3.0

[1] Data based on 100 CPS viscosity and specific gravity approximately equal to 1.0.
[2] Shorter length for single prop; longer length for dual prop

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TO ORDER, use Price Code Number

FOR GEAR DRIVE MODEL, SELECT MIXER, SINGLE OR DUAL PROPELLER AND MOTOR FROM TABLES BELOW.

EXAMPLE:	Mixer	+	Propeller	+	Motor	=	Model	=	Price Code No.
	SMG4014	+	1	+	1 PHASE	=	SMG4014-1-G1.0	=	50-1331G

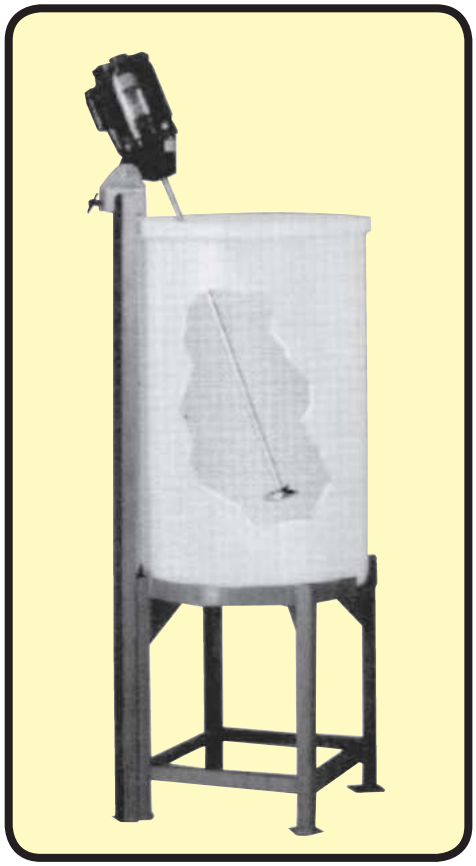
BASIC MODEL		PROPELLER				MOTOR			
MODELS	PRICE CODE NO	SINGLE PROP		DUAL PROP		115-230/1/60		230-460/3/60	
		MODEL	PCN	MODEL	PCN	MODEL	PCN	MODEL	PCN
SMG4012	50-131	-1	1	—	—	-G1.0	G	-H1.0	H
SMG4013	50-132			—	—	-G1.0		-H1.0	
SMG4014	50-133			-2	2	-G1.0		-H1.0	
SMG5015	50-134			—	—	-G1.5		-H1.5	
SMG5020	50-135			—	—	—		-H2.0	
SMG5030	50-136			-2	2	—		-H3.0	

Motor and gear box length - 22”

OPTIONAL	ADD TO MODEL	PCN
Cup Plate Mount	-C	O-CM
Optional Length - Gear Drive	-OL	O-LG

MIXING STATIONS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431



- **Excellent for mixing, adding flocculating agents, waste treat, plating, chemical processing**
- **Pre-engineered packages**
- **7 sizes to choose from** Up to 250 Gallons
- **Chemical resistant**
- **Seamless — corrosion-resistant tanks -** Molded HDPE
- **Cone bottom for easy and complete emptying with optional drain**
- **For liquids to 160°F and 1.3 S.G., 500 CPS**

These mixing stations feature a heavy duty HDPE tank, epoxy painted steel tank stand with mixer mount. The mixers are direct drive to 1725 RPM for optimum tank mixing and blending. Motors are 115/230/1/60. Tank connections and valves ordered separately.

For custom inlet & outlet configurations, consult Application Engineering Dept.

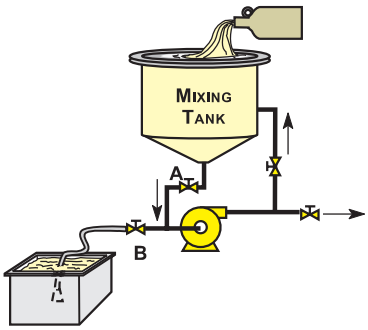
MODEL NUMBER	TANK SIZE		MIXER H.P.	PRICE CODE NO.
	GALLONS	DIA. x HT. (in.)	TEFC	
MS30	30	18 x 29	1/4	48-0974
MS55	55	22 x 36	1/4	48-0975
MS75	75	30 x 24	1/3	48-0976
MS100	100	30 x 36	1/3	48-0977
MS125	125	42 x 24	1/3	48-0978
MS200	200	31 x 65	1/2	48-0979
MS250	250	42 x 46	1/2	48-0980

PORTABLE DOLLY & MIXING TANK

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

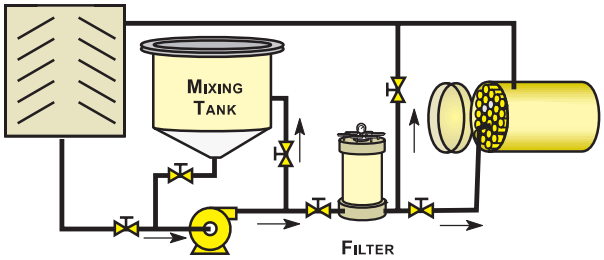
For use with any end suction horizontal centrifugal pump to provide pumping, transferring, recirculating, cleaning or filtering.

- **CHEMICAL & FOOD PROCESSING TANKS**
- **PHOTOGRAPHIC SOLUTIONS**
- **ETCHING SOLUTIONS**
- **CLEANING SOLUTIONS**
- **WASTES** • **ACIDS**
- **CHEMICALS** • **PLATING**
- **FUME SCRUBBING**
- **COOLING TOWER**



PUMP PRIMING
Pumps can be primed by first recirculating solution between the mixing tank and the pump. Partially open valve B to remove air from the suction hose.

ADDING CHEMICALS TO SOLUTIONS
Chemical additions to solutions being pumped can be made directly by placing the chemicals in the mixing tank and opening valve A.



PRECOATING A FILTER
Provides a convenient way to add filter aid (precoating) to a filter support membrane and to provide additional filter aid and carbon as required.

CLEANING A TANK, BOILER or COOLING TOWER
Provides easy descaling, rinsing and flushing with or without a filter.

ADD TO PUMP MODEL NO.	DESCRIPTION	PRICE CODE NO.
-SV	MIXING TANK with piping, valves and base assembly. Consists of a 7.5 gallon (28 liter) polyethylene tank with cone bottom, polypropylene outlet strainer, PVC tank frame. CPVC union ball valves on suction and discharge, two 1" NPT CPVC union ball valves (tank inlet and outlet), CPVC piping, all mounted on an 18" x 33" (457mm x 838mm) vinyl coated steel stationary base. Includes pump installation and quick coupling hose adapter on suction and discharge. (Order pump separately.) Shipping weight – approximately 100 lbs. (45 kg) Order -SV system to match pump suction connection: with 1" NPT suction and discharge valves with 1½" NPT suction and discharge valves with 2" NPT suction and 1½" NPT discharge valves	 48-0972 48-0962A 48-0973
-P	PORTABLE with two fixed wheels, two swivel casters and pull handle. *Note:* If double seal is required, be sure to use self-contained water recirculating pump kit for flushing. (See separate bulletin.)	O-2042
HOSE	HOSE Select necessary length of hose and clamps for suction and discharge.	See separate bulletin

For SERFILCO pump selection, see Bulletins P-203 (HC/HK), P-201 (HE), P-504 (D), P-509 (M), P-621 (F)

SERIES 'WPH'
pH/ORP CONTROLLERS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

Used for the addition of acids and bases to plating solutions; neutralization of waste streams; cooling tower and boiler feed preparation; process control monitoring and recording.

Versatility for a Broad Range of Applications
Select from pH or ORP measurements and from five output options. Use "In-Range" to control a solenoid valve to dump a batch treatment tank when measurement value is within limits, or program for "Out-of-Range Alarm" in waste treatment applications when the measurement value is too high or low.

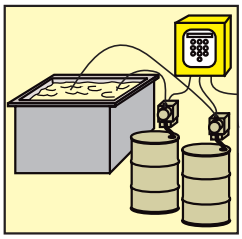
Ideal for Harsh Environments
The NEMA 4X enclosure, combined with W-EL electrodes, provide a waterproof system with no BNC connectors exposed to wet or corrosive environments.

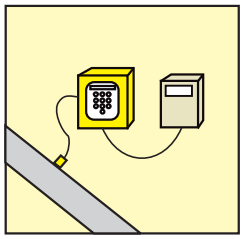
Built-in Safety Features
Programmable output limit timers prevent run-away chemical addition. Digital Interlock Input may be used from a flow switch or level input to prevent chemical addition based on a stagnant sample, or control of an empty batch tank.

Simple, Integrated Data Collection
Download stored data from the controller to a USB stick with the press of a button. Use the data to simply and easily validate system performance, document compliance, and reduce liability. The data and event logs show pH/ORP and temperature values, as well as accumulated chemical feed and relay activation times.

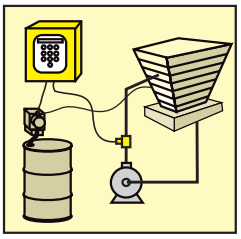
'WPH' Series pH/ORP on-line process controllers will improve your treatment performance. Microprocessor-based, with a very easy-to-use menu format, 'WPH' Series controllers measure in pH or mV accurately and reliably. A versatile output configuration allows you to program up to four outputs in a variety of ways – with just one controller.

'WPH' Series controllers are available with either on/off mechanical relay outputs or direct pulse proportional control for metering pumps. Installation is as easy as unpacking the unit, mounting it and plugging it in. We also offer other wiring options to fit your requirements.


PROCESS CONTROL


WASTE STREAM MONITORING


WASTE NEUTRALIZATION/ RECYCLING


COOLING TOWER

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

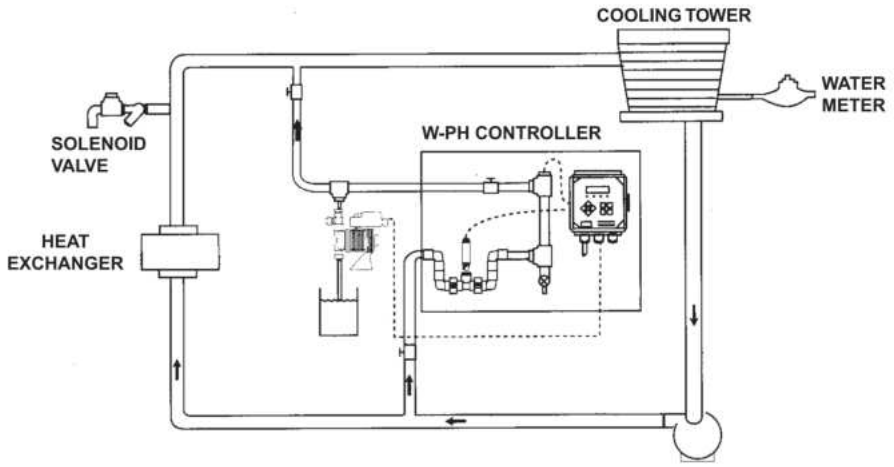
W-PH410 Series On/Off Control

Four control relays may be set as all high or all low or any combination. The control deadband is fully adjustable.

W-PH420 Series Pulse Proportional Control

Two pulse outputs that may be set independently, enhanced by an adjustable minimum and maximum pulse per minute setting, plus three dry-contact relays for control or alarm.

- **Microprocessor-based with intuitive menu format** - No potentiometers to adjust, all set points are known precisely, no repetition of adjustments is necessary.
- **pH or ORP measurement** is configurable via a software menu setting - Reduces inventory requirements.
- **Versatile relay configuration** - Control outputs can be set as high or low set points via keypad. Auxiliary outputs can be set as:
  High alarm
  Low alarm
  In-range output
  Out-of-range alarm
  Probe wash
- **Probe wash feature** - For applications that require frequent electrode cleaning, automatic probe wash stretches out reliable measurement life between maintenance interruptions.
- **Auto buffer recognition** - software selectable for U.S. or European calibration standards.
- **Optional 4-20 mA output** - internally powered and fully isolated, for sending clear signal to a chart recorder, PLC or other control device.
- **At-a-glance status display** - Look at any set point without interrupting control or needing the access code. Able to view:
  Analog graph relative to set points
  pH-ORP values
  Status of alarms, outputs
- **Calibration reminder** - Calibration menu displays the date of the last sensor calibration and allows the user to set the number of days between calibrations. The controller will prompt the user to perform a calibration at the specified time.
- **Self diagnostics** - Software and electronics are constantly monitored, without having to take the controller off line. Any operator-action-needed messages are displayed in plain English. A fifth relay is activated by any diagnostic failures.
- **Self test** - selected via menu, a simulated pH and temperature signal is input to the controller. This on-line diagnostic allows sensor or controller problems to be deciphered quickly.
- **Optional USB feature -** Easily create charts and graphs that demonstrate system performance and identify system upsets



W-PH Controller with In-Line Electrode

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

AGENCY CERTIFICATIONS

UL	ANSI/UL 61010-1:2004, 2nd Edition*
CAN/CSA	C22,2 No.61010-1:2004 2nd Edition*
CE Safety	EN 61010-1 2nd Edition (2001)*
CE EMC	EN 61326 :1998 Annex A*

Note: For EN61000-4-6,-3 the controller met performance criteria B.
*Class A equipment: Equipment suitable for use in establishments other than domestic, and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes.

MEASUREMENT PERFORMANCE

Range	-2 to 16 pH ± 1500 mV (ORP)
Resolution	.0015 pH units (.01 pH displayed) 92 µV (1 mV displayed) (ORP)
Accuracy (Calibrated)	± .01 pH ± 1 mV (ORP)
Temperature Range	32 to 212°F (0 to 100°C)
Temperature Resolution	± .09°F (.05°C)
Temperature Accuracy	± .9°F (± .5°C)

INPUTS

Power	100-240 VAC, 50/60 Hz, 8A
Preamp Power	± 5 VDC, 5 mA
Signal pH/ORP	± 1500 mV
Temperature Comp. (opt.)	Pt 100 or Pt 1000
Interlock (opt.)	solated dry contact closure required (i.e. flow, level, etc.)

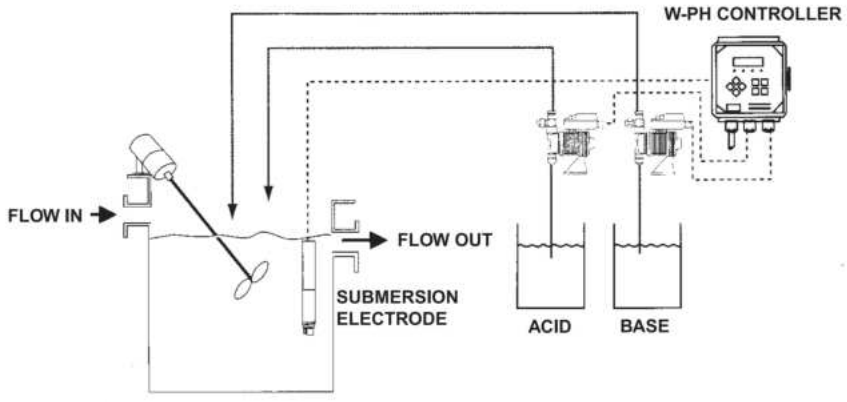
MECHANICAL

Controller	
Enclosure	Polycarbonate
NEMA Rating	NEMA 4X (IP 65)
Dimensions	7.25" x 7.5" x 5.0"
Display	2 x 16 character backlit liquid crystal
Ambient Temperature	32 to 122°F (0 to 50°C)
Shipping Weight	7 lbs (3kg) (approximately)

OUTPUTS

Powered Relays	Internally powered relays switching line voltage 6A (resistive), 1/8 HP All relays are fused together as one group, total current for this group must not exceed 6A
Pulse Outputs	Opto-isolated, Solid state relay 150 mA, 40 VDC Max. VLOWMAX = .13V @ 18 mA
Dry contact relays	6 A (resistive), 1/8 HP Dry contact relays are not fuse protected

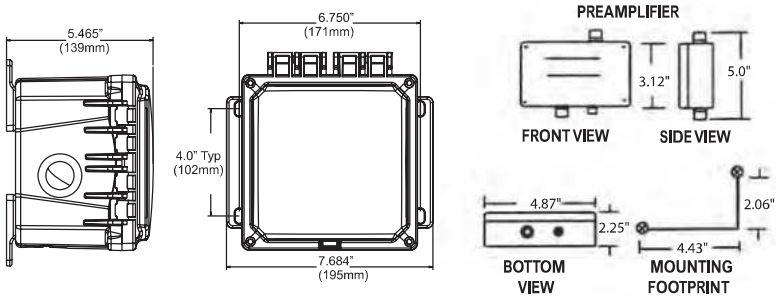
MODEL	CTRL1	CTRL2	CTRL3	CTRL4	ALARM
W-PH410	Powered		Dry		
W-PH420	Pulse		Dry		



W-PH Controller with Submersion Electrode

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

DIMENSIONS



ORDERING INFORMATION

W-PH4 ☐ 0 – ☐ ☐ ☐ ☐

(Control) (Voltage) (Outputs) (Option) (USB)

CONTROL OUTPUTS
1 = Two powered, three dry contact relays
2 = Two proportional relays, three dry contact relays

VOLTAGE
1 = 120 VAC, prewired, 6" pigtails (WPH410) or 10 ft. cables (WPH420 only)
3 = 120 VAC, prewired, 10 ft. cables with connectors (EW pumps)
5 = Hardwired, cable glands

OUTPUT
N = NONE
4 = 4-20 mA
2 = Two 4-20 mA

OPTIONS
N = NONE (requires electrode with pre-amp)
1 = Prewired preamp with 10 ft. cable (electrode not included. Electrode should have BNC connector)

USB FEATURES
N = Software upgrade capability only
U = Integrated datalogging

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ELECTRODE ASSEMBLY without PREAMP

Cartridge type, gel-filled double junction, CPVC with 20 ft. cable and BNC connections. Wetted materials of construction: CPVC, HDPE, Viton®, glass (pH) and platinum for (ORP)

			PRICE CODE NO.
pH ORP pH	Submersion, 1" NPT (User supplies pipe and coupling)	N-TC[1] N-TC[1] A-TC[2]	W-ELPHF41 W-ELMVF41 W-ELPHF31
pH ORP pH	In-line, 1¼" NPT (User supplies pipeline tee)	N-TC[1] N-TC[1] A-TC[2]	W-ELPHF42 W-ELMVF42 W-ELPHF32

ELECTRODE ASSEMBLY with PREAMP

Cartridge type, gel-filled double junction, CPVC with 20 ft. cable and finned leads. Wetted materials of construction: CPVC, HDPE, Viton®, glass (pH) and platinum for (ORP)

			PRICE CODE NO.
pH ORP pH	Submersion, 1" NPT (User supplies pipe and coupling)	N-TC[1] N-TC[1] A-TC[2]	W-ELPHF21 W-ELMVF21 W-ELPHF11
pH ORP pH	In-line, 1¼" NPT (User supplies pipeline tee)	N-TC[1] N-TC[1] A-TC[2]	W-ELPHF22 W-ELMVF22 W-ELPHF12

[1] Non-temperature compensated.
[2] Automatic temperature compensated.

REPLACEMENT ELECTRODES

DESCRIPTION	PRICE CODE NUMBER
pH electrode, flat surface ORP electrode, flat surface	W-ELPHFNN W-ELMVFNN

CABLE ASSEMBLY

DESCRIPTION	PRICE CODE NUMBER
4 pin pulse connection for AA7, B7 and C7 metering pumps	L-33796

ANALOG pH and ORP CONTROLLERS, RECORDERS and MONITORS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

For use in the addition of acids and alkalies to plating solutions, neutralization of waste streams, chemical reactions, cooling tower and boiler feed preparation, process control monitoring and recording.

MODEL 440 pH CONTROLLER / MODEL 443 ORP CONTROLLER - For use indoors

MODEL 440 pH CONTROLLER is designed to provide alkaline or acid addition to cooling towers, plating and chromating solutions and process streams to adjust pH to a desired setpoint. Output connections to the meter will actuate a metering pump or solenoid valve. Readings are indicated on a 5.5" taut-band analog meter. Solid state setpoint actuation avoids troublesome meter contacts. The aluminum case is ideal for panel or wall mounting. Output power is wired to a grounded output receptacle at bottom of case.

MODEL 443 ORP CONTROLLER is designed to provide addition of oxidation/reduction agents to process streams. It is possible to control chlorine or sulfur dioxide gas or liquid sodium hypochlorite, sodium thiosulfate or chromic acid additions and DTC type metal precipitants.

- **With single or dual set points**
- **Easy to read 5.5" analog meter**

TO ORDER, use Price Code No.		
MODEL	**METER FUNCTION**	**PRICE CODE NO. ***
440	pH	56-0045
443	ORP	56-0044

* For 220V/1/50, add **C** to Price Code No.

OPTIONAL	
Dual set point	add 56-0200

MODEL 436 pH or ORP CONTROLLER - For use in outdoor or corrosive atmospheres

- **With single, dual, triple or quad setpoints**
- **Weatherproof case**
- **Similar to Models 440 & 443**

MODEL 436 pH and ORP CONTROLLERS are designed for outdoor and corrosive atmosphere environments. The case is NEMA 4x rated to protect the instrumentation from corrosion. Combination electrodes are used with both pH and ORP. Function and major features are the same as parallel Models 440 and 443 above.

TO ORDER, use Price Code No.	
MODEL	**PRICE CODE NO. ***
436-pH	56-0065A
436-ORP	56-0065B

* For 220V/1/50, add **C** to Price Code No.

OPTIONAL	
Dual setpoint	add 56-0200
Viewing window in cover	add 56-0089
Audible alarm (Requires add'l setpoint)	add 56-0139
Automatic temperature compensation	add 56-0179

FEATURE	MODEL 440 pH	MODEL 443 ORP	MODEL 436-pH	MODEL 436-ORP
Accuracy	Meter ± 0.2 pH	Meter ± 15 mv	Meter ± 0.1 pH	Meter ± 5 mv
pH meter (ORP meter)	5.5" taut-band movement			
pH range (ORP range)	0 to 14 pH	0 - 1000 mV, 10 mV div.	0 to 14 pH	0 - 1000 mV, 10 mV div.
Setpoint range	2 to 12 pH	0 - 1000 mV	2-12 pH, accuracy ± 0.2 pH	0 - 1000 mV
Setpoint stability	± 0.05 pH per month	± 5 mV per month	± 0.05 pH per month	± 5 mV per month
Input current	2 picoamperes maximum			
Temperature compensation	0° C to 100° C in 2° C divisions			
pH electrode connector	Teflon® insulated BNC			
Reference electrode connector	Pin jack			
Automatic temp. compensation connector	Standard phone jack			
Electrode to controller distance	100 ft. nominal w/o preamp			
Power requirements	115 V/1/60, 10 watts		115 V/1/60, 8 watts	
Output	Single, 115V AC 5 amp controlled by the setpoint. May be alarm to indicate on or off condition. Front panel indicator light.			
Fuses	One 5 amp on pump circuit (1/6 HP motor load), one 1/4 amp for controller electronics			
Size	13" high x 9" wide x 3" deep		12" high x 10" wide x 6" deep	
Weight	4.3 lbs.		12 lbs.	
Case	Designed for panel or wall mounting. Requires 12-1/8" x 8-1/8" panel cut out. Aluminum with baked enamel finish.		FRP NEMA 4X. Up to four setpoints may be provided. Neoprene door gasket with all inputs and outputs through the bottom of the case.	

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

MODEL 432 MONITOR pH or ORP RECORDER/CONTROLLER - For process, reaction and waste water

- **Two set points: one for recorder, one for recorder/controller, with space for two optional setpoints and timer**
- **Weatherproof FRP NEMA 4x case**
- **Simple installation**
- **Select options and electrodes to suit your needs**

MODEL 432 pH or ORP RECORDER/CONTROLLER has two independent measuring channels - one with analog meter and the other with a chart recorder. Each channel is used with its own probe monitoring two separate locations, or both channels can share a common probe. The Model 432 is available as either a pH or ORP instrument. Two setpoints are standard.

The setpoints may be used as high / low when both acid and alkaline additions are needed as in a neutralization tank. The second probe can then be placed in the effluent stream to record final pH. If only acid or alkaline is to be added for neutralization, only one setpoint will be connected to the meter and the other can be used as high alarm or recorder.

Hexavalent chrome or cyanide destruct is accomplished by ORP. In this case, only one setpoint is needed and only one reactant is added. Setpoint relays can activate metering pumps, solenoid valves or alarms. Two additional setpoints can be added for maximum versatility. The optional pulse timer prevents over-dispensing of reactant due to a probe or circuitry failure.

TO ORDER, use Price Code Number			
MODEL	**POWER**	**PRICE CODE NO.**	**SHIPPING WEIGHT**
432-pH	115V/1/60 115V/1/50 220V/1/50	56-0066 56-0066B 56-0066C	25 lbs.
432-ORP	115V/1/60 115V/1/50 220V/1/50	56-0142 56-0142B 56-0142C	

OPTIONAL	PRICE CODE NO.
Additional setpoints, to 5 total	add 56-0200
Dual channel setpoint for recorder	add 56-0140
Viewing window in cover	add 56-0089
Adjustable pulse timer, 0 to 60 seconds on and off	add 56-0141
Audible alarm (Requires additional setpoints)	add 56-0139

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MODEL 437 pH or ORP RECORDING CONTROLLER (Similar to Model 436 except has chart recorder instead of analog meter.)

shown with window option

- **Weatherproof fiberglass enclosure** (NEMA 4x standard.)
- **5 amp control circuit**
- **Dual setpoint option**
- **5 amp control circuit**
- **Timer options**
- **2.6 inch strip chart** Includes one roll of chart paper.
- **100 ft. electrode extension without preamp**

TO ORDER, use Price Code No.	
MODEL	**PRICE CODE NO.**
437-pH 437-ORP	56-0178 56-0213

For 220V/1/50, add **C** to Price Code No.

OPTIONAL	
Dual setpoint	add 56-0200
Window	add 56-0089

FEATURE	MODEL 432-pH		MODEL 432-ORP		MODEL 437-pH	MODEL 437-ORP
	METER	RECORDER	METER	RECORDER		
Accuracy	± 0.1 pH	± 0.1 pH	5 mV	± 5 mV	Does not apply	
Range	0-14 in 0.1 div.	2 to 12 pH	0.00-1,000 mV	0 - 1,000 mV		
Indicator	5.5 taut band movement	2-9/16 press. sens. strip chart	5.5 taut band movement	2-9/16 press. sens. strip chart	2-9/16" pressure sensitive strip chart	
Setpoint accuracy	0.2 pH		20 mV		0.2 pH	20 mV
Setpoint range	2 to 12 pH		0 to 1,000 mV		2 to 12 pH	0 to 1000 mV
Setpoint stability	± 0.05 pH per month		± 5 mV per month		± 0.05 pH per month	± 5 mV per month
Setpoint dead band	0.05 pH		5 mV		0.05 pH	5 mV
Setpoint pilot light	Indicates when output relay is activated					
Cabinet size	16" high x 14" wide x 8" deep				12" high x 10" wide x 5" deep	
Temperature compensation	0° C to 100° C in 2° C divisions					
Power requirements	115 VAC / 1 / 60Hz, 10 watts					

pH & ORP CONTROLLERS, RECORDERS & MONITORS cont'd

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

MODEL 400 pH MONITOR RECORDER - For continuous pH recording of waste or process streams

- **Benchtop or panel mount**
- **Compact 5.5" high x 3.5" wide x 7" deep**
- **Rugged— die cast metal with epoxy coating**
- **Inkless 30 day chart** (First roll included)

MODEL 400 pH MONITOR RECORDER weighs in at under 5 lbs., small enough to fit in a briefcase. The compact Model 400 pH recorder features inkless pressure sensitive paper which lasts up to 30 days. Teflon® insulated input circuit assures accurate measurement in severe conditions and allows the use of an electrode up to 100 ft. away without a pre-amp. Controls are conveniently located on the face of the instrument. Panel mount hardware included.

TO ORDER, use Price Code Number			
MODEL	POWER PRICE	CODE NO. SHIPPING	WEIGHT
400	115V/1/60 220V/1/60 220V/1/50	56-0046 56-0046B 56-0046C	5 lbs.

MODELS 434 and 111 ANALOG pH MONITORS

MODEL 434 pH MONITOR

MODEL 434 MONITOR has the same reliable circuitry found in our laboratory instruments. Its NEMA 4X case provides excellent corrosion-proof and chemical resistant protection.

MODEL 111 MONITOR is identical in function to Model 434, but is designed for panel mount. The same reliable monitor is used where weather resistant feature is not needed.

TO ORDER	
MODEL	PRICE CODE NO.
434	56-0176
111	56-0177

MODEL 111 pH MONITOR

FEATURE	MODEL 400	MODEL 434	MODEL 111
Accuracy	± 0.1 pH	0.05 pH when within 2 pH of a buffer solution, 0.1 pH when beyond 2 pH of a buffer solution.	
pH range	2 to 12 pH	0 to 14 scale with 0.1 pH divisions	
Display	2-9/16 chart	5.5" taut band meter	
Input current	2 picoamperes maximum	2 picoamperes maximum	
Temperature compensation	0° C to 100° C in 2° C divisions	0° C to 100° C in 2° C divisions	
pH electrode connector	BNC	BNC	
Power requirements	115V/1/60, 8 watts	115V/1/60, 10 watts	
Size	5-1/2 high x 3-1/2 wide x 7 deep	10" high x 8" wide x 5" deep	8" high x 8-1/2" wide x 2" deep

CONTROLLER AND RECORDER ACCESSORIES

ITEM AND DESCRIPTION APPLICABLE TO	MODEL NOS.	PRICE CODE NO.
DUAL CONTROL OPTION - Includes a second DPDT relay and a second setpoint control. Valuable when adding to solutions.	436, 437, 440, 443	56-0200
	432, 436, 437	56-0201
- Specify this option when second setpoint is to be wired to the recorder - useful as an alarm or to control the addition of a final neutralization treatment.	432	56-0202
- Specify this option when second setpoint is to be used as an over-range safety shutoff in the event fouling of the electrode poses a problem. The recorder setpoint is connected in series with the controller setpoint. The recorder setpoint is then adjusted 1 or 2 pH units beyond that of the controller.	432	56-0203
ADJUSTABLE CYCLE TIMER - A solid state timer which will start timing when the setpoint is reached. At any preset point between 0 and 50 minutes, the timer will reverse the output relay. This safety feature is designed to stop an acid pump in a closed system in the event of a mechanical or electrode failure.	432, 436, 437, 440	56-0204
BNC to BNC EXTENSION CABLE (to 100 ft. maximum)	400, 432, 436, 440, 443	Base 56-0207 + 56-0207A per ft.
pH / ORP CHART PAPER (inkless 30 day)- 50 divisions, 63 foot roll	400, 432, 437	56-0211
ELECTRODE FILLING SOLUTION		56-0304A

pH and ORP ELECTRODES and ACCESSORIES

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

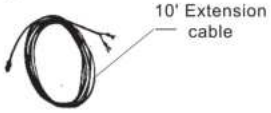
For pH and ORP controllers, recorders, and monitors Models 111, 400, 432, 434, 436, 437, 440 and digital

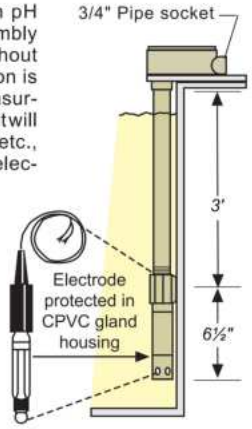
Combination pH electrodes have an all glass seal design allowing high temperature operation, easier cleaning and less carry over between solutions. The small silver-silver chloride internals provide rapid temperature equilibrium and the low bulb impedance allows rapid response even at low sample temperatures. These electrodes are designed for all pH meters having a zero potential near pH 7. For portable or lab use electrodes, see Bulletin A-303.

IMMERSION ASSEMBLY WITH REPLACEABLE ELECTRODES

- **Double junction design**
- **Sealed peripheric junction combination pH electrode** with extension cable and spade lug connections
- **Annular non-fouling reference junction**
- **Removable guard** for ease of cleaning
- **Permits use where high solution currents prevail**
- **Easy mounting**
  CPVC 36" x 3/4" NPT pipe extension and terminal with terminal strip for No. 6 spade lug connector and junction box. 10' extension cable (BNC to spade lug). Available with 8" x 3" x ½" PVC mounting bracket.
- **CPVC electrode gland**

Features a peripheric junction combination pH electrode housed in a CPVC immersion assembly and can be replaced in a matter of minutes without tools. The special peripheric reference junction is designed in an annular form around the pH measuring electrode. With this special junction design, it will allow operation where sulfides, heavy metals, etc., would normally foul a standard combination electrode reference. This immersion assembly will satisfy the requirements of almost any continuous process application in which a pH electrode must be submerged into a tank, trough or manhole. ORP ± 5000 mV, pH 0-14, Temp -5 to 100°C.





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TO ORDER, use Price Code No.	
DESCRIPTION	**PRICE CODE NO.**
IMMERSION ASSEMBLY	
with double junction pH electrode	56-0301
with double junction ORP electrode	56-0302

OPTIONAL & REPLACEMENT EQUIPMENT		
DESCRIPTION		**PRICE CODE NO.**
Replacement electrodes with 36" leads & spade lug connector	pH	56-0115
	ORP	56-0086
Immersion pipe (¾" MNPT) & terminal box, CPVC		56-0539
Electrode gland housing, CPVC		56-0540
10' extension cable - BNC x spade lug		56-0311
PVC mounting bracket, 8" x 3" x ½"		56-0568

DISPOSABLE COMBINATION ELECTRODE ASSEMBLY

A single junction probe features both the pH measuring and reference constructed in a single stem for a single probe convenience. The sealed reference needs no pressurization or filling during entire probe life. The combination pH electrode is potted permanently into the PVC housing with a 3/4" NPT fitting.

1" outside diameter x 6" overall length. pH 0 to 14. Temperature - 5 to 80 °C. To 100 PSI.

DESCRIPTION	PRICE CODE NO.
In-line general purpose, 3/4" MNPT with 10 ft. BNC cable.(Fig. 1)	56-0305
Refillable immersion general purpose - extra life, 3/4" FNPT w/10' BNC to spade. May be used with immersion pipe above. (Fig. 2)	56-0541
Drum pH probe assembly - 42" long (Fig. 3)	56-0543
Extension cable BNC (female) by BNC (male) 10 ft.	56-0542

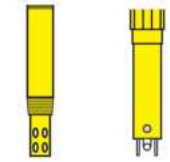


FIGURE 1

FIGURE 2
Refillable reference junction

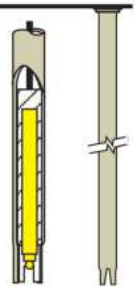


FIGURE 3

CONDUCTIVITY CONTROLLER / MONITOR

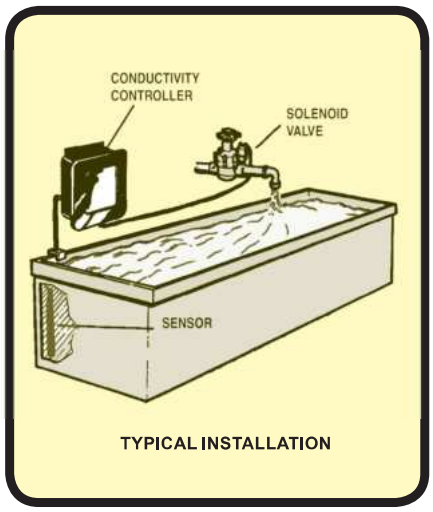
2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

CONDUCTIVITY CONTROLLER

Ideal for plating rinse water

MODEL CC-97 (wall mounted)

MODEL CC-97 WALL MOUNTED SYSTEM



TYPICAL INSTALLATION

BENEFITS:

- **Conserve rinse water - up to 85%**
- **Eliminate rejects from spotty rinsing**
- **Reduce waste treatment load**
- **Reduce sewer use charges**

FEATURES:

- **Corrosion resistant enclosure**
  Wall mount NEMA 12 enclosure
  LED lamps: POWER ON, VALVE OPEN
- **Submersion sensor - dual range**
  0 to 500 micromhos
  500 to 5,000 micromhos
  Variable set-point
- **Solenoid valve**
  Nylon (glass reinforced), 1" NPT
  24 volt for safety

What it does -
The CC-97 controller is a fully automatic system which will greatly reduce the amount of water used in continuous flow rinse tanks. At the same time, it automatically maintains water quality, ensuring effective rinsing in water up to 180°F (82°C).

How it works -
The three parts of the system are easily installed. Submersible conductivity sensor is adjusted to either of the two microsiemen scales and immersed in rinse tank. Controller set-point is then selected. Generally, rinse water contamination is caused by chemicals being "dragged in" and salts that are dissolved from the parts being rinsed. These solutions ionize and can be measured and controlled by their electrical conductivity. Rinse water cannot flow into the tank until the contamination level rises above the set-point. Sensor then signals for solenoid valve to open and add fresh water. When the dilution lowers the contamination to below the set-point, the solenoid valve will close. Indicator lights on controller signal operating power and valve position.

WATER CONDUCTIVITY		
ppm (NaCl)	**Microsiemens**	**Water Quality**
1 - 150	2 - 300	D. I.
10 - 20	20 - 40	Demineralized
20 - 100	40 - 200	Soft
100 - 300	200 - 600	Medium
300 +	600 +	Hard

For specifications, refer to next page.

CONDUCTIVITY CONTROLLER / MONITOR Specifications

A-305_R

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

SPECIFICATIONS

MODEL CC-97 CONTROLLER SYSTEM	
CONTROLLER - NEMA 12 wall mount, NEMA 3 panel mount	
Input power	Choice of 120 or 240 VAC, 50/60 Hz. Automatic voltage regulation insures operation of the systems from 105-125V or 210-250V respectively.
Output to valve	24 volts @ 600 milliamps AC (stepdown transformer included)
Maximum power consumption	@ 117V, 12 watts (103 milliamps)
Lights	LEDs indicate POWER (red) and VALVE (yellow)
Electrical installation	Either hard wire with 5/8" conduit or plug-in with 2.4M (8 ft.), 18 gauge, 3-conductor plug (supplied with 120V systems only)
Enclosure dimensions	7¼"H x 7¾"W x 5"D (184mm H x 197mm W x 127mm D)
Shipping weight	8 lbs. (3.6 kg)
Ranges	5-500 micromhos (for high quality water) 500-5000 micromhos (for normal tap water) } field select
ON - OFF span	Approximately 5% of set-point
SUBMERSION SENSOR	
Temperature compensation	Automatic to 180° F (82° C)
Materials	Epoxy and 316 stainless steel
Cord	10 foot (3 M), 22 ga., 4-conductor, vinyl jacketed
Solenoid valve operating pressure	10 - 100 PSI (69-690 kPa)
SOLENOID VALVE - Nylon (glass reinforced), 24 VAC	
Operating pressure	10 - 100 PSI (69-690 kPA)
Connections	1 NPT inlet, 1/2 NPT conduit

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TO ORDER

MODEL	MOUNT	POWER PRICE	CODE NO.
CC-97	Wall mount NEMA 12	120V/1/60 240V/1/50-60	56-0552 56-0552 B

REPLACEMENT ITEMS

DESCRIPTION	PRICE CODE NO.
Submersion sensor replacement (dual range CC models)	56-0554
1" solenoid valve	56-0108 A

CONDUCTIVITY MONITOR / CONTROLLER

IDEAL FOR: ***D.I. WATER / WASTE TREATMENT / REVERSE OSMOSIS LABORATORIES / POWER PLANTS / ELECTRONICS***

MODEL CCM-57 PANEL MOUNTED SYSTEM

ANALOG MODEL CCM-57

- **Corrosion resistant enclosure**
  Panel mount NEMA 3 enclosure
  (optional wall mount plate)
  Seven microsiemen ranges available
  LED lamps: ABOVE or BELOW set-point
  Adjustable set-point, 0-100% full scale
  "PUSH-TO-TEST" set-point check
- **In-line sensor**
  316SS, epoxy, TFE
  ¾" NPT, 1¼" lg., 100 PSI max. at 212°F (100°C)
- **Solenoid valve with 115 V to 24V transformer**
  Nylon (glass reinforced), 1" NPT
  24 VAC for safety
  (Optional, required for use as controller)

CONDUCTIVITY CONTROLLER / MONITOR Specifications (cont'd)

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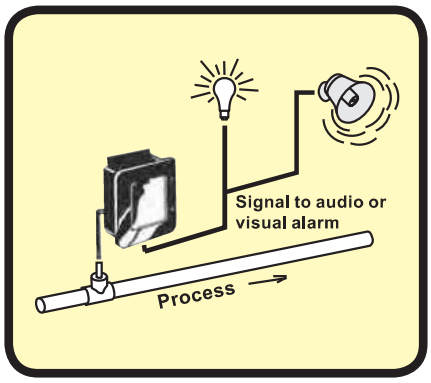


TYPICAL MONITOR - ALARM SYSTEM

What it does -

The CCM-57 Monitor / Controller is a precision instrument which accurately measures solution conductivity in a variety of micro-siemens ranges. It is ideal for reverse osmosis water treatment systems, as well as applications in laboratories, plating, electronics production and general industrial process control. The CCM-57 is exceptionally reliable and includes many convenient features such as push button set-point check. When used as a Monitor/ Controller, optional solenoid valve and transformer are required.

How it works -

Rugged 316 stainless steel sensor is mounted in a pipeline tee or directly in the side of a tank. The attached sensor cable (10' standard, 25' optional) is connected to the instrument. Desired conductivity set-point is then easily adjusted using the push button on the front panel and a potentiometer on the internal circuit board. By changing a jumper on the circuit board, the 10 amp alarm relay can be activated by choice of increasing or decreasing readings.

MODEL CCM-57 MONITOR (When used as controller, order optional solenoid valve and transformer)	
CONTROLLER - NEMA 3 panel mount with optional wall mount brackets	
Readout	2½" (63 mm) analog meter
Accuracy	± 2% of span
Sensitivity	0.05% of span
Repeatability	0.1% of span
Calibration check	Built-in (push to test)
Voltage output for chart recorder	0-10 VDC @ 5 mA max. (linear)
Relay function for alarm	Single set-point control continuously adjustable 0-100% of full scale Indicators: ABOVE (red) and BELOW (green) set-point LEDs Contact rating: SPDT 10 amp @ 250 VAC, 30 VDC. Relay operates increasing or decreasing reading (selectable)
Input power	115 VAC, 50-60 Hz, ± 15% (user changeable to 220 VAC)
Maximum power consumption	@ 115V; 3 watts (25 milliamps)
Dimensions	6" (152 mm) H x 4.8" (122 mm) W x 3.8" (96 mm) D
Ambient temperature range	-22° F (-30° C) to 140° F (60° C)
Shipping weight	2 lbs (0.9 kg)
IN-LINE SENSOR	
Temperature compensation	Automatic to 77°F (25°C) between 32° to 212° F (1 - 100°C)
Pressure / temperature limits	100 PSI (690 kPa) @ 212° F (100°C)
Bushing	Polypropylene threaded 3/4" NPT
Materials	316 stainless steel, EPDM, TFE
Cable	24 ga. shielded; 10' (3 meters) standard
Dimensions	Metal portion 1.2" (30 mm) L; 0.5" (13 mm) diameter
OPTIONAL SOLENOID VALVE - Nylon (glass reinforced), 24 VAC with separate 115V to 24V transformer	
Operating pressure	10 - 100 PSI (69-690 kPA)
Connections	1" NPT inlet, 1/2" NPT conduit
Output to valve	24 volts @ 600 milliamps AC (115V to 24V transformer included)

TO ORDER MONITOR

MODEL NO.	MICROSIEMENS	PCN
CCM-57-20	O - 20	56-0555
CCM-57-50	O - 50	56-0556
CCM-57-100	O - 100	56-0557
CCM-57-200	O - 200	56-0558
CCM-57-500	O - 500	56-0559
CCM-57-2000	O - 2000	56-0560
CCM-57-5000	O - 5000	56-0569

OPTIONAL

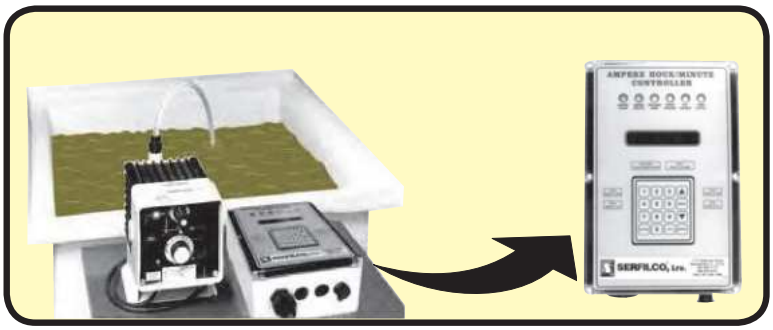
DESCRIPTION	ADD SUFFIX TO PCN
For 50 Hz, 220V monitor w/o cord	C
For use as Monitor / Controller Solenoid valve with transformer for 115V/60 Hz Solenoid valve for 220V/50 Hz (requires 220V to 24V transformer)	 A B
Wall mount plate	56-0563
25 ft sensor cable	56-0565
In-line sensor replacement w/10' cable (CCM models)	56-0561
1" solenoid valve	56-0108 A

ELECTROPLATING BRIGHTENER CONTROLLERS & TOTALIZERS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

INTEGRATING AMPERE-TIME CONTROLLER / TOTALIZERS

for replacement of additives and brighteners at precise rate of consumption



IDEAL FOR:
ANODIZING;
PULSE PLATING;
ZINC, NICKEL, CHROME & PRECIOUS METAL ELECTROPLATING

SERIES 1200 CONTROLLER / TOTALIZER
Monitors plating current for 1 or 2 rectifiers

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The Series 1200 system is suitable for 1 - 99,999 amp rectifiers. The unit features keypad data input for user programming of shunt current rating, ampere-hour or ampere-minute totalizing, totalizer reset, preset reset and preset values plus factory / field calibration. Internal circuitry converts an input signal to activate pump(s) at a near continuous flow rate determined by the user programmed setting. Temporary power loss does not affect last totalizer reading.

- **Eliminates manual additions**
- **Increases safety and precision of operation**
- **Verifies metal consumption**
- **Activates electronic pulse or motor driven pumps**
- **Eight digit LED display**
- **Digital totalizing Ampere-Time**
- **System accuracy ± 0.5%**
- **Programmable for Amp-Hours or Amp-Minutes**
- **Programmable for millivolt and current values of shunts**

STATUS INDICATORS INCLUDE:

- 8-digit LED display — *shows power is supplied*
- Ampere-Hour or Ampere-Minute LED display
- Program LED — *shows unit is in programming mode and not running*
- Preset LED — *shows a preset event has occurred*
- Low chemical LED — *shows the chemical supply level is low causing the alarm relay to operate*
- Pump output LED — *pulses with each stroke of the electronic chemical pump*

Brightener is replenished at precise rate of consumption in relation to metal deposited, automatically compensating for variation in work load or rate. Compact solid state circuitry is protected in a corrosion resistant plastic case. System includes an 8 foot, 3-wire cord and molded plug.

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Output signal: 4-20 mAdc isolated output for recording total shunt current

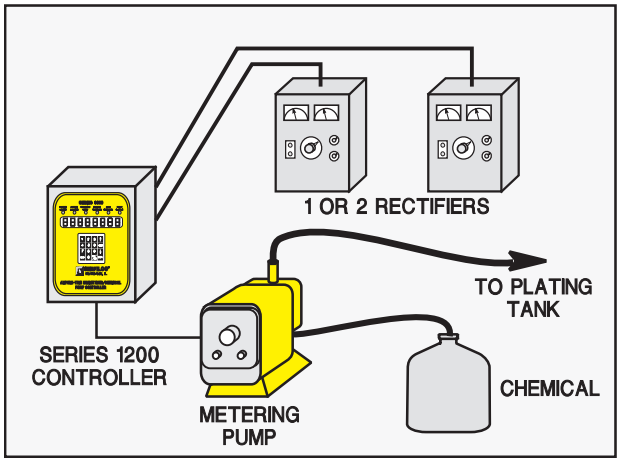
Control output: SPST relay, 5 ampere, N.O. control output for percentage ON/OFF controlling a 115/230 VAC motor driven pump

Control relay: SPDT, 0.1 mAdc control relay for pulsing electronic metering pumps

Alarm relay: SPST, 115/230 VAC, 5 ampere, N.O.

Dimensions: 12" H x 6.25" W x 3.75" D

Shipping weight: 5 lbs.



TO ORDER	
	PRICE CODE NO.
SERIES 1200	56-0578

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OPTIONS

DESCRIPTION	PRICE CODE NO.
Low level chemical sensor	56-0566
Connecting cable for external pulse pumps (to connect pump to controller): For SERIES 'A', 'B' & 'C' pumps	56-0567

See Metering Pump Bulletin P-607 for pump selections.

AMP-SENTRY TOTALIZER

Ampere totalizer with non-resettable, 6-digit electro-mechanical counter, power and shunt cables, mounted in a NEMA 4X enclosure, features:

- **Solid state with dual LED indicators for power and rectifier**
- **Correlates plating bath chemistry, plating thickness or emissions evolved** (required when chrome plating)
- **Field programmable** - for shunt size, amp-hours or amp-minutes

VOLTAGE	PRICE CODE NO.
115V/1/50-60	56-0182
230V/1/50-60	56-0182A

ELECTRONIC FLOW INSTRUMENTATION

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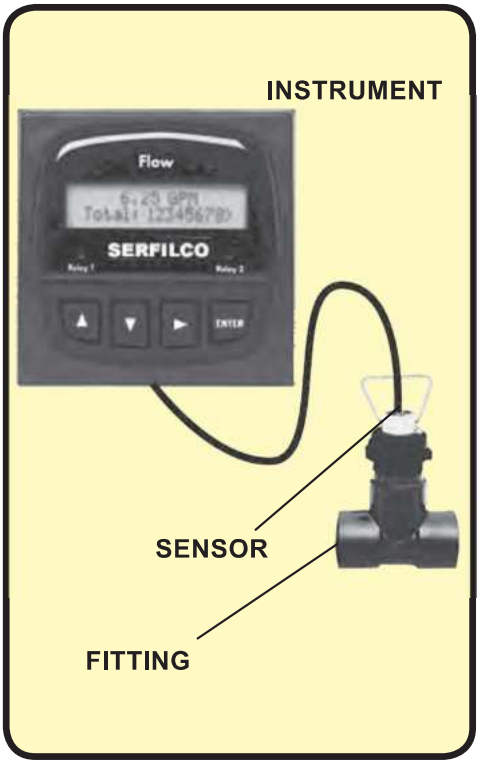
INDICATORS, CONTROLLERS AND SENSORS USED FOR:



FILTRATION SYSTEMS

WASTE WATER MONITORING

PROCESS FLOW CONTROL AND MONITORING

WATER TREATMENT SYSTEMS

BATCH PROCESSING AND BOTTLING

FEED PUMP PULSING AND CHEMICAL ADDITIONS

FEATURES and BENEFITS

- *1/2" to 4" pipe size, 0 - 800 GPM*
- *Highly accurate*
  ± 1% full scale, ± 0.5% repeatability
- *Local or remote readout and control*
- *Easy to install and use*
- *Convenient field calibration*
- *Highly flexible*
  Interface with metering pumps, chart recorders, alarms or programmable logic controllers.
- *Intrinsically safe model available*
- *Quality standards:*
  UL, CSA, CE (except Model 5600)
  Manufactured to ISO 9001

17

These high performance electronic flow monitoring/control systems consist of three components:

1. Flow Meter
2. In-line/Insertion Flow Sensor
3. Installation Fitting

A variety of different configurations is available to provide a system that will monitor or control the movement of fluids and is compatible with corrosive chemicals. The instruments are waterproof for long life in shop environments.

A system may be assembled to monitor a process flow rate (GPM, LPM or any other units) or keep track of accumulated flow for a period of time (totalize gallons or liters). Instruments can be selected that provide a pre-set electrical output signal for batch-mixing applications or triggering acid and caustic feed pumps. They can also be interfaced with other instruments in your plant, including a computer.

The accuracy and reliability come from patented Flow Sensor designs that convert fluid velocity in a pipe into an electronic signal. The signal is measured and channeled through microprocessor based solid state circuitry to the appropriate meter: flow rate, totalizer or controller.

Cost effectiveness of this equipment makes plant applications feasible. The initial investment pays for itself quickly by providing cost savings from improved process efficiency. These systems are an excellent choice for the simple to the complex industrial application.

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MODEL 509 - ANALOG FLOW RATE INDICATOR

An economical feature packed flow monitor, the Model 509 is designed exclusively for use with the Model 515 Flow Sensor to provide a completely independent flow monitoring system.

- **Sensor powered**
- **Front panel calibration**
- **Economical flow monitoring**
- **Splash-proof, shatter-resistant acrylic front panel**
- **Factory Mutual (FM) approved for intrinsic safety in Classes I, II and III, Division I**

MODEL	PRICE CODE NO.
509	56-0576

SPECIFICATIONS:

Compatible sensor: Model 515
Minimum full scale range: 7 fps
Accuracy: ± 2% of full scale
Repeatability: ± 1% of full scale

Environmental:
Operating temperature: 14°F - 149°F
Display:
Type: Taut-band suspension meter movement, 250° deflection - not suitable for prolonged exposure to vibration.
Dials:
Reversible dial kit included (0-2, 4, 6, 8, 10, 100)
Electrical power: none required

MODEL 815 BATTERY POWERED DIGITAL FLOW METER/TOTALIZER

INTEGRAL MOUNT

Integral field mount comes complete with sensor.

PANEL MOUNT

- **Three totalizers - 2 resettable**
- **Displays flow rate and totalized flow volume simultaneously**
- **Accuracy ± 0.5% of reading**
- **"No-flow" indicator**
- **Simple push - button operation**
- **Users selectable access code**

MOUNTING VERSION	DESCRIPTION	MODEL	PRICE CODE NO.
Integral Mount	PP sensor for ½"-4" pipe*	815-PO	56-0759
Panel Mount	used with 515PO sensor	815-1P	56-0760
--	Replacement battery - 3.6V (2 required)		56-0761

* For PVDF sensor change **P** to **N** in model and add **-N** to price code No.

OPTIONAL for all models

DESCRIPTION	PRICE CODE NO.
Surface mounting bracket	56-0571
Splashproof rear cover kit	56-0573

DESCRIPTION	PRICE CODE NO.
Power supply	
120 / 220 VAC-24 VDC (5600 & 855)	56-0758
120 VAC - 24 VC (5600 only)	56-0757

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MODEL 5600 BATCH CONTROLLER

The Model 5600 Batch Controller is an accurate and reliable instrument that combines complex control capability with operational simplicity. Batch progress is displayed on the analog dial, while the backlit LCD is used for calibration, set-up, and to show totalized flow volumes. Requires 12 to 24 VAC or VDC. The intuitive software design and four button keypad arrangement is user friendly.

- *Dual totalizers, 0 to 99,999,999*
- *Two SPDT alarm relays*
- *4 - 20 mA non-isolated output*
- *CE compliant*
- *Accuracy ± 0.5% of reading*

MODEL	PRICE CODE NO.
5600	56-0752

MODEL 855 - FLOW TRANSMITTER

PANEL MOUNT

The Model 855 Flow Transmitter is an advanced, cost effective instrument that converts the flow sensor signal into a 4 to 20 mA signal for long distance transmission. Configuration flexibility is maximized with two packaging options for field mounting or panel installation, two optional relays for process control and scalability for virtually any flow range or engineering unit. State-of-the-art electronic design ensures long term reliability, signal stability and simple user set-up and operation.

- **Permanent and resettable totalizers**
- **Isolated 4 to 20 mA output, fully adjustable and reversible**
- **Two optional SPDT relays: Hi, Lo, Pulse, Off (Max. 300 pulses / min.)**
- **2 x 16 ohmeter LCD display**
- **Power: 12 to 24 VDC ± 10%, regulated**
- **Field mount includes universal**

FIELD MOUNT

MOUNTING VERSION	DESCRIPTION	MODEL	PRICE CODE NO.
Panel	Flow transmitter	855-1P	56-0753
Panel	Flow transmitter with 2 relays	855-2P	56-0754
Field	Flow transmitter	855-1F	56-0755
Field	Flow transmitter with 2 relays	855-2F	56-0756

mounting kit

NOTE:

All scale ranges shown are examples. When ordering installation fittings, please specify desired scale range. Instrument bodies measure 3.8" x 3.8" x 3.5" and include panel mounting hardware (except Model 855 field mount and Model 815-PO integral mount).

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MODEL 515 ROTOR-X™ FLOW SENSOR

Polypropylene or optional pure PVDF

Optional local or remote capability lets you place your meter up to 200 ft. away without signal amplification. The Model 515 can be installed in pipes ranging in size from 1/2" to 4". Patented rotor design ensures a linear output with minimal head loss and no cavitation. The Model 515 can be used with any of the flow meters shown on the preceding pages.

*For PVDF body and Hastelloy® C shaft, change **P** to **N** in Model Number and add **N** to Price Code Number.

SPECIFICATIONS:

Output signal: 1 volt peak to peak
Flow rate range: 1-30 FPS
Output accuracy: ±1% of full range
Maximum % of solids: 1% of fluid volume

Linearity: ± 1% of full range
Repeatability: ± 0.5% of full range
Standard cable length: 25 feet
Pressure rating: 200 PSI @ 80°F

1/2" NPT

PIPE SIZE	MATERIAL*	MODEL	PRICE CODE NO.
1/2" - 4"	Polypropylene boby and titanium shaft	515-PO	56-0428

SENSOR INSTALLATION FITTINGS

for Model 515 flow sensors

SADDLE
'S' in Model Number

TEE
'T' in Model No.

PIPE SIZE	RECOMMENDED SCALE RANGES GPM	MINIMUM FLOW GPM	PVC 80		CPVC 80	
			MODEL NUMBER	PRICE CODE NO.	MODEL NUMBER	PRICE CODE NO.
1/2" 3/4" 1"	0-18 0-30 0-50	1 1.5 2.7	PV8T005 PV8T007 PV8T010	56-0440 56-0441 56-0442	CP8T005 CP8T007 CP8T010	56-0454 56-0455 56-0456
1 - 1/4" 1 - 1/2"	0-80 0-120	4.5 6.2	PV8T012 PV8T015	56-0443 56-0444	CP8T012 CP8T015	56-0457 56-0458
2"	0-180	10.5	PV8T020 PV8S020	56-0445 56-0446	-- --	-- --
2 - 1/2"	0-300	15	PV8T025 PV8S025	56-0447 56-0448	-- --	-- --
3"	0-500	23	PV8T030 PV8S030	56-0449 56-0450	-- --	-- --
4"	0-800	39	PV8T040	56-0451	--	--

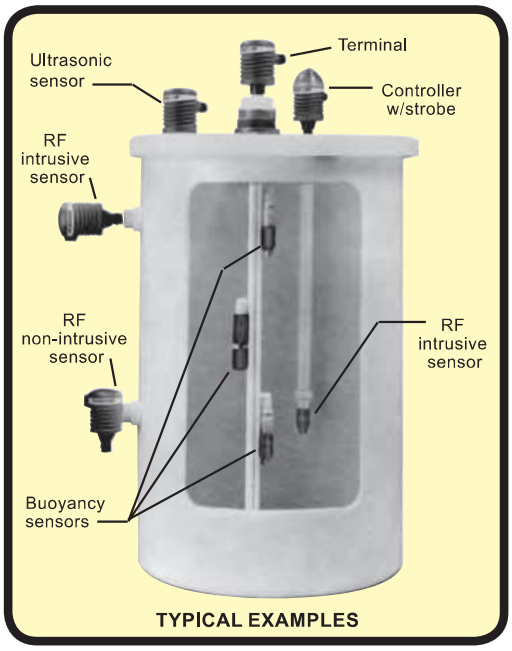
NOTE: ***OTHER PIPING MATERIALS AVAILABLE SUCH AS STEEL, COPPER, PVDF, ETC. FITTINGS ARE SOCKET-TYPE***

PLASTIC LEVEL CONTROL SYSTEM

A-109_A

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

FIRST ALL- PLASTIC LEVEL CONTROL SYSTEM DESIGNED FOR PLASTIC AND FIBERGLASS TANKS



TYPICAL EXAMPLES

ACIDS / ALKALIES
SOLVENTS / FOOD PRODUCTS
OILS / WASTE STREAMS
PLATING SOLUTIONS / PAINTS
WATER / D.I. WATER
PHOTOGRAPHIC SOLUTIONS

This system allows you to solve industrial liquid level problems with a value added all-plastic system. Select a reliable industrial all-plastic level sensor in four technologies, a controller or output option and a mounting system. These point level switches will offer high and low alarms, automatic pump up or pump down (automatic empty or fill operations) and leak detection.

- **Replace unreliable level sensors**
- **Eliminate corrosion problems**
- **Protect pumps and other equipment**
- **Prevent operator errors**
- **Improve process quality with more monitoring**
- **Detect leaks and piping failures immediately**
- **Reduce installation and maintenance costs**

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Build a system in 3 easy steps

1. **Sensing technology:** Select the appropriate level sensing technology from this unique family of four plastic liquid level sensors. All offer a liquid tight package in polypropylene or PVDF. Each sensor provides an output for a controller and each comes with 8 ft. of cable coated in the same material as the sensor.

2. **Controller:** Select the appropriate controller configuration (Ultrasonic, Buoyancy, Intrusive RF capacitance or Non-intrusive RF capacitance), rail or panel mounted. In selecting the controller, consider the specific control and installation requirements of the application, including the type and number of sensing points.

Note: Rail terminal head is required when panel mounted controller is selected.

3. **Sensor configuration:** Select the appropriate sensor mounting configuration: in-tank rail system mount, outside-tank mount or above solution mount. Consider the specific parameters of the application, including the number of sensors to be mounted and the total length of in-tank rail required.

Rail mounted controller with two sensors and 2" NPT adapter.

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ULTRASONIC TRANSMITTER (LED DIGITAL DISPLAY)

for water-based, viscous, high purity or very hazardous liquids, process and storage tanks

PRICE CODE NO.
66-1415

Provides non-contact continuous level measurement. LED display indicates level in inch or centimeter values. Internal relay for alarm, auto fill / empty operation. SPDT relays rated for ½ hp. or 10 amp resistive at 230 VAC. Mounted above liquid in bracket or tank cover, 2" NPT. Unit is constucted of polypropylene and PVDF. It can be used with 66-1416 controller if LED display is desired; otherwise controller is not required for operation.

VERTICAL BUOYANCY SENSOR

for any clean, non-coating, non-clogging liquid, high level alarms

PP 66-1403
PVDF 66-1403K

Dynamically stabilized floats minimize surface chatter, increase reliability and accuracy. Shrouded body resists turbulence and process debris. Reed switch rated 15 VA @ 120 VAC. ¾" NPT. -40° to 194°F. For rail mounting only. Use with PLC or with a controller.

RF CAPACITANCE SENSOR (INTRUSIVE)

for any water based liquids, waste sumps, caustic soda, D.I. water, process and storage tanks

PP 66-1405
PVDF 66-1405K

High frequency circuit, factory calibrated for plastic ungrounded tanks with conductive and non-conductive liquids. Eliminates metal grounding straps and reference rods. Resists coating and works with a wide range of liquids. Mounts on rail or through tank wall. ¾" NPT. -40° to 194°F

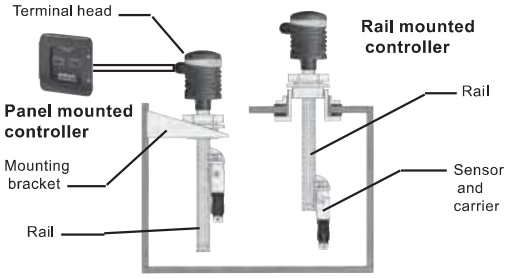
RF CAPACITANCE SENSOR (NON-INTRUSIVE)

for water-based, high purity or very hazardous liquids, process and storage tanks

66-1406

Mounted on exterior wall of plastic or fiberglass tank, this unit senses liquid through 1" of non-metallic material. Patented two-point calibration ensures accuracy and easy installation. Includes polyethylene mounting pad for welding, adhesives, or glassing. NEMA 4X polysulfone housing.

TYPICAL INSTALLATION



CONTROLLERS

These controllers feature SPDT relays rated for ½ hp. or 10 amp resistive at 230 VAC. Adjustable time delay from 0-60 seconds prevents frequent relay-cycling.

Choose single sensor controllers for single point/alarm applications. Two sensor controllers perform automatic fill/empty operations. Three sensor controllers perform automatic fill/empty operations and offer a separate relay for level alarm.

Panel mount controllers can be mounted up to 1000 ft. from sensor. LED's indicate wet/dry sensor condition and on/off relay status. Mount controllers on any 35mm DIN rail or screw directly to panel. Cord and plug not included.

Rail mount controllers have a ¾" NPT fitting that connects directly to the sensor's threaded end or to the mounting rail's end cap. Polypropylene NEMA 4X housing with ½" conduit fitting withstands industrial environments. The unit with strobe is a standard single point controller with a high intensity strobe light mounted on top to call immediate attention to alarm conditions.

PANEL MOUNTED CONTROLLERS			
SENSORS	RELAYS	APPLICATION	PRICE CODE NO.
1	1	Single point, switch/alarm	66-1400
2	1	Two-point, auto fill/empty	66-1401
3	2	Three-point, auto fill/empty w/alarm	66-1402
3	2	Three-point, LED display*	66-1416
RAIL MOUNTED CONTROLLERS			
1	1	Single point, switch/alarm	66-1410
1	1	Single point, switch/alarm w/strobe	66-1411
2	1	Two-point, auto fill/empty	66-1412

* Available w/ultrasonic transmitter only

IN-TANK MOUNTING RAIL

Make system setup easy with these rail kits and accessories. The rails allow you to position the sensor anywhere along the length of the rail. Slide sensors up or down to adjust level easily. To change sensor, simply snap sensor out of carrier and snap in a new sensor.

Rails come with adapters to fit 2" NPT tank openings. Or, mount rail on tank wall using optional mounting bracket. Cut rail sections to form shorter lengths.

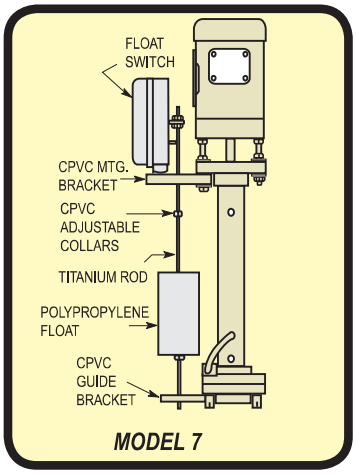
DESCRIPTION		PRICE CODE NO.
2 ft. rail kit.	Includes 2" NPT adapter, rail and carrier for one sensor. For additional carriers, see below.	66-1407
4 ft. rail kit.		66-1408
6 ft. rail kit.		66-1409
Terminal head. Provides terminals for up to four sensors. Attaches to top of rail. For use with panel mount controllers.		66-1413
Mounting bracket. Use to install a rail to the top of the side wall of an open top tank. 2" NPT.		66-1414
Sensor carrier kit.		66-1417

HI-LO LIQUID LEVEL CONTROLS FOR PUMPS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

MECHANICAL FLOAT SWITCHES

Refer to Bulletin A-103 for Motor Starters and order separately. One starter is required for each pump on duplex assembly.

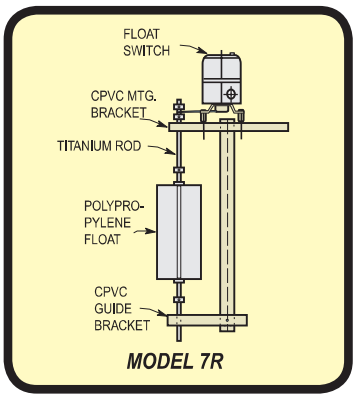


MODEL 7

MODEL 7 FLOAT SWITCH ASSEMBLY (for pump mounting)

Double pole switch for inline stop and start of 115-230V, 460-575V motors. Use as two-pole con troller on 3 phase circuit. Switch rating: 2 HP @ 115V/1 phase, 3 HP @ 230V/1 phase, 5 HP @ 230V/3 3 phase or 5 HP @ 460-575V/3 phase. This unit can be used as a pilot device for single or three phase magnetic and manual motor starters. Float assembly consists of a polypropylene float, titanium float guide rod, CPVC float guide brackets and adjustable CPVC collars. Standard length is 24".

DESCRIPTION	PRICE CODE NUMBER
NEMA 1 Float switch	66-0726 A
NEMA 4 Float switch	66-1117 A
NEMA 7 & 9 Float switch *(Class I, Group C, D & Class II, Group E, F, G)*	66-1118 A

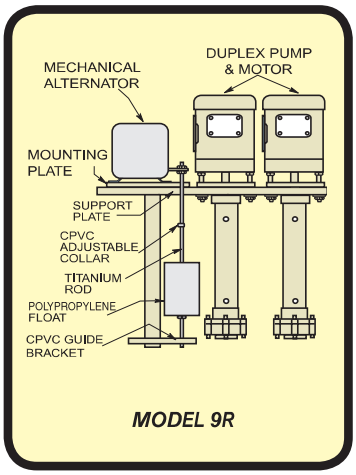


MODEL 7R

MODEL 7R FLOAT SWITCH ASSEMBLY (for independent tank mounting)

Similar to model above with the following additions: CPVC support column and CPVC switch mount-ing bracket. The switch mounting bracket can be clamped to the top of the tank or holes can be drilled through the mounting bracket for a permanent installation. Standard length is 24 inches.

NEMA 1 Float switch	66-0732 A
NEMA 4 Float switch	66-1119 A
NEMA 7 & 9 Float switch *(Class I, Group C, D & Class II, Group E, F, G)*	66-1121 A



MODEL 9R

MODEL 9R ALTERNATOR FLOAT SWITCH ASSEMBLY (for independent mounting)

Double pole mechanical alternator switch alternates the operation of two pumps installed in a duplex pump system in a common tank or sump. If one pump cannot handle the flow demand, the second pump is automatically energized and continues to function until one pump can handle the load. The float switch assembly consists of a polypropylene float, titanium float guide rod, CPVC float guide brackets and adjustable CPVC collars. A high level alarm circuit is available. The assembly is mounted on a support plate independent of the pumps. Standard length is 24". Switch rating: 1-1/2 HP @ 115V single phase or 2 HP @ 230V single phase. Can also be used as a pilot device for single or three phase magnetic motor starters.

NEMA 1	Mechanical alternator	66-0730 A
NEMA 4	Mechanical alternator	66-0961 A
NEMA 4	Mechanical alternator with high level alarm circuit	66-0962 A
NEMA 7 & 9	Mechanical alternator	66-0963 A
NEMA 7 & 9	Mechanical alternator with high level alarm circuit *(Class I, Group C, D & Class II, Group E, F, G)*	66-0964 A

OPTIONAL (for Models 7, 7R & 9R)

CPVC sleeve over titanium rod	Add 66-0830
High level alarm circuit (Models 7 & 7R) (Not for NEMA 1), 115-230V	Add 66-1211

FOR LONGER FLOAT GUIDE, ADD . . .			
TOTAL LENGTH (INCHES)*	PRICE CODE NUMBERS		
	MODEL 7	MODEL 7R	MODEL 9R
36	66-1163 A	66-1164 A	66-1165 A
48	66-1163 B	66-1164 B	66-1165 B
60	66-1163 C	66-1164 C	66-1165 C
72	66-1163 D	66-1164 D	66-1165 D
84	66-1163 E	66-1164 E	66-1165 E
96	66-1163 F	66-1164 F	66-1165 F
108	66-1163 G	66-1164 G	66-1165 G
120	66-1163 H	66-1164 H	66-1165 H
132	66-1163 J	66-1164 J	66-1165 J
144	66-1163 K	66-1164 K	66-1165 K

*This includes the standard 24" length. It is not a separate added length.

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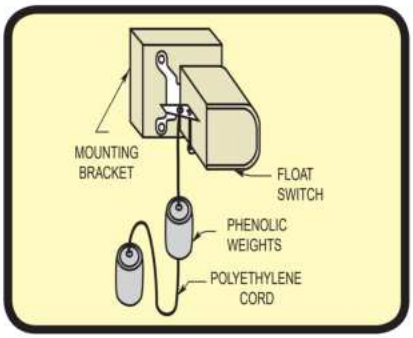


MODEL 8 FLOAT SWITCH ASSEMBLY
(Pump mounted for shallow tanks)

Double pole switch NEMA 1 enclosure for inline stop and start of single phase motor to 1 HP @ 115 or 230 volts. This unit can also be used as a pilot device for single or three phase magnetic starters. Operated by two phenolic weights sliding on a high density polyethylene cord. Float switch is fastened to a PVC bracket which is mounted to the pump-motor mounting plate. Maximum operating depth is 30 inches.

PRICE CODE NUMBER
66-0855 A

LIQUID CONDUCTIVITY LEVEL CONTROLS

CAUTION: Probes function in a low energy control circuit. Possible electrical hazard exists at the probe tip. See Operating Instructions.

MODEL 6
PROBE SWITCH ASSEMBLY

Standard assembly consists of Hastelloy® C probes attached to insulated PVC wire. The wire suspended probes are mounted on a PVC holder by which the probe wire length can be adjusted to the various liquid levels. Standard length - 24"

The induction relay included in the system has the following rating: 1 HP @ 120 or 240 VAC single phase. For horsepower greater than 1 HP a corresponding magnetic motor starter is required. The 66-0230-2 & 66-0231-2 systems consist of two & three probes respectively. A ground probe is needed when the sump pump or tank is constructed of any material other than steel. The probe holder and induction relay are each mounted in a NEMA 4 watertight enclosure.

	PRICE CODE NUMBER
High & low level control without ground probe	66-0230 2
High & low level control with ground probe	66-0231 2

PROBE SWITCH ASSEMBLY - with Alarm Circuit

A choice of high or low level alarm control signals is available with four suspended probes and two induction relays, in a NEMA 4X enclosure. Ground probe is included as standard. The alarm mechanism is not supplied.

	PRICE CODE NUMBER
High & low level control with high level alarm circuit	66-0232 2
High & low level control with low level alarm circuit	66-0244 2

ALTERNATOR PROBE SWITCH ASSEMBLY

Provides for the operation of two pumps installed in a duplex system. If one pump cannot handle the flow, the second pump automatically is activated until the low level is reached.

66-0236

CAUTION: Probes and housing are not explosion-proof.

TO ORDER - SPECIFY: (1) AC line voltage to relay (2) Lenght of longest probe (3) pH of solution

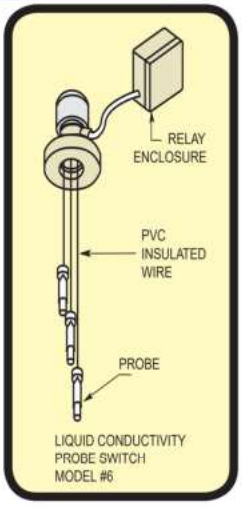
AGITATION SHIELD

PRICE CODE NUMBER	66-0245 B

The agitation shield should be used to isolate the wire suspended probes from a solution in high velocity, thus preventing twisting of wire leads, resulting in misleading liquid level sensing. The shield is constructed of all CPVC material. The length of the shield corresponds to the "C" dimension of the sump pump and length of probe suspension. Standard length - 24"
36" and longer, refer to chart below.

TOTAL LENGTH (INCHES) *	FOR LONGER PROBE WIRE, ADD . . .			FOR LONGER AGITATION SHIELD, ADD . . .
	2-WIRE SET	3-WIRE SET	4-WIRE SET	
	PRICE CODE NUMBERS			PRICE CODE NUMBERS
36	66-1166 A	66-1167 A	66-1168 A	66-1169 A
48	66-1166 B	66-1167 B	66-1168 B	66-1169 B
60	66-1166 C	66-1167 C	66-1168 C	66-1169 C
72	66-1166 D	66-1167 D	66-1168 D	66-1169 D
84	66-1166 E	66-1167 E	66-1168 E	66-1169 E
96	66-1166 F	66-1167 F	66-1168 F	66-1169 F
108	66-1166 G	66-1167 G	66-1168 G	66-1169 G
120	66-1166 H	66-1167 H	66-1168 H	66-1169 H
132	66-1166 J	66-1167 J	66-1168 J	66-1169 J
144	66-1166 K	66-1167 K	66-1168 K	66-1169 K

*This includes the standard 24" length. It is not a separate added length.



LIQUID CONDUCTIVITY PROBE SWITCH MODEL #6

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MODEL P-10
PUMP PROTECTOR

A-313

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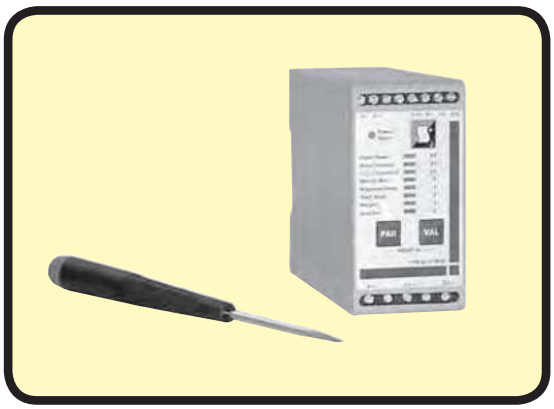


DIGITAL MOTOR LOAD MONITOR shuts down pump in the event of:

- **DRY RUN**
- **CAVITATION**
- **DAMAGED IMPELLER**
- **CLOSED INLET VALVE**
- **CLOSED OUTLET VALVE**
- **BLOCKAGES**

The P-10 digital motor load monitor uses a unique and patented method of measuring the torque of a pump's drive motor. By monitoring the "normal" load level any deviation from this range changes the state of the internal relay activating a red LED alarm light. The output relay will shut down the pump, activate additional alarm and / or communicate with other equipment in the process. Designed for use in conjunction with a motor starter, the P-10 protector will monitor motor underload OR overload. In pumping applications, conditions such as dry run, cavitation, damaged impeller, closed valves or blockages will create an "abnormal" underload condition, which the P-10 will detect and subsequently shut down the pump and provide communication to users and / or processes.

TECHNICAL DATA	
Dimensions	1.77" W x 3.54" H x 4.53" D (45 mm x 90 mm x 115 mm)
Weight	5.25 oz. (0.15 kg)
Supply voltage	1 x 100-240 (± 10%) 3 x 100-600 (± 10%) 3 x 600-690 (± 10%)
Frequency	50 or 60 Hz
Current input	Current transformers only; CTM 010, 025 or 050 (Max. 50 A motor)
Start-up delay	1 - 64 s
Response delay	0.05 - 64 s
Relay output	5 A 240 VAC Resistive, 1.5 A 240 VAC Pilot duty / AC 12
Fuse	Maximum 10 A
Terminal wire size	Use 75°C copper (CU) wire only. 0.2 - 4.0 mm^2 single core (AWG12) 0.2 - 2.5 mm^2 flexible core (AWG14), stripped length 8 mm (0.32")
Terminal tightening torque	5 - 7 in.-lbs. (0.56 - 0.79 Nm)
Repeatability	±2.5% FS, 24 H, @ +77 °F (+25 °C)
Temperature tolerance	<0.1% / °C
External RESET on term. 5	24 - 48 VDC or 24 - 240 VAC, 50 / 60 Hz
Operating temperature	4°F — 122°F (-20°C — +50°C)
Storage temperature	22°F — 176°F (-30°C — +80°C)
Protection class	IP 20
Approved by	UL and cUL up to 600 V, CE

AMP RANGE	MODEL NO.	PRICE CODE NO.
.4 - 10	P-10-10	99-1170
10.1 - 25	P-10-25	99-1171
26 - 50	P-10-50	99-1172

Each P-10 pump protector comes complete with monitor, current transformer and complete installation instruction manual.

To order, use Price Code No.

DRI-STOP
PUMP PROTECTOR

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

DRI-STOP 2R and 2RE (Flow activated)

DRI-STOP 2R
w/PCB shown for factory mounting into motor starter (ordered separately)

Cooling water service for double mechanical seal pumps and vertical pump bearings.

These flow activated models use a state-of-the a t PCB to monitor a minimum flow to stop the pump motor They are adjustable for flow rates from 0.1 GPM to 2.5 GPM. These units are factory set for 0.1 GPM. If used for a multiple bearing sump pump, the unit must be reset to a higher set point per the pump's operating instructions.

These models are plastic enclosed include 8 feet of extension cable and mounting bracket for 56 140 and 180 "C" face motor frames. Select a model for either factory or field installation.

When used with magnetic H O-A starter: In the AUTO position, the DRI-STOP will allow the motor to start if the seal/bearing water flow is 6 GPH or higher. The HAND position should not be wired into the control circuit.

Note that a push button magnetic starter may be used instead of the recommended H-O-A. For motor starters, see Bulletin A-103.

CAUTION: In the AUTOMATIC mode the motor will come on aut matically when the water supply is turned on.

TO ORDER, use Price Code No.

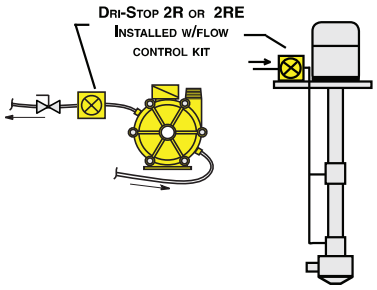
DESCRIPTION	MODEL NUMBER	SOLUTION CONTACT	MAXIMUM OPER. TEMP. °C	MAXIMUM OPER. TEMP. °F	CONN.	DIM.	FLOW MIN.	PRESS. MAX.	CONTROL CIRCUIT 1ø/50-60 Hz	PRICE CODE NO.
DRI-STOP 2R Factory installed	DSWF-1/4	PVDF (Kynar®), polypropylene, 316SS, polysulfo e, V ton	180°	82°	1/4" FNPT	3" x 2-3/4" x 2 5/8" deep	6 GPH (23 LPH)	100 PSI (690 kPa)	24V	99-1116R*
									115V	99-1152R*
DRI-STOP 2RE Field installed	DSWFE-1/4								24V	99-11 6RE *
									115V	99-1152RE *

* PCB (3" x 2-3/4" x 1 5/8") is mounted in motor sta ter (ordered separately).

** PCB is enclosed in DRI-STOP case Motor sta ter ordered or provided separately, and field wired to DRI-STOP Includes mounting bracket for 56, 140 & 180 "C" face motor frames.

OPTIONAL

FLOW CONTROL KIT	
Provides precise cooling water flow on stationary applications. City water flow is controlled with a petcock valve and pressure gauge to permit convenient installation and adjustment prior to start-up. Order motor starter separately. ***DO NOT USE WITH DEIONIZED WATER.***	
DESCRIPTION	**PRICE CODE NO.**
Includes petcock, pressure gauge and fittings	99-1387



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DRI-STOP 3

DRI-STOP 3C and 3K (Pressure activated)

With body and diaphragm protection suitable for

Pressure activated models must be used with a magnetic push button starter. This allows the operator to temporarily and manually "hold-in" the circuit until the pump

TO ORDER, use Price Code No.

DESCRIPTION	MODEL NUMBER	SOLUTION CONTACT	MAXIMUM OPER. TEMP.		CONN.	DIM.	SET-POINT	OPERATING PRESSURE	CONTROL CIRCUIT	PRICE CODE NO.
			°C	°F			PSI.	MAX. PSI	1ø/50-60 Hz	
DRI-STOP 3C	DSCP-1/2	CPVC, Viton	200°	93°	1/2" NPT	7" x 3" DIA	Fixed 4	80	24-115-230V	99-0377A
DRI-STOP 3K	DSCK-1/2	PVDF, Viton								99-0379A

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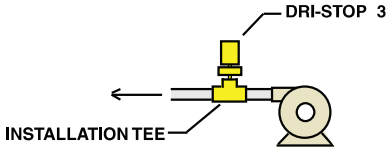
OPTIONAL

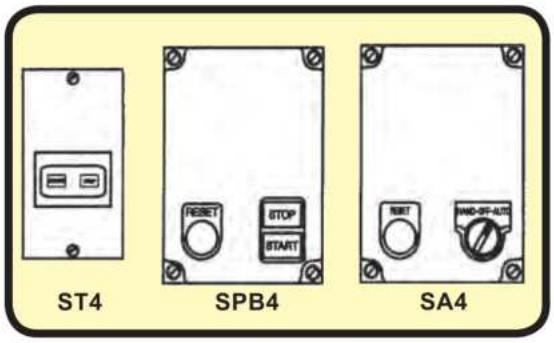
INSTALLATION TEE		
For convenient installation of DRI-STOP on pump discharge		
DESCRIPTION	**PIPE SIZE NPT**	**PRICE CODE NO.**
Installation tee (CPVC)* with ½" NPT connection for DRI-STOP 3 and NPT in-line connections.	**¾"** **1"** **1½"** **2"**	**99-0393** **99-0388** **99-0384** **99-0386**



* To order PVDF, add **-K** to Price Code No.

MAGNETIC MOTOR STARTERS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431



- **UL Class 10 overload relay trip time**
- **Corrosion resistant PVC enclosures**
- **Ambient temperature compensated -20° to +60°C**
- **Adjustable thermal overload protection with reset**
- **Full approvals -IEC type**
- **Coil voltage +10% to -30% of rated voltage**
- **1,000,000 cycles electrical life**
- **10,000,000 cycles mechanical life**
- **Differential single phasing protection**
- **Magnetic three pole starter with reset button**

ST4 MAGNETIC PUSH-BUTTON -
IP 54 watertight enclosure (NEMA 4X)
For STOP-START control of single or three phase motors. Full voltage control.

SPB4 MANUAL MAGNETIC PUSH-BUTTON -
IP 54 watertight enclosure (NEMA 4X)
For STOP-START control of single or three phase motors, or pilot duty with all DRI-STOP switches. Will not allow automatic restart. Includes fused industrial control transformer (230/460 to 24 VAC) for low voltage control circuit.*

SA4 MANUAL MAGNETIC SELECTOR SWITCH -
IP 557 watertight enclosure (NEMA 4X)
For manual HAND-OFF-AUTO control of single or three phase motors used for sump pumps equipped with float switch or DRI-STOP switch on water flushed, mechanical seal or bearings. Includes fused industrial control transformer (230/460 to 24 VAC) for control circuit.*

** NOTE: 115 volt starters have 115 volt energizing coil, no control transformer.*

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TO ORDER, use Price Code No.
Specify operating voltage, motor HP and current (amps).

VOLTAGE	MAXIMUM HP	PHASE / CYCLE	PRICE CODE NUMBER		
			ST4	SPB4	SA4
115	.5	1/60	66-2161A	66-1197C	66-1197A
230	1.5	1/50-60	66-2161B	66-1197DB	66-1197BB
115	1	1/60	66-2162A	66-1198C	66-1198A
230	2	1/50-60	66-2162B	66-1198DB	66-1198BB
115	1.5	1/60	66-1110A	66-1111C	66-1111A
230	3	1/50-60	66-1110B	66-1111DB	66-1111BB
200 - 230	.5	3/50-60	66-2163A	—	—
380 - 460	1		66-2163B		
200 - 230	1.5	3/50-60	66-2165A	66-2164CB	66-2164AB
380 - 460	3		66-2165B	66-2164DB	66-2164BB
200 - 230	3	3/50-60	66-2166A	66-1160CB	66-1160AB
380 - 460	5		66-2166B	66-1160DB	66-1160BB
575 - 600	7.5		66-2166C	66-2167CB	66-2167AB
200 - 230	5	3/50-60	—	66-1112CB	66-1112AB
380 - 460	7.5			66-2168CB	66-2168AB
575 - 600	10			66-2168DB	66-2168BB
380 - 460	10	3/50-60	—	66-1112DB	66-1112BB
575 - 600	15			66-2169CB	66-2169AB
200 - 230	7.5	3/50-60	—	66-2170BB	66-2170AB
380 - 460	15			66-1113EB	66-1113BB
200 - 230	10	3/50-60	—	66-1113DB	66-1113AB
380 - 460	20			66-1114EB	66-1114BB
230	15	3/50-60	—	66-1114DB	66-1114AB

The motor starters described are industry approved and recommended for use with most pumps and filtration systems. For horizontal and vertical pump / motor assemblies, the starters are neither mounted nor wired unless specified and ordered. (See OPTIONAL).

Starters for filtration systems should be ordered as options from respective bulletins.

OPTIONAL

Starter wired to motor with 6 foot (1.8m) PVC conduit, connectors and lead wire.

PRICE CODE NO.	66-1170

PUMP PRIMING CHAMBERS

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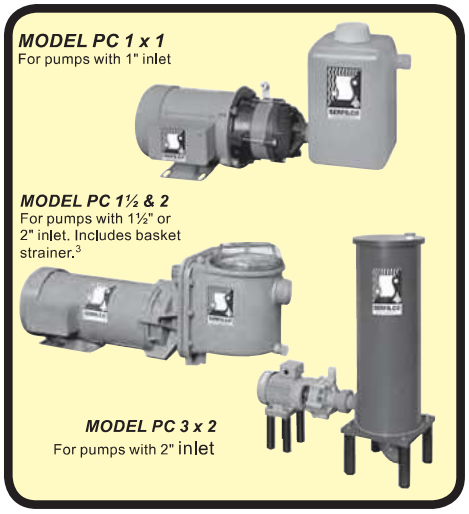


FOR USE WITH MAGNETIC-COUPLED AND DIRECT DRIVE CENTRIFUGAL PUMPS, OFFERING:

- *Convenient start-up and re-start*
- *Unique design for mounting to all horizontal pumps*
- *Less chance of cavitation*
- *Four sizes available to handle lifts to 6 ft. (1.8m)*

Centrifugal pumps may require a priming chamber as an auxiliary means of lifting liquid from below the pump centerline to the pump inlet or from the liquid surface over a tank wall. The answer to this requirement is this line of easy to use and install priming chambers. Once the priming chamber is filled, the pump can be started and re-started without subsequent re-priming.

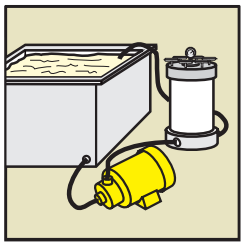
Each time the pump is turned off, the priming chamber retains a volume of liquid. When the pump is re-started, it pumps the entrapped liquid out of the priming chamber, creating a vacuum in its place. Atmospheric pressure then forces liquid from the tank or sump up the suction hose or pipe to the pump, completing the prime.

TO ORDER, use Price Code Number.

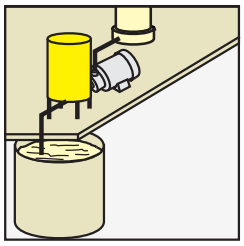
Order BSP connections, pipe, fittings and suction strainers separately.

MODEL[1]	MATERIAL	FLOW	VOLUME	SUCTION LIFT[2]	CONNECTIONS	DIMENSIONS	PRICE CODE NUMBER
		GPM *(LPM)*	in.[3] *(cm³)*	FEET *(m)*	IN x OUT, FILL	INCHES *(mm)*	
PC 1 x 1*†	Polyethylene w/ Viton® gasket	40 (151)	215 (3523)	6 (1.8)	1" MNPT x 1" MNPT w/2" threaded cap	6 X 6 X 9 H (152x152x228)	99-0336
PC 1½ x 1½ *	CPVC, Noryl® & PP † w/ EPDM gasket	80 (302)	190 (3114)	4 (1.2)	1½" x 1½" FNPT w/5" threaded cap	9 x 9 x 12 H (228x228x304)	99-1159 1
PC 1½ x 1½ RCV *	Ryton®, CPVC & PP † w/ Viton gasket						99-1159 R
PC 2 x 2 *	CPVC, Noryl & PP † w/ EPDM gasket	100 (379)		2 (.6)	2"MNPT x 2" FNPT w/5" threaded cap		99-1159 3
PC 2 x 2 RCV *	Ryton®, CPVC & PP † w/ Viton gasket						99-1159 R2
PC 3 x 2	PVC w/EPDM gasket	180 (681)	3456 (.05 m³)	3 (.91)	3 FNPT x 2 MNPT w/ 1½" NPT plug	14 Dia. X 36 H (355 D. x 914 H)	99-0308

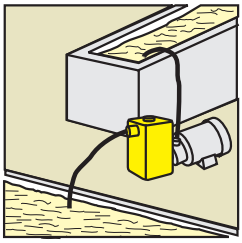
[1] To order Viton gasket, add suffix **V** to Model and Price Code Number.
[2] Based on water (1.0 SG) at 68° F (20° C). Suction lift is approximate and determined by air volume in suction piping.
[3] Max operating temp. 150°
* Not for use with 2" suction pumps.
† Removable polypropylene basket strainer.



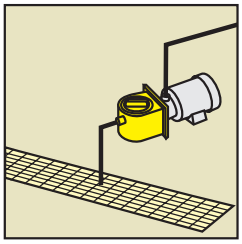
SELF-PRIMING FILTRATION SYSTEM



LIFTING FROM BELOW PUMP LEVEL



LIFTING OVER SIDE OF TANK



EMERGENCY STANDBY and SUMP PUMPING

18

IN LINE GAUGE GUARD ASSEMBLY

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

FOR USE WITH SERFILCO PUMPS AND SER-DUCTOR® AGITATION SYSTEMS

- **Non-metallic solution contact**
  Diaphragm guard isolates gauge from pumped fluid
- **Material selection**
  CPVC, Polypropylene or PVDF with EPDM or Viton® elastomers
  (See a Chemical Resistant chart)
- **Sizes 1" to 4"**

The **In Line Gauge Guard Assembly** is designed for use with SERFILCO pumps and SER-DUCTOR agitation systems to provide performance feedback for optimization of the pump operating point. Pumps which have too little system backpressure operate far out on the pump curve where NPSH requirements are highest. This can lead to pump cavitation with corresponding premature wear and seal failure.

Use of the In Line Gauge Guard Assembly along with a flow control valve allows the user to determine where on the curve the pump is operating and to control the pump output for best performance.

IN LINE GAUGE GUARD ASSEMBLY

SIZE	TYPE[1]	CPVC / EPDM	CPVC / VITON	POLYPRO / EPDM	PVDF / VITON
		PCN	PCN	PCN	PCN
1"	THD	99-1240	99-1240 V	99-1240 PP	99-1240 KV
1 1/4"	THD	99-1241	99-1241 V	99-1241 PP	—
1 1/2"	THD	99-1242	99-1242 V	99-1242 PP	99-1242 KV
2"	THD	99-1243	99-1243 V	99-1243 PP	99-1243 KV
3"	THD	99-1244	99-1244 V	99-1244 PP	—
3"	SOC	99-1244 1	99-1244 1V	—	—
4"	THD	99-1245	99-1245 V	—	—
4"	SOC	99-1245 1	99-1245 1V	—	—

FLOW CONTROL VALVE[2]

CPVC	PP	PVDF
PCN	PCN	PCN
33-0572	33-0572 PP	33-0572 K
33-0573	33-0573 PP	—
33-0574	33-0574 PP	33-0574 K
33-0575	33-0575 PP	33-0575 K
33-0576	33-0576 PP	33-0576 K
33-0584	33-0584 PP	33-0584 K
33-0577	—	—
33-0585	—	—

1. Threaded Gauge Guard is MNPT X MNPT
2. Double union ball valve with female threaded or socket connections

HEATERS and HEAT EXCHANGER COILS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

HEATERS WITH "SAFEGUARD" CONTROLS PROVIDE SAFE, EFFICIENT AND ECONOMICAL HEATING FOR:

PLATING / PICKLING / RINSING
ANODIZING / D.I. WATER / DYES
ACIDS / ALKALIES / CLEANERS
and OTHER AQUEOUS SOLUTIONS

UL LISTED CSA CERTIFIED

- **Heaters**
  Available in a variety of configurations in steel, 304 SS, 316 SS, titanium, quartz, and Teflon®
- **Thermostat controls and liquid level sensors for safe operation**
- **Heat exchanger coils**
  Metal coils in 316 SS and titanium; fluoropolymer tube coils

THERMAL OVERLOAD PROTECTION

Protector I, II and III-Series

PROTECTOR I SERIES (Standard on all electric immersion heaters)
The Protector I over-temperature control system utilizes a heat sensitive fuse to detect overheating conditions. The fuse, placed inside a thermowell, positioned in contact with the heater sheath, will cut power to the heater in the event of a low liquid level.

PROTECTOR II AND PROTECTOR III SERIES (Optional - Consult Sales Dept.)
The Protector II and Protector III systems provide the same reliable over-temperature protection as the Protector I; however, the control systems feature a heat sensing thermostat. Should the tank's liquid level drop to a preset overheat point, the thermostat will trip and an audible alarm will sound, as well as cutting power to the heater. This eliminates dangerous operating conditions. After filling the tank, the immersion heater can be quickly made operational by pushing the reset button on the control to restore power.

DETERMINING SPECIFIC HEATING REQUIREMENTS FOR IMMERSION HEATERS

A-102_N

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TO DETERMINE THE HEATING REQUIREMENT OF A TANK

Obtain the following information:

1. TOTAL CUBIC FEET OF TANK. - Multiply the inside dimensions of the tank (depth x width x length). If the solution is normally 6" below the top of the tank, allow for this when calculating.
2. TOTAL GALLONS OF SOLUTION - Multiply by 7.48 the cubic feet of the tank occupied by solution.
3. AVERAGE AMBIENT (ROOM) TEMPERATURE WHERE TANK IS LOCATED.
4. TEMPERATURE LEVEL AT WHICH SOLUTION IS TO BE HELD.
5. HEAT-UP TIME DESIRED (HOURS).

After this information is known, use the legend at right to make the calculations.

$$\frac{\mathbf{A} \times 1.0^{*} \times 8.35^{**} \times \mathbf{B}}{3412 \times \mathbf{C}} = \_\_\_\_\_$$

$$\mathbf{D} \times \mathbf{E} = \_\_\_\_\_$$

Add the results of both calculations. The total is the Kilowatt requirement of the tank.

LEGEND

* Specific heat of water. Insert specific heat of your solution here. If unavailable, use water value.
** Weight of water. Insert specific weight of your solution here. If unavailable, use water value.
A = Total gallons of solution
B = Difference between ambient temperature and desired solution temperature.
C = Desired heat-up time (hours).
D = Heat loss of tank. Refer to "Surface Losses" chart below.
E = Square feet of top of tank (multiply length x width)

SURFACE LOSSES IN KW from open hot water tank

80°	--	130°	.16	180°	.50
85°	.01	135°	.18	185°	.55
90°	.02	140°	.21	190°	.60
95°	.04	145°	.24	195°	.66
100°	.05	150°	.27	200°	.72
105°	.065	155°	.30	205°	.80
110°	.09	160°	.34	210°	.87
115°	.10	165°	.37	215°	.95
120°	.12	170°	.41	220°	1.04
125°	.14	175°	.45		

TYPICAL HEATER INSTALLATION

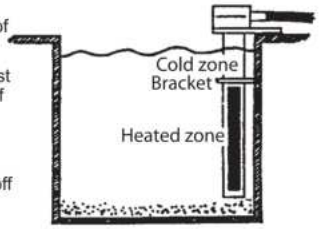
Be certain heater is properly connected in compliance with all codes and per instructions which accompany heater.

Solution level must always remain above heated zone of heater.

Heater should remain at least 2" above sludge at bottom of tank.

CAUTION: All heated tanks should be equipped with an emergency automatic shut-off device.

Solution level must be at least one inch below junction box. Junction box must not be submerged.



AMPS FOR SELECTION OF CONTROLS

HEATER WATTS	AMPS FOR HEATING LOAD										
	SINGLE PHASE						THREE PHASE (BALANCED)				
	120V	208V	230V	240V	460V	480V	208V	230V	240V	460V	480V
1,000	8.4	4.8	4.4	4.2	2.2	2.1	2.8	2.6	2.5	1.3	1.2
2,000	16.7	9.7	8.7	8.4	4.4	4.2	5.6	5.1	4.9	2.6	2.5
3,000	25.0	14.5	13.1	12.5	6.6	6.3	8.4	7.6	7.3	3.8	3.7
4,000	33.4	19.3	17.4	16.7	8.7	8.4	11.2	10.1	9.7	5.9	4.9
6,000	50.0	28.9	26.1	25.0	13.1	12.5	16.7	15.1	14.5	7.6	7.3
8,000	66.7	38.5	34.8	33.4	17.4	16.7	22.3	20.2	19.3	10.1	9.7
9,000	75.0	43.3	39.2	37.5	19.6	18.8	25.1	22.7	21.7	11.4	10.9
12,000	100.0	57.7	52.2	50.0	26.1	25.0	33.4	30.2	29.0	15.1	14.5
18,000	150.0	86.6	78.3	75.0	39.2	37.5	50.1	45.3	43.4	22.7	21.7
27,000	225.0	129.9	117.4	112.5	58.7	56.3	75.1	67.9	65.1	34.0	32.6
36,000	300.0	173.1	156.6	150.0	78.3	75.0	100.1	90.5	86.8	45.3	43.4

OVER-THE-SIDE HEATERS (OTS) - Spiral & Spiral-L TEFLON® A-102_N

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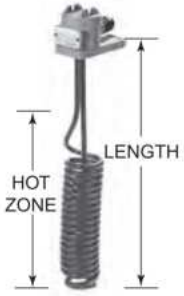
SINGLE ELEMENT SPIRAL OVER - THE - SIDE TEFLON IMMERSION HEATERS



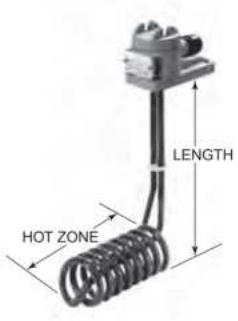
10 watts/square inch nominal.
240 volts standard as listed - other voltages available.

Compatible with most plating tank solutions, inert to acids, anodizing and pickling solutions up to 212°F. temperature. Check Chemical Resistance Chart or with chemical supplier for proper material selection.
Replaces alumina or graphite heaters.

FEATURES:

- Low watt density for long service life.
- Non-contaminating Teflon covered stainless steel elements.
- PTI or PTLI thermal protection standard.
- Grounded internal metal element for safety.
- U.L. listed, CSA certified.
- Lightweight, non-floating construction.
- Standard 3' flexible PVC liquid-tight conduit.
- Polypropylene or Teflon guards optional. Consult Sales Dept.
- Single phase only
- Longer lengths available.
- Vapor-tight polypropylene terminal enclosure.

SINGLE ELEMENT SPIRAL L-SHAPED TEFLON IMMERSION HEATERS



Bottom design for even heating and varying liquid levels.

WATTS	VOLTS*	HOT ZONE Inches	VERT.* LENGTH Inches	PRICE CODE NUMBER	SHIP WT. lbs.
500	240	5	11	79-1000XAA1	6
1,000	240	7	11	79-1001XAA1	7
2,000	240	12	17	79-1002XAA1	8
3,000	240	16	23	79-1003XAA1	13
4,000	240	20	29	79-1004XAA1	15
5,000	240	25	35	79-1005XAA1	18
6,000	240	29	40	79-1006XAA1	21
8,000	240	37	47	79-1007XAA1	25
9,000	240	44	54	79-1008XAA1	28

WATTS	VOLTS*	HOT ZONE Inches	VERT.* LENGTH Inches	PRICE CODE NUMBER	SHIP WT. lbs.
500	240	6	12	79-1009XAA1	6
1,000	240	8	12	79-1010XAA1	7
2,000	240	12	18	79-1011XAA1	8
3,000	240	17	18	79-1012XAA1	13
4,000	240	20	18	79-1013XAA1	15
5,000	240	24	18	79-1014XAA1	18
6,000	240	29	18	79-1015XAA1	21
8,000	240	37	18	79-1016XAA1	26
9,000	240	44	18	79-1017XAA1	29

* Consult Sales Dept. for other choices.

PRICE CODE IDENTIFICATION

Price Code Number: 79-_____ #1 #2 #3 #4 #5

#1 HEATER MATERIAL	#2 VOLTAGE	#3 PROTECTOR Consult Sales Dept.	#4 PHASE
X = PTFE (Teflon) Q = Quarts P = Plain steel F = 304 stainless steel S = 316 stainless steel T = Titanium	A = 240V B = 480V C = 120V D = 208V E = 415V G = 600V H = 380V	Replaceable PI: A = to 180°F; B = 180-230°F; C = 230-300°F Resettable PII or PIII: D = to 180°F; E = 180-230°F; F = 230-300°F	1 = 1φ 3 = 3φ **#5 OPTIONS** Blank = No guard C = w/guard G = Guard only J = Tube only E = Element only

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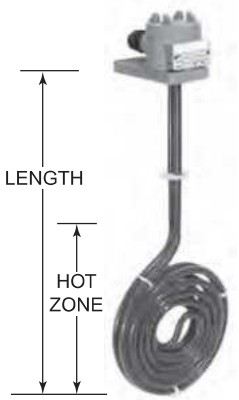
SINGLE ELEMENT FLAT OVER-THE-SIDE TEFLON



Flat, low profile design.

Compatible with most plating tank solutions, inert to acids, anodizing and pickling solutions up to 212°F. temperature. Check Chemical Resistance Chart or with chemical supplier for proper material selection.Replaces alumina or graphite heaters.

FEATURES:

- Low watt density for long service life.
- Non-contaminating Teflon covered stainless steel element.
- PTI or PTLI thermal protection standard
- U.L. listed, CSA certified.
- Lightweight, non-floating construction.
- Vapor-tight polypropylene terminal enclosure.
- Standard 3' flex ble PVC liquid-tight conduit.
- Polypropylene or Teflon guards optional. Consult Sales Dept.
- Single phase only
- Grounded internal metal element for safety.
- Longer vertical lengths available.

SINGLE ELEMENT FLAT L-SHAPED TEFLON IMMERSION HEATERS

10 watts/square inch nominal

240 volts standard as listed - other voltages available.

Low profile bottom design for even heating and varying liquid levels.

WATTS	VOLTS*	HOT ZONE Inches	VERT.* LENGTH Inches	DIA.* inches	PRICE CODE NUMBER	SHIP WT. lbs.
500	240	6	14	5	79-1018XAA1	6
1,000	240	7	14	6	79-1019XAA1	7
2,000	240	9	17	8	79-1020XAA1	8
3,000	240	10	23	9	79-1021XAA1	13
4,000	240	12	29	11	79-1022XAA1	15
5,000	240	13	35	12	79-1023XAA1	18
6,000	240	14	40	13	79-1024XAA1	22

WATTS	VOLTS*	HOT ZONE Inches	VERT.* LENGTH Inches	DIA.* inches	PRICE CODE NUMBER	SHIP WT. lbs.
500	240	5	12	5	79-1027XAA1	6
1,000	240	6	12	6	79-1028XAA1	7
2,000	240	8	18	8	79-1029XAA1	8
3,000	240	9	18	9	79-1030XAA1	13
4,000	240	11	18	11	79-1031XAA1	15
5,000	240	12	18	12	79-1032XAA1	18
6,000	240	13	18	13	79-1033XAA1	22

* Consult Sales Dept. for other choices.

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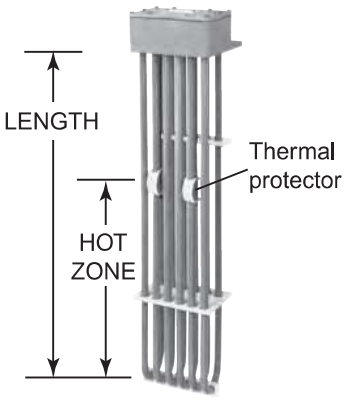
SIX ELEMENT OVER - THE - SIDE TEFLON IMMERSION HEATERS



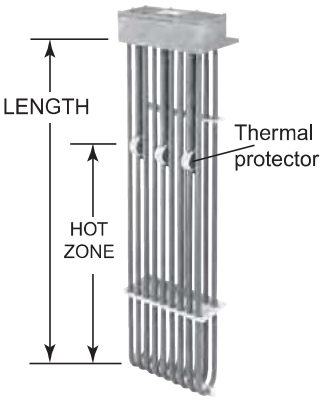
10 watts/square inch nominal 240 volts standard as listed - other voltages available.

Compatible with most plating tank solutions, inert to acids, anodizing and pickling solutions up to 212°F. temperature. Check Chemical Resistance Chart or with chemical supplier for proper material selection.Replaces alumina or graphite heaters.

FEATURES:

- U.L. listed, CSA certified.
- Low watt density for long service life.
- Non-contaminating Teflon covered stainless steel elements.
- PTI thermal protection standard.
- Grounded internal metal element for safty.
- Lightweight, non-floating construction.
- Vapor-tight polypropylene terminal enclosure.
- Standard 3' flexible PVC liquid-tight conduit.
- Polypropylene or Teflon guards optional. Consult Sales Dept.
- Standard 3-phase wiring. Consult Sales Dept. for optional single phase.

NINE ELEMENT OVER - THE - SIDE TEFLON IMMERSION HEATERS



3 to 18 kw, 10 watts/square inch nominal 240 volts standard as listed - other voltages available.

WATTS	VOLTS*	HOT ZONE inches	LENGTH* inches	PRICE CODE NUMBER	SHIP WT. lbs
2,000	240	9	17	79-1069XAA3	19
3,000	240	15	23	79-1070XAA3	22
4,000	240	21	29	79-1071XAA3	24
6,000	240	28	35	79-1072XAA3	27
8,000	240	38	47	79-1073XAA3	33
10,000	240	47	59	79-1074XAA3	40
12,000	240	55	68	79-1075XAA3	45

WATTS	VOLTS*	HOT ZONE inches	LENGTH* inches	PRICE CODE NUMBER	SHIP WT. lbs
3,000	240	9	17	79-1076XAA3	28
4,500	240	15	23	79-1077XAA3	33
6,000	240	21	29	79-1078XAA3	36
9,000	240	28	35	79-1079XAA3	40
12,000	240	38	47	79-1080XAA3	49
15,000	240	47	59	79-1081XAA3	60
18,000	240	55	68	79-1082XAA3	67

* Consult Sales Dept. for other choices.

OVER-THE-SIDE HEATERS (OTS) - Tubular

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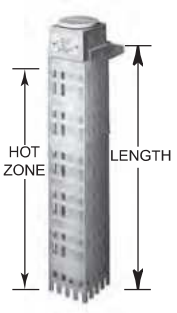
SINGLE TUBE



26 watts/square inch nominal.
240 volts standard as listed, other voltages available.

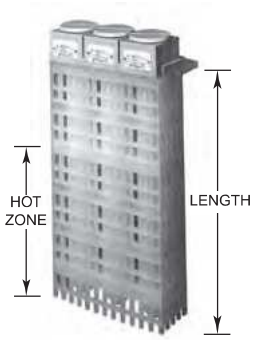
For plating tanks, pickling and other acidic aqueous solutions. Check Chemical Resistance Chart or with chemical supplier for proper material selection.

Not for use in hydrofluoric acid or alkaline solutions.

FEATURES:

- Heavy duty, long lasting construction.
- PQI thermal protection standard
- Grounded for safety.
- U.L. listed, CSA certified.
- Vapor-tight polypropylene terminal enclosure.
- Standard 3' flexible PVC liquid-tight conduit.
- Replaceable elements and quartz tube.
- Complete standard heater provided with polypropylene guard, optional Teflon guard available for solutions over 200°F. and chromic acid.

TRIPLE TUBE



26 watts/square inch nominal.
240 volts standard as listed, other voltages available.

WATTS	VOLTS*	HOT ZONE inches	LENGTH* inches	PRICE CODE NUMBER	SHIP WT. lbs.
500	240	6	10	79-1136QAA1C	9
1,000	240	7	11	79-1137QAA1C	10
1,000	240	7	17	79-1138QAA1C	11
2,000	240	12	17	79-1139QAA1C	11
2,000	240	12	23	79-1140QAA1C	14
3,000	240	18	23	79-1141QAA1C	14
3,000	240	18	29	79-1142QAA1C	17
3,500	240	21	29	79-1143QAA1C	17
4,000	240	28	35	79-1144QAA1C	20
4,000	240	28	41	79-1145QAA1C	23
5,000	240	33	41	79-1146QAA1C	23
5,000	240	33	47	79-1147QAA1C	26
6,000	240	39	47	79-1148QAA1C	26
6,000	240	39	52	79-1149QAA1C	29
8,000	240	49	59	79-1150QAA1C	31
10,000	240	62	71	79-1151QAA1C	34

WATTS	VOLTS*	HOT ZONE inches	LENGTH* inches	PRICE CODE NUMBER	SHIP WT. lbs.
1,500	240	6	10	79-1152QAA1C	21
3,000	240	7	11	79-1153QAA1C	22
3,000	240	7	17	79-1154QAA1C	26
6,000	240	12	17	79-1155QAA1C	26
6,000	240	12	23	79-1156QAA1C	30
9,000	240	18	23	79-1157QAA1C	30
9,000	240	18	29	79-1158QAA1C	34
10,500	240	21	29	79-1159QAA1C	34
12,000	240	28	35	79-1160QAA1C	38
12,000	240	28	41	79-1161QAA1C	44
15,000	240	33	41	79-1162QAA1C	44
15,000	240	33	47	79-1163QAA1C	48
18,000	240	39	47	79-1164QAA1C	48
18,000	240	39	52	79-1165QAA1C	52
24,000	240	49	59	79-1166QAA1C	55
30,000	240	62	71	79-1167QAA1C	65

Single phase standard. Consult Sales Dept. for optional 3 phase.

* Consult Sales Dept. for other choices.

Standard design consists of three individual single phase heaters, which can be wired delta in the field to achieve a three phase balanced operating system. Individual elements are field replaceable.

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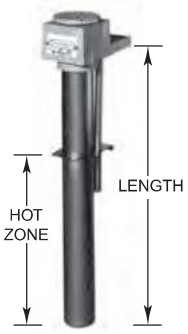
SINGLE TUBE METAL OVER - THE - SIDE IMMERSION HEATERS



35 watts/square inch nominal

240 volts standard as listed - other voltages available.

Single phase standard. Consult Sales Dept. for optional 3 phase.

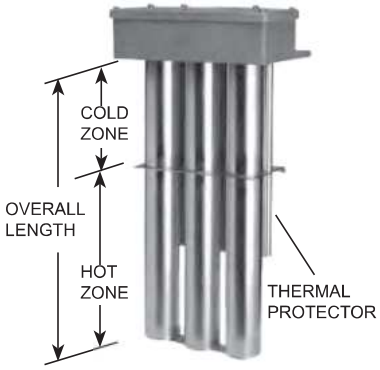
Standard 3' flexible PVC liquid-tight conduit.

For plating tanks, rinse tanks and other aqueous solutions. Check Chemical Resistance Chart or with chemical supplier for proper material selection.

FEATURES:

- Heavy duty, long lasting construction.
- PI thermal protection standard
- U.L. listed except plain steel, all CSA certified.
- Grounded for safety.
- Vapor tight polypropylene terminal enclosure.

TRIPLE TUBE METAL OVER - THE - SIDE IMMERSION HEATERS



35 watts/square inch nominal

240 volts standard as listed - other voltages available.

Standard units consist of a single head with 3' flex ble PVC liquid tight conduit.

Single phase standard. Consult Sales Dept. for optional 3 phase.

WATTS	VOLTS[1]	HOT ZONE inches	LENGTH[1] inches	316 STAINLESS STEEL[2]	SHIP WT. lbs.
1,000	240	6	11	79-1168SAA1	7
2,000	240	10	17	79-1169SAA1	10
3,000	240	16	23	79-1170SAA1	11
4,000	240	20	29	79-1171SAA1	13
5,000	240	25	35	79-1172SAA1	15
6,000	240	30	40	79-1173SAA1	17
8,000	240	37	47	79-1174SAA1	23
9,000	240	44	54	79-1175SAA1	24
10,000	240	49	59	79-1176SAA1	25
12,000	240	58	68	79-1177SAA1	28

WATTS	VOLTS[1]	HOT ZONE inches	LENGTH[1] inches	316 STAINLESS STEEL[2]	SHIP WT. lbs.
3,000	240	6	11	79-1178SAA1	21
6,000	240	10	17	79-1179SAA1	30
9,000	240	16	23	79-1180SAA1	33
12,000	240	20	29	79-1181SAA1	39
15,000	240	25	35	79-1182SAA1	45
18,000	240	30	40	79-1183SAA1	51
24,000	240	37	47	79-1184SAA1	63
27,000	240	44	54	79-1185SAA1	69
30,000	240	49	59	79-1186SAA1	75
36,000	240	58	68	79-1187SAA1	84

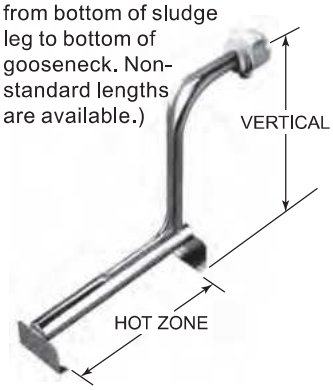
[1] Consult Sales Dept. for other choices.

[2] For 304SS heater, change **S** to **F** in Price Code Number.
For titanium heater, change **S** to **T** in Price Code Number.
For plain steel, change **S** to **P** in Price Code Number.

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

SINGLE TUBE METAL L-SHAPED IMMERSION HEATERS

(Riser height measured from bottom of sludge leg to bottom of gooseneck. Non-standard lengths are available.)



35 watts/square inch nominal
240 volts standard as listed - other voltages available.
Single phase standard. Consult Sales Dept. for optional three phase.

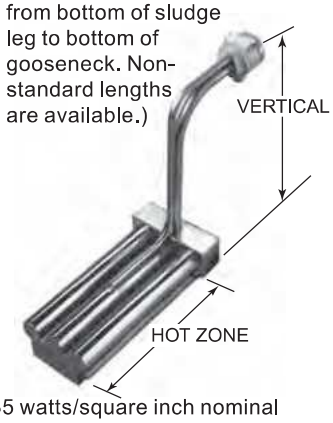
For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check Chemical Resistance Chart or with chemical supplier for proper material selection.

FEATURES:

- Bottom mount design for even heating and varying solution levels.
- Standard 2" sludge legs (longer available).
- Heavy duty, long lasting construction.
- PLI thermal protection standard
- U.L. listed except plain steel, all CSA certified.
- Grounded for safety.
- Vapor- tight polypropylene terminal enclosure.
- Standard 3' flex ble PVC liquid-tight conduit.
- Optional Teflon flexible riser or straight vertical configuration available.(Consult Sales Dept).

TRIPLE TUBE METAL L-SHAPED IMMERSION HEATERS

(Riser height measured from bottom of sludge leg to bottom of gooseneck. Non-standard lengths are available.)



35 watts/square inch nominal
240 volts standard as listed - other voltages available.
Three phase standard. Consult Sales Dept. for optional single phase.

WATTS	VOLTS[2]	HORIZ.[2] inches	VERT.[2] inches	316 STAINLESS STEEL[1]	SHIP WT. lbs.
1,000	240	13	15	79-1208SAA1	10
2,000	240	17	19	79-1209SAA1	11
3,000	240	22	25	79-1210SAA1	12
4,000	240	26	25	79-1211SAA1	13
5,000	240	31	37	79-1212SAA1	14
6,000	240	36	50	79-1213SAA1	15
8,000	240	44	50	79-1214SAA1	18
9,000	240	50	50	79-1215SAA1	20
10,000	240	55	50	79-1216SAA1	22
12,000	240	64	50	79-1217SAA1	25

WATTS	VOLTS[2]	HORIZ.2 inches	VERT.2 inches	316 STAINLESS STEEL1	SHIP WT. lbs.
3,000	240	13	15	79-1218SAA3	30
6,000	240	17	37	79-1219SAA3	33
9,000	240	22	37	79-1220SAA3	36
12,000	240	26	37	79-1221SAA3	39
15,000	240	31	37	79-1222SAA3	42
18,000	240	36	50	79-1223SAA3	45
24,000	240	44	50	79-1224SAA3	54
27,000	240	50	50	79-1225SAA3	60
30,000	240	55	50	79-1226SAA3	66
36,000	240	64	50	79-1227SAA3	75

[1] For 304SS heater, change **S** to **F** in Price Code Number.
For titanium heater, change **S** to **T** in Price Code Number.
For plain steel, change **S** to **P** in Price Code Number.

[2] Consult Sales Dept. for other choices.

WARNING

ELECTRIC IMMERSION HEATERS WILL IGNITE MANY PLASTIC TANKS SUCH AS POLYPROPYLENE AND POLYETHYLENE AND SUBJECT PERSONNEL TO SHOCK HAZARD IF NOT PROPERLY INSTALLED AND MAINTAINED.

IGNITION SOURCE

SHOCK HAZARD

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

DIGITAL COMBINATION CONTROLS WITH STEPDOWN TRANSFORMER

Provides digital indication of setpoint and control point temperature.

- SIngle setpoint
- 1 or 3 phase controls with 5 ft. FEP sleeved sensor.
- -58°F to 302°F temperature range. (-50° to 150°C).
- cULus listed.
- ±1°F accuracy.
- Optional 10 ft. sensor
- Large LED readout.

ORDERING INFORMATION					
PRICE CODE NO.	MODEL NUMBER	VOLTS	MAX. AMPS	SHIP/ WT. lbs/(Kg.)	OPTIONS*
79-1660 A 79-1660 B	DLC 302 DLC 304	240 480	30	16 (7.5)	Add **-LT** to Price Code Number and Model Number for "less transformer". Transformer must be used at 480 volts. PII or PIII resettable systems (Consult Sales Dept.) *Consult Sales Dept. for other choices
79-1661 A 79-1661 B	DLC 502 DLC 504	240 480	50	17 (8)	
79-1662 A 79-1662 B	DLC 752 DLC 754	240 480	75	23 (10.5)	
79-1663 A 79-1663 B	DLC 902 DLC 904	240 480	90	25 (11.5)	
79-1664 A 79-1664 B	DLC 1202 DLC 1204	240 480	120	27 (12.5)	
79-1665 A 79-1665 B	DLC 1502 DLC 1504	240 480	150	33 (15)	

DIGITAL COMBINATION CONTROLS WITH STEPDOWN TRANSFORMER

Provides digital indication of setpoints and control point temperatures.

- Dual setpoints for heat / cool applications.
- 1 or 3 phase controls with 10 ft. FEP sleeved sensor.
- 0-500°F temperature range (Field selectable 0 - 260°C).
- cULus listed
- ±.25% accuracy (full span).
- Large LED readout.

ORDERING INFORMATION					
PRICE CODE NO.	MODEL NUMBER	VOLTS	MAX. AMPS	SHIP/ WT. lbs/(Kg.)	OPTIONS*
79-1670 A 79-1670 B	DQ 302 DQ 304	240 480	30	19 (8.5)	Add **-LT** to Price Code Number and Model Number for "less transformer". Transformer must be used at 480 volts. PII or PIII resettable systems (Consult Sales Dept.) *Consult Sales Dept. for other choices
79-1671 A 79-1671 B	DQ 502 DQ 504	240 480	50	20 (9)	
79-1672 A 79-1672 B	DQ 752 DQ 754	240 480	75	26 (12)	
79-1673 A 79-1673 B	DQ 902 DQ 904	240 480	90	28 (13)	
79-1674 A 79-1674 B	DQ 1202 DQ 1204	240 480	120	30 (13.5)	
79-1675 A 79-1675 B	DQ 1502 DQ 1504	240 480	150	36 (16.5)	

NON-INDICATING COMBINATION CONTROLS WITH STEPDOWN TRANSFORMER

For temperature control of heated aqueous solutions.

- Single setpoint
- 30°F to 220°F temperature range.
- 1 or 3 phase controls with 5 ft. FEP sleeved sensor.
- cULus listed.
- ±5°F accuracy.

FEP is fluorinated ethylene propylene fluoro polymer.

ORDERING INFORMATION					
PRICE CODE NO.	MODEL NUMBER	VOLTS	MAX. AMPS	SHIP/ WT. lbs/(Kg.)	OPTIONS*
79-1534A 79-1534B	NR302 NR304	240 480	30	15 (7)	Add -LT to Price Code No. and Model No. for "less transformer". Transformer must be used at 480 volts. Add -H to Price Code No. and Model No. for high temp. model (150°F to 550°F) PII or PIII resettable systems (Consult Sales Dept.) *Consult Sales Dept. for other choices
79-1535A 79-1535B	NR502 NR504	240 480	50	16 (7.5)	
79-1536A 79-1536B	NR752 NR754	240 480	75	22 (10)	
79-1537A 79-1537B	NR902 NR904	240 480	90	24 (11)	
79-1538A 79-1538B	NR1202 NR1204	240 480	120	26 (12)	
79-1539A 79-1539B	NR1502 NR1504	240 480	150	32 (14.5)	

LIQUID LEVEL SENSOR - SINGLE AND DUAL FUNCTION

For fluid processing and leak detection

SERIES LC2 Single function probe Designed to control power to immersion heater should process solution drop below upper probe.

SERIES LC3 Dual function probe Style same as above and also controls power to pump, solenoid valve or other equipment. 10 amp maximum.

- Prevents heater burn out from low liquid level.
- Designed for use in conductive solutions up to 70K OHMS resistance.
- PTFE covered stainless steel, titanium, Hastelloy® C or graphite probes available.

ORDERING INFORMATION					
LC SERIES — 2 PROBES			LC SERIES — 3 PROBES		
PRICE CODE NO.	MODEL NUMBER	PROBE LENGTH (FIELD TRIM) in.	PRICE CODE NO.	MODEL NUMBER	PROBE LENGTH (FIELD TRIM) in.
79-1510_*	LC2(*)6	6	79-1517_*	LC3(*)6	6
79-1511_*	LC2(*)12	12	79-1518_*	LC3(*)12	12
79-1512_*	LC2(*)18	18	79-1519_*	LC3(*)18	18
79-1513_*	LC2(*)24	24	79-1520_*	LC3(*)24	24
79-1514_*	LC2(*)30	30	79-1521_*	LC3(*)30	30
79-1515_*	LC2(*)36	36	79-1522_*	LC3(*)36	36
79-1516_*	LC2(*)48	48	79-1523_*	LC3(*)48	48

* Designate material selection in Price Code Number and Model Number.
S = 316 Stainless steel T = Titanium
H = Hastelloy G = Graphite (Not field trimmable)

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HEAT TRANSFER TUBE & COIL SIZING

A-102_N

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

TEFLON and METAL

QUICK ESTIMATION (BASED ON STEAM) HEAT-UP

STEP 1 Determine gallons in tank.
(U.S. Gal. = Tank Width ___" x Length ___" x Depth ___" ÷ 231.)
Enter this amount at (**A**) in Formula 1.

STEP 2 Subtract temperature of media to be heated from the temperature to which it must be heated.
(Δ Temperature = Desired Temp. ___°F - Initial Temp.___ °F)
Enter this amount at (**B**).

STEP 3 Locate your useable steam pressure in Steam Pressure Factor chart and find the factor number. Enter this at (C).

STEP 4 Multiply (A) times (B) times (C). Divide the product by 1000. This is the square foot area you require for a one hour heat-up. If more time is available, coil surface area may be reduced by dividing the square foot area by the heat-up time available, up to 4 hours maximum.

Formula 1

(**A**) _____ (GALLONS) x (**B**) _____ (ΔT) x (**C**) _____ (STEAM FACT.) ÷ 1,000 = FT²

FORMULA FOR HOT WATER HEATING MEDIA

STEP 1 Determine gallons in tank. Enter at (A) in Formula 2.

STEP 2 Subtract temperature of media to be heated from the temperature to which it must be heated. Enter at (B).

STEP 3 Multiply (A) times (B) times 8.33. Enter answer at (C).

STEP 4 Subtract the required tank temperature from the temperature of your hot water supply. Enter this figure at (D).

STEP 5 Multiply (D) by 100 for all metals or 30 for Teflon and enter answer at (E).

STEP 6 Divide (C) by (E) to determine square feet of area required. If more time is available, coil surface area may be reduced by dividing the square foot area by the heat-up time available, up to 4 hours maximum.

Formula 2

(**A**)_____ (gallons) x (**B**)_____ (ΔT) x 8.33 = ——

_____ = (**C**) = FT² OF AREA REQ'D FOR ONE HOUR HEAT-UP
100 (all metals) (**E**)

or x (**D**)_____
30 (Teflon) (Temp. rise required)

STEAM PRESSURE FACTORS

Steam Pressure Available PSI	5	10	15	20	25	50
Steam Factor for Metal	.55	.50	.42	.37	.30	.25
Steam Factor for Teflon	2.75	2.50	2.10	1.85	1.50	—

Consult Sales Dept. for pressures above 50 lb. for metal and 30 lb. for Teflon.

FORMULA FOR COOLING WITH ANY MEDIUM

This formula assumes that all electrical energy is dissipated in the tank as heat. In more efficient electrochemical conversions, the energy dissipated as heat may be less.

STEP 1 Determine watts by multiplying voltage times amperage delivered by the tank rectifier. Multiply this product times 3.412 to determine BTU's. Enter answer at (A) in Formula 3.

STEP 2 Subtract cooling liquid temperature from required tank temperature. Enter at (B). CAUTION: If this number is less than 15, consult Sales Dept. for assistance in determining proper coil size.

STEP 3 Multiply (B) times 100 for all metals or 30 for Teflon and enter answer at (C).

STEP 4 Divide (A) by (C) to determine square feet of surface area required.

Formula 3

(**A**)_____
(volts x amps x 3.412)

= (**A**) = ____ FT.² OF SURFACE AREA REQUIRED
(**C**)

(**B**)_____ x **100** (all metals) or 30 (Teflon)
(Req'd. tank temp. minus cooling liquid temp.)

FOR A MORE IN-DEPTH ANALYSIS OF YOUR SPECIFIC HEAT REQUIREMENTS, PROVIDE THE FOLLOWING INFORMATION AND WE WILL GLADLY SIZE YOUR HEAT EXCHANGER.

Initial temperature_____

Desired temperature_____

Tank size: Length _____ Width _____ Height _____

Solution depth _____

Type of solution to be heated or cooled _____

Production load: Lbs./hr. _____ & load temp. _____

Agitation (type) _____

Rectifiers: Number _____ Voltage _____ Amp _____

Covered or uncovered tank _____

Insulated tank & tank material _____

Steam pressure at coil hook-up point _____

Cooling media _____ Inlet temp. _____ Flow rate _____

Maximum flow rates, performance curves and pressure drops are determined at the factory for optimum design efficiency. Contact us for performance data.

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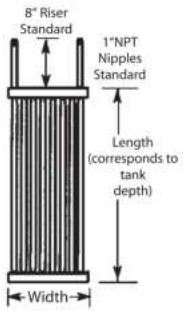
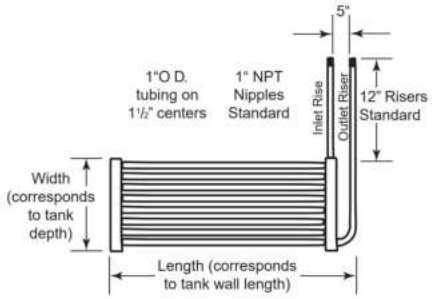
GRID COILS

VERTICAL GRID



HORIZONTAL GRID

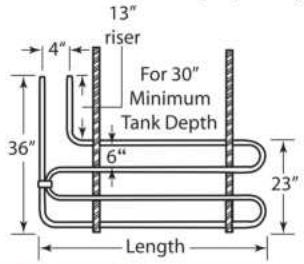


Where tank space is at a premium, the gridcoil is only 2" thick. The gridcoil permits full flow-through of solution for efficient heat transfer. Every square inch of surface is an active heat transfer area. Gridcoils can be banked or stacked for greater heat transfer.

Standard connections are 1" NPT nipples on 4" centers for serpentine and 5" centers for grids. 1" NPT nipples on variable centers for vertical models.

Gridcoils are offered in two styles - horizontal and vertical. However, the horizontal gridcoil is more commonly specified. Also, gridcoils can be operated in shallow solutions - as low as 12". The vertical style is ideal for deep, narrow tanks or wells.

SERPENTINE COILS (4-pass)



SURFACE AREA Sq. ft.	LENGTH in.	PRICE CODE NO. **	
		316 SS	TITANIUM
2.75	24	79-1432SA	79-1432TA
3.75	36	79-1432SB	79-1432TB
4.75	48	79-1432SC	79-1432TC
5.75	60	79-1432SD	79-1432TD
7.25	78	79-1432SE	79-1432TE
8.75	96	79-1432SF	79-1432TF

Serpentine coils offer lower cost per heating surface area. The design allows them to be installed in tanks with limited space.

GRIDCOIL SPECIFICATIONS

SURFACE AREA Sq. ft.	COIL DIMENSIONS (inches)		NUMBER OF TUBES	PRICE CODE NUMBER [1,2,3] 316 SS
	WIDTH	LENGTH		
5.6	12-1/2	30	8	79-1442SB
6.7	12-1/2	36	8	79-1442SC
6.8	18-1/2	24	12	79-1443SA
8.4	18-1/2	30	12	79-1443SB
8.8	12-1/2	48	8	79-1442SD
9.4	24-1/2	24	16	79-1444SA
10.0	18-1/2	36	12	79-1443SC
11.5	24-1/2	30	16	79-1444SB
13.2	18-1/2	48	12	79-1443SD
13.6	24-1/2	36	16	79-1444SC
13.7	12-1/2	72	8	79-1442SF
13.7	36-1/2	24	24	79-1446SA
15.1	12-1/2	84	8	79-1442SG
15.8	42-1/2	24	28	79-1447SA
16.3	18-1/2	60	12	79-1443SE
16.8	36-1/2	30	24	79-1446SB
17.2	12-1/2	96	8	79-1442SH
17.8	24-1/2	48	16	79-1444SD
19.2	12-1/2	108	8	79-1442SJ
19.5	18-1/2	72	12	79-1443SF
19.5	42-1/2	30	28	79-1447SB
20.0	36-1/2	36	24	79-1446SC
22.0	24-1/2	60	16	79-1444SE
22.6	18-1/2	84	12	79-1443SG
23.2	42-1/2	36	28	79-1447SC
23.4	12-1/2	132	8	79-1442SL
25.7	18-1/2	96	12	79-1443SH
26.1	24-1/2	72	16	79-1444SF
26.3	36-1/2	48	24	79-1446SD
28.9	18-1/2	108	12	79-1443SJ
30.3	24-1/2	84	16	79-1444SG
30.6	42-1/2	48	28	79-1447SD

SURFACE AREA Sq. ft.	COIL DIMENSIONS (inches)		NUMBER OF TUBES	PRICE CODE NUMBER [1,2,3] 316 SS
	WIDTH	LENGTH		
32.0	18-1/2	120	12	79-1443SK
32.5	36-1/2	60	24	79-1446SE
34.5	24-1/2	96	16	79-1444SH
35.2	18-1/2	132	12	79-1443SL
38.0	42-1/2	60	28	79-1447SE
38.3	18-1/2	144	12	79-1443SM
38.7	24-1/2	108	16	79-1444SJ
38.8	36-1/2	72	24	79-1446SF
42.9	24-1/2	120	16	79-1444SK
45.1	36-1/2	84	24	79-1446SG
45.4	42-1/2	72	28	79-1447SF
47.1	24-1/2	132	16	79-1444SL
51.3	24-1/2	144	16	79-1444SM
51.4	36-1/2	96	24	79-1446SH
52.8	42-1/2	84	28	79-1447SG
57.7	36-1/2	108	24	79-1446SJ
60.2	42-1/2	96	28	79-1447SH
64.0	36-1/2	20	24	79-1446SK
67.6	42-1/2	108	28	79-1447SJ
70.3	36-1/2	132	24	79-1446SL
75.0	42-1/2	120	28	79-1447SK
76.6	36-1/2	144	24	79-1446SM
82.4	42-1/2	132	28	79-1447SL
89.8	42-1/2	144	28	79-1447SM

[1] For titanium grid coil change 'S' to 'T' in price code no.

[2] Add 'V' to end of price code no. for vertical style.
Add 'H' to end of price code for horizontal style.

[3] Add 'S' to end of price code number for steam.
Add 'W' to end of price code number for water

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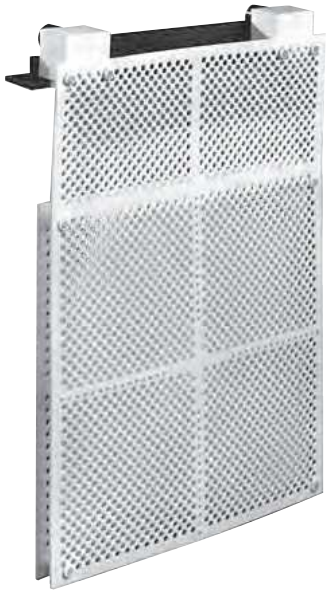
STATE-OF-THE-ART IN HEAT



Unmatched for operating performance, installation ease and quality construction, tube coils are produced from high grade FEP with PTFE guard construction.

Compact tube coil exchangers maximize heating/cooling efficiency through a design that not only creates extremely high surface area, but also ensures outstanding flow-through circulation of the process bath by creating uniform spacing between the tubing. No other heat exchanger is faster or cheaper to install/service thanks to a unique design that incorporates a manifold into the heat exchanger package.

Only the highest quality components and craftsmanship go into the manufacture of these tube coils . . . so that you can expect outstanding performance and dependability over a long service life.

- **CONSTRUCTION FROM HIGH GRADE MATERIALS**
  Frame - high strength mechanical grade Teflon
  Guard and fittings - mechanical grade Teflon
  Coil - FEP (virgin fluorinated ethylene propylene) to 30 PSI steam or water (For up to 60 PSI steam or water, consult Sales Dept.)
- **NON-CONTAMINATING**
- **OUTSTANDING RESISTANCE TO VIRTUALLY ALL ACIDS AND ALKALIES**
- **SIZES FROM 2.25 FT.² OF EXCHANGE AREA TO 46.5 FT.²**
- **OTHER SIZES AVAILABLE**

TO ORDER - Select Price Code Number

1/4 TUBE COIL - Rectangular			
SURFACE AREA sq. ft.	CONNECTIONS in.	SIZE in	PRICE CODE NUMBER
2.25	½" FNPT	11½ x 11½ x 1½	79-1478X
4.5	½" FNPT	11½ x 11½ x 2	79-1479X
4.5	½" FNPT	15½ x 15½ x 1½	79-1480X
9.25	½" FNPT	15½ x 15½ x 2	79-1481X

1/2 TUBE COIL - Round			
SURFACE AREA sq. ft.	CONNECTIONS in.	PRICE CODE SIZE in.	PRICE CODE NUMBER
6	1" FNPT	17½ x 17½ x 2	79-1482X
12	1" FNPT	17½ x 17½ x 3¼	79-1483X
18	1½" FNPT	17½ x 17½ x 4½	79-1484X
24	1½" FNPT	17½ x 17½ x 5¾	79-1485X
11.5	1" FNPT	23½ x 23½ x2	79-1486X
23	1" FNPT	23½ x 23½ x 3¼	79-1487X
34.5	1½" FNPT	23½ x 23½ x 4½	79-1488X
46.5	1½" FNPT	23½ x 23½ x 5¾	79-1489X

CUSTOM COIL CAPABILITIES

We offer many standard model heat exchangers in a wide range of materials such as stainless steel, titanium and FEP. Custom configurations, high density exchange areas, special fittings on connections, and consideration for heating and/or cooling media (as in using a coil for an evaporator for a refrigeration system) are just a few. Consult Sales Dept.

MAINTENANCE

Due to the well known anti-stick properties of FEP, very little maintenance is required. However, when excessive build-up does occur, either chemically clean or pressure spray to clean.

DO NOT ATTEMPT TO CLEAN BY SCRAPING.

Manifold fittings may require slight re-tightening after the first 24 hours of use due to the cold flow properties of FEP. However, once re-tightened, no further tightening should be required.

AIR FILTER / DRYERS AND COALESCERS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

MODEL C418-1 w/Metal Automatic Drain (optional)

AIR COALESCER MODEL BFCD201

Designed for use with tools, instruments, and paint booth equipment operated with compressed air, as well as for cleaning and drying parts.

Prevents damage to air devices and systems

SERFILCO Kompressed-Air-Konditioners provide acid-free, clean, dry air at the lowest dewpoints attainable without refrigeration. They extend operating life and improve performance of pneumatic instruments, tools and equipment.

- **Removes free water and oil**
- **Removes water and oil vapors**
- **Removes particles to one micron**
- **Lowers dewpoint**
  25°F with dehydrated clay element
  80°F with molecular sieve element
- **Pipe sizes from ¼" to 2" NPT**
- **Flow rates to 550 SCFM at 100 PSI**

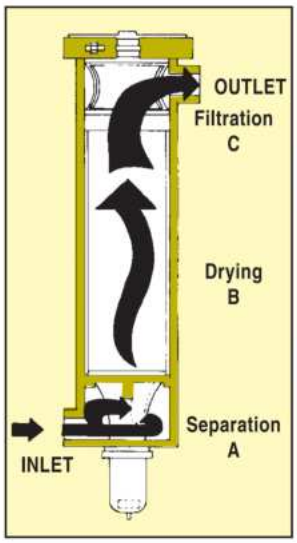
WHAT CAUSES A PNEUMATIC DEVICE TO FAIL?

First, a mist of oil and water vapor escapes from the compressor and condenses as oil and water droplets in the air tank and lines. In a rotating or reciprocating device the water and oil are mixed into an emulsion. When reheated, this will build up a varnish residue between contacting surfaces which will slow down, and may eventually even stop the air device.

In addition, most petroleum oils contain sulfur compounds. These can react with condensate to form corrosive sulfuric acid. This acid not only deteriorates 'O'-rings and seals, but also pits and corrodes metal surfaces. Once initiated, the pits become progressively bigger and eventually the metal part will have to be replaced.

Another factor that contributes to wear is pipe scale. Vibration of the pipe will loosen the scale and the rust particles will travel and collect at critical points. When these mix with oil and/or water, the resulting "grinding compound" causes considerable wear of moving parts.

THREE STAGE FILTER / DRYER SOLVES THE PROBLEM



C - THIRD STAGE
Final filter removes particles down to one micron to provide a clean, dry air supply.

B - SECOND STAGE
Dryer element removes water and oil vapors, medium size particles and provides a lower dewpoint.

A - FIRST STAGE
Cyclonic cone spins out free oil and water. Large particles and scale are separated from air stream and discharged via drain.

KOMPRESSED-AIR-KONDITIONERS Ordering Information

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

TO ORDER use Price Code Number

Select Kompressed-Air-Konditioner based on flow rate or pipe size. Assembly includes dryer element and filter pads. Select choice of drain style. Pressure ratings for both components are shown. System maximum pressure is limited by the lowest pressure rating of filter / dryer and drain.

KOMPRESSED-AIR-KONDITIONERS

MODEL	SCFM @ 100 PSI*	MAX. PSI	PRESS. DIFF. @ 150 PSI MAX. SCFM	CONNS. NPT	DIMENSIONS		SHIPPING WEIGHT LBS.	WITH ELEMENT		
					DIA.	HT.		Dehydrated Clay	Molecular Sieve	Dehydrated Clay / Carbon
								PRICE CODE NO.		
SF-B25-¼	7	250	3.5 PSI	¼"	2½"	7"	3	79-0070	79-0094	79-0301
SF-A38-½	30	250	4.0 PSI	½"	3½"	11½"	8	79-0002 A	79-0004	79-0302
SF-C418-1	70	250	3.5 PSI	1"	4½"	20"	18	79-0034 A	79-0036	79-0303
SF-E625-1½	150	200	3.5 PSI	1½"	6"	21¼"	29	79-0050	79-0056	—
SF-D832-2	300	150	11.0 PSI	2"	8¾"	34"	25	79-0072	79-0093	—

* Maximum flow - intermittent operation

DRAINS FOR KONDITIONERS

MODEL	DESCRIPTION		FOR KONDITIONERS				
			B25	A38	C418	E625	D832
			PRICE CODE NUMBERS				
D3	Metal Manual	Metal bowl with sight bubble & petcock. 250 PS	79-0078	79-0083			
D4	Metal Automatic	Metal bowl. Float operated drain. 175 PSI	79-0062	79-0084			
D5	Electronic Automatic	115V/1/60,175 PSI	–	79-0309			

REPLACEMENT ELEMENTS [1]

FOR MODEL	DESCRIPTION	PRICE CODE NO.	DESCRIPTION	PRICE CODE NO.
SF-B25-¼ SF-A38-½ SF-C418-1 SF-E625-1½ SF-D832-2	**DEHYDRATED CLAY** media hydro-philically removes water and oil vapors and medium size particles from the air stream. Pressure dewpoint is lowered approximately 25°F below the entering air temperature.	79-0071 A 79-0003 A 79-0035 A 79-0051 A 79-0073 A	**MOLECULAR SIEVE** media is recommended for those applications requiring exceptionally pure air at low dewpoints free of oil vapor. Pressure dewpoint is lowered approximately 80°F below the entering air temperature. For use with oilless compressors or a coalescer upstream.	79-0021 A 79-0022 A 79-0023 A 79-0024 A 79-0025 A
SF-B25-¼ SF-A38-½ SF-C418-1	**DEHYDRATED CLAY / CARBON** combination media bag removes rough materials, water, oil aerosols and other solvents.	79-0006 A 79-0005 A 79-0037 A		

[1] Element sets include desiccant media packaged in PP bag, one micron filter pads, "O"-ring seal and instructions.

For Kompressed-Air-Konditioners purchased prior to 1993, drop the **A** from the Price Code Number of the replacement media.

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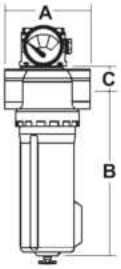
AIR COALESCERS

- **Remove aerosols economically**
- **99.98% efficiency, to 0.3 micron**

The use of SERFILCO Air Coalescers is recommended to stop the negative effects of water, oil and solids concentrations on instruments, air tools, valves and desiccant dryers. The result is longer lasting equipment, fewer production stoppages and higher quality products.

Models starting with B have metal bowls. Others have plastic bowls with metal guards. The letter **D** in the model signifies an internal automatic drain which is standard on 1/2" and larger models. The 1/4" model has a manual drain.

Plastic bowls are rated 150 psig at 125°F. Metal bowls are rated 200 psig at 175°F.



MODEL	CAPACITY SCFM @ 100 PSIG	CONNECTION NPT	DIMENSIONS			WEIGHT Lbs.	PRICE CODE NO.
			A	B	C		
FC101-2	20	¼"	3½"	5¾"	5/8"	2¼	79-0310
FCD101H-4	60	½"	3½"	10¼"	5/8"	3¼	79-0311
BFCD201-6	185	¾"	4½"	10 1/8"	1"	3½	79-0312
BFCD201-8	220	1"	4½"	10 1/8"	1"	3½	79-0313
BFCD201-12	278	1½"	5½"	10¾"	1 5/8"	4 3/8	79-0314
BFCD101-16	430	2"	7¾"	22"	1 5/8"	19¾	79-0315

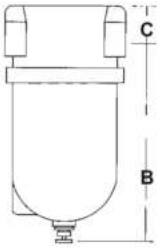
5 MICRON AIR FILTERS

REMOVE COARSE PARTICLES ECONOMICALLY AND EXTEND LIFE OF AIR DRYER AND COALESCING ELEMENTS

SERFILCO 5 Micron Air Filters are designed to be used independently for less sensitive filtration applications and as prefilters for the high efficiency air coalescer designs, thereby extending the operating life of the high efficiency coalescing element.

These air filters cover a wide variety of sizes and flow rates. Models starting with **B** have metal bowls. Others have plastic bowls with metal guards. All models come standard with an internal automatic drain.

Plastic bowls are rated 150 psig at 125°F. Metal bowls are rated 200 psig at 175°F.



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MODEL	CAPACITY SCFM @ 100 PSIG	CONNECTION NPT	DIMENSIONS			WEIGHT Lbs.	PRICE CODE NO.
			A	B	C		
FC101-2	45	¼"	2 5/8"	4 5/8"	5/8"	1¼	79-0320
FCD101H-4	130	½"	3½"	5¾"	5/8"	2¼	79-0321
BFCD201-6	225	¾"	4½"	8"	13/16"	2½	79-0322
BFCD201-8	275	1"	4½"	8"	13/16"	2½	79-0323
BFCD201-12	950	1½"	8"	13¼"	1¾"	14½	79-0324
BFCD101-16	950	2"	8"	13¼	1¾"	14½	79-0325

2900 MacArthur Blvd Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

SERFILCO Kompressed-Air-Konditioners remove water and oil vapor to prevent condensation downstream. Three choices of desiccant elements are available:

DEHYDRATED CLAY ELEMENT

Effective for both water and oil removal Requires no coalescing or air preparation A general purpose desiccant which produces initial dew point de-pressions (pressure dew points) of 20° to 25°F. Life expectancy is up to three months depending on humidity, flow rate and frequency of operation.

DEHYDRATED CLAY WITH ACTIVATED CARBON ELEMENT

A layer of activated carbon following the clay desiccant produces slightly lower initial dew points. It provides better removal of noxious gasses and oil aerosols. It is to be used where a higher degree of purification is required.

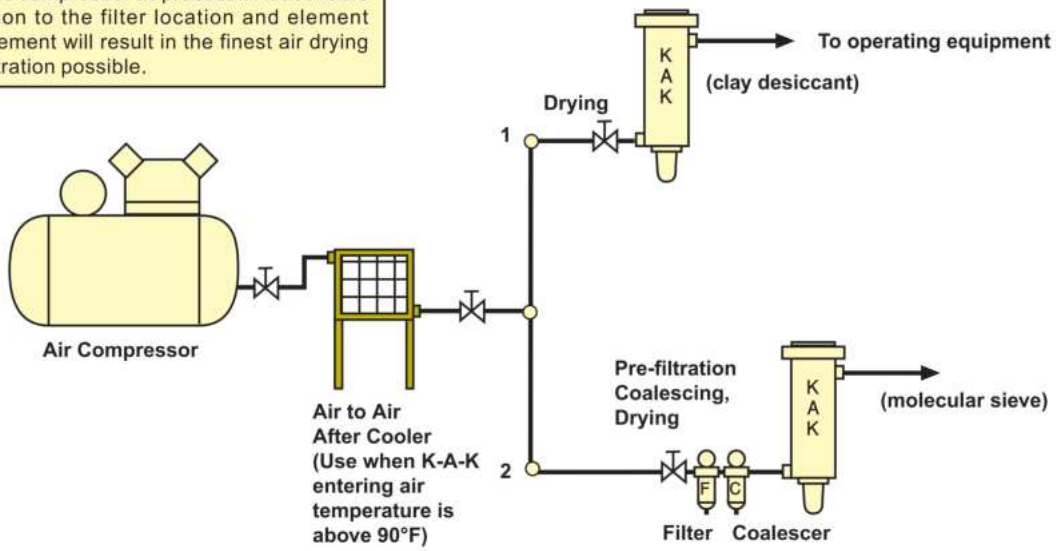
MOLECULAR SIEVE ELEMENT

Highly porous alumina s licate complexes produce exceptionally low dew points - as much as an 80°F initial pressure dew point depression Molecular sieve material will be coated with oil passing through the system thereby reducing efficiency and life expectancy. They are generally used with oil-less compressors or a coalescing filter is used to remove the oil before the air enters the Filter/Dryer. The addition of a general purpose filter will extend the life of the coalescing filter element, further reducing cost. Always install filters before the Molecular Sieve models.

TYPICAL INSTALLATIONS

INSTALLATION RECOMMENDATION

It is intended that all models be located as far from the compressor as practical. Reasonable attention to the filter location and element replacement will result in the finest air drying and filtration possible.



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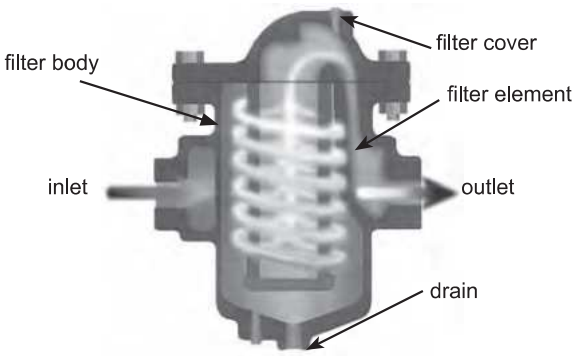
SERIES 'G'
STEAM / GAS FILTERS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

Sizes 1/2" to 6" with steam flow rates up to 28,000 lb/hr. or gas flow rates to 6,900 SCFM

IMPROVE PLANT PRODUCTION MINIMIZE MAINTENANCE COSTS

- **Two step separation process**
- **Rugged design and construction provides long term reliability**
- **Inline connections easy to install**
- **Durable permanent element withstands repeated cleanings to extend tube life**



STEAM FILTER

- **Nominal two micron filtration Poro-Carbon element**
- **Operating temperatures to 500°F**
- **Standard units with design pressure to 200 psi are available from stock.**
- **Complies with 3A accepted practices, meets requirements for culinary steam systems**

GAS FILTER

- **Nominal five micron filtration Poro-Stone element**
- **Operating temperatures to 650°F**
- **Standard units with design pressure to 300 psi are available from stock.**
- **Designed for and can be certified to ASME Code, Section VIII, Division 1**

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GP Filters for Saturated Steam Service
Capacity in lb/hr based on operating pressure noted below

Size	Model	50 PSIG	100 PSIG	125 PSIG	150 PSIG	200 PSIG
1/2"	GP-22	95	160	195	225	290
3/4"	GP-31	165	285	340	400	515
1"	GP-47	270	460	555	650	835
1-1/2"	GP-99	635	1,090	1,310	1,530	1,965
2"	GP-132	1,050	1,800	2,165	2,525	3,240
3"	GP-283	2,310	3,965	4,773	5,570	7,145
4"	GP-508	3,985	6,825	8,215	9,590	12,305
6"	GP-1527	9,045	15,495	18,650	21,770	27,930

GP Filters for Gas Service
Capacity in SCFM based on operating pressure noted below

Size	Model	50 PSIG	100 PSIG	150 PSIG	200 PSIG	300 PSIG
1/2"	GP-22	30	40	50	65	70
3/4"	GP-31	95	130	155	195	215
1"	GP-47	125	165	195	250	275
1-1/2"	GP-99	235	310	375	475	515
2"	GP-132	335	450	540	685	745
3"	GP-283	705	935	1,120	1,425	1,550
4"	GP-508	835	1,115	1,335	1,695	1,850
6"	GP-1527	3,145	4,185	5,015	6,360	6,935

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

CHEMICAL RESISTANT, SELF-SUPPORTING LINEAR HIGH DENSITY POLYETHYLENE TANKS

- **Molded as one piece — No seams to leak**
- **Excellent chemical resistance — Ideal for handling acids or caustics**
- **Operating temperatures to 140° F**
- **Excellent impact resistance for long, dependable service**
- **Translucent* for viewing content level**
- **Tank covers and stands available**

* The degree of translucency varies with wall thickness and tank color.

RECTANGULAR TANKS

CAPACITY (Gallons)	DIMENSIONS (Inches) L x W x D	TANK ONLY PRICE CODE NO.	COVER ONLY PRICE CODE NO.
7	12 x 12 x 12	88-0600	88-0606
11	12 x 12 x 28	88-1551	88-0606
14	12 x 12 x15	88-1552	88-3311
15	12 x 24 x 12	88-3065	88-3310
18	12 x 18 x 18	88-3066	88-3311
25	18 x 18 x 18	88-3067	88-3312
30	12 x 24 x 24	88-3068	88-3310
37	18 x 24 x 18	88-0603	88-0609
44	18 x 24x 24	88-3069	88-0609
56	24 x 30 x 18	88-3070	88-3314

CAPACITY (Gallons)	DIMENSIONS (Inches) L x W x D	TANK ONLY PRICE CODE NO.	COVER ONLY PRICE CODE NO.
62	20 x 36 x 20	88-0604	88-0607
75	24 x 24 x 30	88-3071	88-3315
90	24 x 36 x 24	88-0610	88-0611
115	30 x 30 x 30	88-3072	88-3316
150	24 x 48 x 30	88-3073	88-3317
270	36 x 48 x 36	88-3660	88-3661
390	42 x 66 x 33	88-3301	88-3319
530	54 x 54 x 42	88-3302	88-3320
670	36 x 72 x 60	88-3303	88-3321

CYLINDRICAL TANKS

CAPACITY (Gallons)	DIMENSIONS (Inches) Dia. x Ht.	TANK ONLY PRICE CODE NO.	COVER ONLY PRICE CODE NO.
30	18 x 29	88-0612	88-0622
55	22 x 36	88-0613	88-0623
100	28 x 42	88-0614	88-0624
200	36 x 48	88-0615	88-0625
360	48 x 48	88-0616	88-0626
500	52 x 60	88-3304	88-3322
650	48 x 84	88-3305	88-0626
800	60 x 66	88-3306	88-3323

CYLINDRICAL DRUM LINERS

CAPACITY (Gallons)	DIMENSIONS (Inches) Dia. x Ht.	TANK ONLY PRICE CODE NO.	COVER ONLY PRICE CODE NO.
30	18 x 28	88-0617	88-0627
55	22 x 35	88-0618	88-0628

CYLINDRICAL CONE BOTTOM TANKS

Open top tanks for convenient filling and mixing of chemicals to 140° F.
Cone bottom design allows for complete drainage.

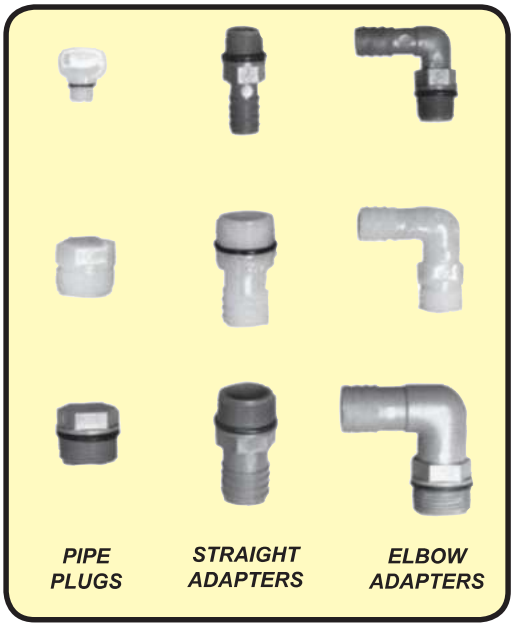
CAPACITY (Gallons)	DIMENSIONS (Inches) Dia. x Ht.	TANK ONLY PRICE CODE NO.	STAND w/MOUNT PRICE CODE NO.
30	18 x 29	88-3077	77-1304
55	22 x 36	88-3078	77-1305
75	30 x 24	88-3079	77-1306
100	30 x 36	88-3080	77-1307
125	42 x 24	88-3081	77-1308
200	31 x 65	88-3082	77-1309
250	42 x 46	88-3083	77-1310
350	42 x 60	88-3307	77-1311
500	52 x 64	88-3308	77-1312
750	62 x 58	88-3309	77-1313

Consult Sales Dept. for optional pipe connections, larger capacities, special assemblies with pumps and level controls and F.O.B point.

PLASTIC FITTINGS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

FOR TOTAL SOLUTION CONTAINMENT



PIPE / VALVES / FITTINGS / FLANGES
HOSE / CLAMPS / STRAINERS
TANK CONNECTIONS AND MORE . . .

Polypropylene, CPVC and PVDF
(See a chemical resistance guide)

All fittings are designed to be used conventionally with tape or other types of thread lubricant, but to achieve total solution containment, fittings with "O"-rings are offered which enable the installer to seal the joint even if the fitting is slightly unscrewed as might be required to achieve the proper location of an elbow.

These "O"-rings also provide the necessary expansion to seal a joint when the fitting is cold and the plastic shrinks, as well as when the plastic expands. There is simply no better way to assure that a sealed joint has been established with disjoinable fittings than with the use of "O"-rings.

Make certain your pumping, agitation & filtration systems are properly piped. Select installation components from this bulletin. Always refer to operating instructions to ensure trouble-free and efficient performance.

Contact our sales application engineering dept. for recommendations and a complete selection of plastic pumps, filters, agitation and filtration systems.

ADAPTERS - HOSE I.D. x MNPT

DESCRIPTION	MATERIAL (molded)	5/8" x 1/2"	5/8" x 3/4"	3/4" x 3/4"	3/4" x 1"	1" x 1"
		PRICE CODE NUMBERS				
STRAIGHT ADAPTER	CPVC PVDF	33-0710 33-0710 K	33-0503 33-0503 K	33-0711 33-0711 K	33-1360 33-1360 K	33-0712 33-0712 K
ELBOW ADAPTER	CPVC PVDF	33-1336 33-1336 K	33-0504 33-0504 K	33-1337 33-1337 K	33-1342 33-1342 K	33-1338 33-1338 K
OPTIONAL "O"- RING	EPDM VITON	22-0569 22-0568	22-0570 22-0563	22-0570 22-0563	22-0442 22-0533	22-0442 22-0533

DESCRIPTION	MATERIAL (machined)	1¼" x 1¼"	1½" x 1½"	2" x 2"
		PRICE CODE NUMBERS		
STRAIGHT	CPVC	33-1157	33-1158	33-1159
STRAIGHT / W/"O"-RING	CPVC & EPDM	33-0713	33-0714	33-0759
ELBOW	CPVC	33-1482	33-1483	33-1484
ELBOW / W/"O"- RING	CPVC & EPDM	33-0788	33-0790	33-0758

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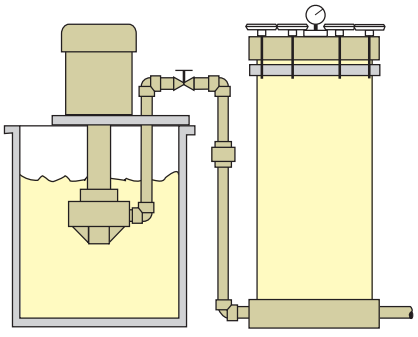
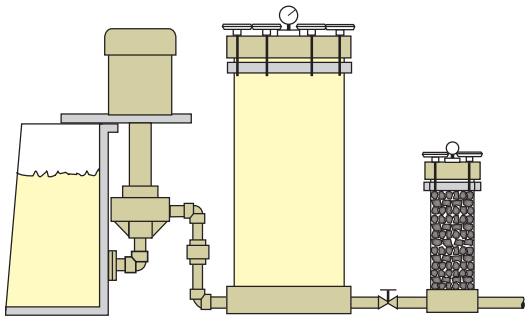
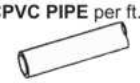
CPVC, POLYPROPYLENE & PVDF
for total solution containment

DESCRIPTION		PART NUMBERS for CPVC [1] For polypropylene add **-PP**, for PVDF add **-K**						
		1/2"	**3/4"**	**1"**	**1-1/4"**	**1-1/2"**	**2"**	**3"**
NIPPLE (NPT) Threaded both ends	Close	33-0197	33-1005	33-1011	33-1017	33-1023	33-1029	33-1041
	Short	33-0198	33-1006	33-1012	33-1018	33-1024	33-1030	33-1042
	3" Long	33-1001	33-1007	33-1013	33-1019	33-1025	33-1031	—
	4" Long	33-1002	33-1008	33-1014	33-1020	33-1026	33-1032	33-1043
	5" Long	33-1003	33-1009	33-1015	33-1021	33-1027	33-1033	33-1044
	6" Long	33-1004	33-1010	33-1016	33-1022	33-1028	33-1034	33-1045
BALL VALVE Double union w/Viton "O"-ring	Threaded (NPT)	33-0570	33-0571	33-0572	33-0573	33-0574	33-0575	33-0576
	Socket	33-0578	33-0579	33-0580	33-0581	33-0582	33-0583	33-0584
UNION w/Viton "O" ring	Socket	33-0196	33-0287	33-0288	33-0289	33-0290	33-0291	33-0292
	Threaded (NPT)	33-0293	33-0294	33-0295	33-0296	33-0297	33-0298	33-0299
TEE	Socket	33-0195	33-0950	33-0951	33-0952	33-0953	33-0954	33-0956
	Threaded (NPT)	33-0958	33-0959	33-0960	33-0961	33-0962	33-0963	33-0965
90° ELBOW	Socket	33-0193	33-0984	33-0985	33-0986	33-0987	33-0988	33-0990
	Threaded	33-0992	33-0993	33-0994	33-0995	33-0996	33-0997	33-0999
45° ELBOW	Socket	33-0194	33-0967	33-0968	33-0969	33-0970	33-0971	33-0973
	Threaded (NPT)	33-0975	33-0976	33-0977	33-0978	33-0979	33-0980	33-0982
COUPLING	Socket	33-0882	33-0883	33-0884	33-0885	33-0886	33-0887	33-0889
	Threaded (NPT)	33-0891	33-0892	33-0893	33-0894	33-0895	33-0896	33-0898
FLANGE	Socket	33-0829	33-0830	33-0831	33-0832	33-0833	33-0834	33-0836
	Threaded (NPT)	33-0839	33-0840	33-0841	33-0842	33-0843	33-0844	33-0846
FLANGE GASKET	EPDM	22-0517	22-0518	22-0236	22-0237	22-0238	22-0239	22-0243
CAP	Socket	33-1140	33-1141	33-1142	33-1143	33-1144	33-1145	33-1147
	Threaded (NPT)	33-0873	33-0874	33-0875	33-0876	33-0877	33-0878	33-0880
PLUG	Threaded (NPT)	33-0866	33-0211	33-0212	33-0867	33-0868	33-0869	33-0871
	Threaded with EPDM "O" ring	33-0791	33-0755	33-0792	—	—	—	—
"O"-RING	EPDM	22-0569	22-0570	22-0442	—	—	—	—
	Viton	22-0568	22-0563	22-0533	—	—	—	—
REDUCING BUSHING		**½" x ¼"**	**¾" x ½"**	**1" x ¾"**	**1¼" x 1"**	**1½" x 1¼"**	**2" x 1½"**	**3" x 2"**
	Socket	33-1110	33-1111	33-1112	33-1113	33-1114	33-1115	33-1118
	Threaded (NPT)	33-1130	33-1131	33-0184	33-0183	33-1137	33-1132	33-1862





DESCRIPTION		PRICE CODE NUMBERS							
		1/2"	5/8"	3/4"	1"	1-1/4"	1-1/2"	2"	3"
CPVC PIPE per ft. 	Schedule 40 Socket only	33-0233	—	33-0234	33-0235	33-0236	33-0237	33-0238	33-0228
	Schedule 80 Unthreaded	33-0216	—	33-0217	33-0218	33-0219	33-0220	33-0221	33-0223
HOSE 	Vinyl w/PVC	—	—	—	22-0392	22-0393	22-0394	22-0395	—
	Vinyl, clear, wire reinforced	22-0494	22-0484	22-0482	22-0483	22-0527	22-0528	22-0529	—
	Vinyl, clear (Discharge only)	22-0490	22-0491	22-0492	22-0493	—	—	—	—
	Vinyl, clear, nylon reinforced	22-0424	22-0480	22-0481	22-0432	22-0433	22-0434	22-0435	—
	Teflon® ribbed, 8 ft. length	—	—	22-0462	22-0463	—	—	—	—
	Vinyl, cross linked, PE lined	—	—	22-0548	22-0549	—	—	—	—
CLAMPS 	Stainless steel	22-0502	22-0502	22-0505	22-0505	22-0503	22-0503	22-0504	—
STRAINERS 	PE, NPT	33-1948	—	33-6078	33-6058	—	—	99-0744 1	99-0745
	PE, BSP	—	—	—	—	—	—	—	64-1339 01
	ECTFE (Halar®), NPT	—	—	—	—	—	—	99-1030	99-1031
	BSP	—	—	—	—	—	—	—	64-1339 91
BULKHEAD TANK CONNECTION 	PP	33-0690	—	33-0691	33-0692	33-0693	33-0694	33-0695	33-0696
BALL VALVE	PP, threaded w/EPDM "O"-ring	33-0560	—	33-0561	33-0609	—	—	—	—
FOOT VALVE	PVC, threaded with strainer	33-0541	—	33-0542	33-0543	33-0544	33-0545	33-0546	33-0547
VERTICAL CHECK VALVE	PVC, threaded	33-0593	—	33-0594	33-0595	33-0596	33-0597	33-0598	33-0599

VENT VALVE	PP (1/4")	33-8108 PP
	CPVC (3/8")	33-0051

THUMBSCREW / PLUG, 1/4" w/"O" ring 	PP	88-1282A	88-1282B
	PVDF	88-2833	88-2822

316 SS SPRING CLAMPS

WITH HOOKS

WITH HOSE CLAMP

WITH HOOKS	FORCE TO OPEN FROM CLOSED	PRICE CODE NUMBER
Small - 4.5"	12 lbs.	99-0190
Large - 7.0"	22 lbs.	99-0191

WITH HOSE CLAMP	FOR HOSE SIZE I.D.	PRICE CODE NUMBER
Small - 4.5"	1/2" to 1"	99-0190A
Large - 7.0"	1-1/4" to 2"	99-0191A

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

POLYPROPYLENE QUICK-CONNECT COUPLINGS

FOR: PLATING, ANODIZING, FERTILIZER, CHEMICALS, PETROLEUM

Working Pressures: 100 PSI at 0°F, 125 PSI at 70°F, 70 PSI at 150°F

Vacuum - 28 inches Mercury

- MOLDED OF GLASS REINFORCED POLYPROPYLENE
- NYLON LEVERS
- STA NLESS STEEL PINS AND RINGS
- INTERCHANGEABLE WITH OTHER BRANDS
- RESISTANT TO MANY CHEMICALS, RUST-PROOF
- MANUFACTURED TO MILITARY SPECIFICATIONS
- RETAINED GASKETS N COUPLERS WILL NOT FALL OUT WHEN CONNECTIONS ARE OPEN
- SIZE IDENTIFICATION MOLDED NTO EACH PART
- NPT OR BSP THREADS

(Consult Application Engineering Dept. for BSP.)

FEMALE COUPLER w/EPDM GASKET							
DESCRIPTION	PRICE CODE NO.						
	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	3"
DUST CAP 	33-1586	33-1587	33-1588	—			
MALE THREADS 	33-1334	33-1287	33-1352	—	33-1353	33-1497	33-1581
HOSE ADAPTER 	33-1572	33-1573	33-1574	33-2275	33-1329	33-1506	33-1585
FEMALE THREADS 	33-1454	33-1455	33-1285	— 33-1589	33-1456 33-1590	33-1498 33-1591	33-1582
MALE ADAPTER							
HOSE ADAPTER 	33-1564	33-1565	33-1566		33-1567	33-1568	33-1569
MALE THREADS 	33-1335	33-1288	33-1286	—	33-1284	33-1499	33-1583
FEMALE THREADS 	33-1466	33-1467	33-1468	33-2276	33-1469	33-1496	33-1580
DUST PLUG 	33-1592	33-1593	33-1594 —	—	33-1595	33-1596	33-1597
REPLACEMENT GASKETS for quick-connect couplings							
EPDM 	33-1475	33-1476	33-1477	—	33-1478	33-1500	33-1584
BUNA N	64-1481 71	64-1482 71	64-1483 71	—	64-1625 71	64-1626 71	64-1627 71
VITON	—	—	—	—	64-1625 73	64-1626 73	64-1627 73
STREET ELBOWS							
POLYPROPYLENE 							
NPT	—	—	—	—	64-0753 40	64-0752 40	64-0756 40
BSP	—	—	—	—	64-1366 40	64-1367 40	64-1368 40

HOSE KITS

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

KITS FOR LABMASTER© AND SPACE-SAVER® SYSTEMS

PUMP MODEL	CHAMBER MODEL	SUCTION HOSE PRICE CODE #, SIZE	DISCHARGE HOSE PRICE CODE #, SIZE	CLAMPS QTY., PRICE CODE #	FITTINGS QTY., PRICE CODE #	SUCTION STRAINER PRICE CODE #	HAND PUMP PRIMER PRICE CODE #	TOTAL KIT PRICE CODE #
A X40	L (CPVC, PVC)	22-0484 6 ft., 5/8" VW	22-0484 6 ft., 5/8" VW	(2) 22-0502	(1) 33-0503	33-1948	99-0160	99-1600
A X40	L (PP)	22-0480 6 ft., 5/8" VN	22-0480 6 ft., 5/8" VN	(2) 22-0502	(1) 33-0503 K			99-1601
B X50 / X100	L (CPVC, PVC)	22-0482 10 ft., 3/4" VW	22-0482 10 ft., 3/4" VW	(2) 22-0505	(1) 33-0711			99-1602
B X50 / X100	L (PP)	22-0481 10 ft., 3/4" VN	22-0481 10 ft., 3/4" VN	(2) 22-0505	(1) 33-0711 K			99-1603
B	S (CPVC, PVC)	22-0482 10 ft., 3/4" VW	22-0482 10 ft., 3/4" VW	(2) 22-0505	(1) 33-1360			99-1604
B	S (PP)	22-0481 10 ft., 3/4" VN	22-0481 10 ft., 3/4" VN	(2) 22-0505	(1) 33-1360 K			99-1605
X200 / X250	S (CPVC)	22-0483 10 ft., 1" VW	22-0483 10 ft., 1" VW	(2) 22-0505	(1 ea.)33-1468/33-1574 (1 ea.)33-1286/33-1574	99-0741	99-0161	99-1606
X200 / X250	S (PP, PVC)	22-0432 10 ft., 1" VN	22-0432 10 ft., 1" VN	(2) 22-0505	(1 ea.)33-1468/33-1574 (1 ea.)33-1286/33-1574			99-1607
HC1x¾ D1x¾ M1x¾	S (CPVC)	22-0483 10 ft., 1" VW	22-0483 10 ft., 1" VW	(2) 22-0505	(2 ea.)33-1286/33-1574			99-1608
HC1x¾ D1x¾ M1x¾	S (PP, PVC)	22-0432 10 ft., 1" VN	22-0432 10 ft., 1" VN	(2) 22-0505	(2 ea.)33-1286/33-1574			99-1609
D1½x1 M1½x1 F1½x1¼	S (CPVC)	22-0528 10 ft., 1-1/2" VW	22-0527 10 ft., 1-1/4" VW	(2) 22-0503	(1 ea.)33-1284/33-1329 (1 ea.)33-2276/33-2275	99-0743	—	99-1610
D1½x1 M1½x1 F1½x1¼	S (PP, PVC)	22-0434 10 ft., 1-1/2" VN	22-0433 10 ft., 1-1/4" VN	(2) 22-0503	(1 ea.)33-1284/33-1329 (1 ea.)33-2276/33-2275		—	99-1611
HK1½x1½	S (CPVC)	22-0528 10 ft., 1-1/2" VW	22-0527 10 ft., 1-1/4" VW	(2) 22-0503	(1 ea.)33-1469/33-1329 (1 ea.)33-2276/33-2275		—	99-1612
HK1½x1½	S (PP, PVC)	22-0434 10 ft., 1-1/2" VN	22-0433 10 ft., 1-1/4" VN	(2) 22-0503	(1 ea.)33-1469/33-1329 (1 ea.)33-2276/33-2275		—	99-1613
G2x2	S (CPVC, PVC, PP)	22-0529 10 ft., 2" VW	22-0527 10 ft., 1-1/4" VW	(1) 22-0503 (1) 22-0504	(1 ea.)33-1496/33-1506 (1 ea.)33-2276/33-2275	99-0744	—	99-1614

KITS FOR SUPER SPACE-SAVER® AND GUARDIAN© SYSTEMS

PUMP MODEL	CHAMBER MODEL	SUCTION HOSE PRICE CODE # SIZE	DISCHARGE HOSE PRICE CODE # SIZE	CLAMPS QTY., PRICE CODE #	FITTINGS QTY., PRICE CODE #	SUCTION STRAINER PRICE CODE #	TOTAL KIT PRICE CODE #
HC1x¾ D1x¾ M1x¾	G	22-0483 10 ft., 1" VW	22-0432 10 ft., 1" VN	(2) 22-0505	(2 ea.) 33-1286 / 33-1574 (1 ea.) 33-1137 / 33-0183	99-0741	99-1615
M1½x1 D1½x1 F1½x1¼	G, GC	22-0528 10 ft., 1-1/2" VW	22-0394 10 ft., 1-1/2" PVC	(2) 22-0503	(2 ea.) 33-1284 / 33-1329	99-0743	99-1616
HK1½x1½	G	22-0528 10 ft., 1-1/2" VW	22-0394 10 ft., 1-1/2" PVC	(2) 22-0503	(1 ea.) 33-1284 / 33-1329 (1 ea.) 33-1469 / 33-1329	99-0743	99-1617
HE2x1½	G	22-0529 10 ft., 2" VW	22-0394 10 ft., 1-1/2" PVC	(1) 22-0503 (1) 22-0504	(1 ea.) 33-1499 / 33-1506 (1 ea.) 33-1284 / 33-1329	99-0744	99-1619
HE2x1½ F2X2 S2X2	GC	22-0529 10 ft., 2" VW	22-0395 10 ft., 2" PVC	(2) 22-0504	(2 ea.) 33-1499 / 33-1506	99-0744	99-1620
G2x2	G, GC	22-0529 10 ft., 2" VW	22-0394 10 ft.,1-1/2" PVC	(1) 22-0503 (1) 22-0504	(1 ea.) 33-1496 / 33-1506 (1 ea.) 33-1284 / 33-1329	99-0744	99-1622

SKIMMER ASSEMBLY & FLOATING BALLS

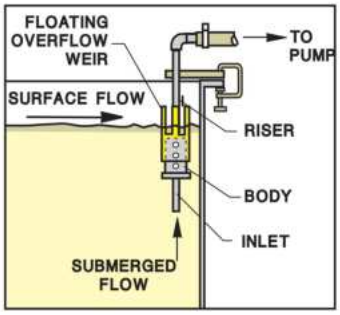
2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

SKIMMER ASSEMBLY

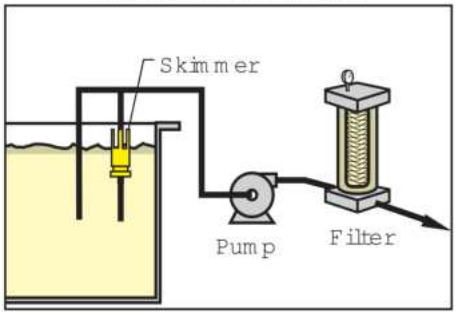
To remove floating oil & particulates from cleaners, plating baths and other two-phase liquids.

MODEL NUMBER	SKIM RATE GPM	CONNS.	INLET LENGTH	RISER LENGTH	BRACKET 1/2" THICK	LIQUID LEVEL DIFF.	PRICE CODE NO.
SK ½	2-5	½"	15"	13"	4" x 2"	2"	99-0475
SK ¾	5-10	¾"	18"	18"	4" x 2"	2"	99-0476
SK 1	10-15	1"	18"	18"	6" x 2"	4"	99-0477
SK 1¼	15-20	1¼"	18"	18"	6" x 2"	4"	99-0478
SK 1½	25-40	1½"	24"	24"	8" X 4"	6"	99-1458
SK 2	40-60	2"	24"	24"	8" X 4"	6"	99-1459
SK 3	60-80	3"	24"	24"	10" X 6"	8"	99-1460

SK ½ to SK 1¼ have NPT inlet and hose adapter outlet.
SK 1½ to SK 3 have NPT inlet and outlet.

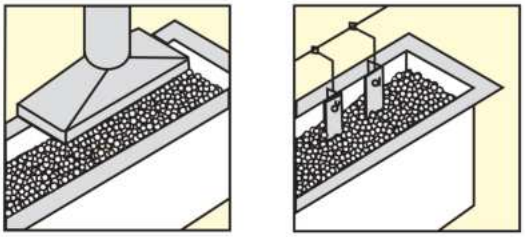


AUXILIARY MOUNTING



BALLS, SOLID POLYPROPYLENE

"FLOATING SOLUTION BLANKET" - for all processing chemicals



PLATING / CLEANING / ETCHING
ANODIZING / HOT RINSE

Solid polypropylene balls floating on an open tank will reduce the exposed surface area - up to 90%, thereby greatly lessening the emission of objectionable fumes and odors. A carpet of "Energy Controlling Balls" will reduce heat or refrigeration loss and evaporation in open tank installations, such as those used in plating. Access to the tank is not impaired. Balls maintain compact coverage as parts move in and out. Solid polypropylene balls will not sink and have a longer service life than hollow balls. Polypropylene is non-toxic and resistant to most chemicals. *(Consult Chemical Resistance Chart.)* Withstands temperatures to 230°F. (110°C)

SAVE ENERGY - REDUCE POLLUTION

- **ELIMINATES MIST & EXCESS EVAPORATION**
  Prevents noxious fumes
- **INSULATES - Keeps hot or cold**
  Saves heating or refrigeration energy
- **SELF-ADJUSTING - No hang-ups or sinking**
  Automatically maintains coverage
- **EASY ACCESS TO TANK - In or out**
- **SIZES: 1" & 1-1/2" (25mm & 38mm)**

DIAMETER		QUANTITY *	COVERAGE		SHIPPING WEIGHT		PRICE CODE NUMBER
In.	mm		Sq. ft.	Sq. M	Lbs.	Kg.	
1	25	1,000	6.1	.56	17.6	8	99-0640
1-1/2	38		13.8	1.28	52.8	24	99-0641

* Sold by weight — quantity may vary slightly.

GENERAL CHEMICAL RESISTANCE GUIDE

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1. Good for 200°F (93°C)
2. Good for 185°F (85°C)
3. Good for 140°F (60°C)
4. Good for 70°F (21°C)

Q – Questionable
NR – Not recommended
— No data available

	PLASTICS											METALS					LINERS, RINGS and SEALS			ELASTOMERS					
	ABS	ECTFE (HALAR®)	PTFE (TEFLON®)	PVDF (KYNAR®)	ETFE (TEFZEL®)	POLYESTER*	PVC	CPVC	POLYPROPYLENE	NORYL®	RYTON®	CARBON STEEL	304 ST. STEEL	316 ST. STEEL	HASTELLOY® C	TITANIUM	CERAMIC (M1 x M2)	NICKEL GRAPHITE	G.F. TFE (RULON®)	BUNA N	VITON® A	EPDM (ETH. PROP.)	HYPALON®	NEOPRENE®	CORK-NITRILE
Acetaldehyde	—	—	1	—	4	4	NR	NR	4	—	1	Q	1	1	1	1	1	1	1	NR	Q	3	NR	NR	Q
Acetic Acid, 20%	—	1	1	1	1	NR	4	4	3	3	2	NR	Q	1	1	1	1	1	1	3	NR	2	1	Q	3
Acetic Acid, Glacial	—	3	1	4	4	NR	NR	NR	4	1	1	NR	Q	1	1	1	1	Q	1	4	NR	2	Q	NR	3
Acetic Anhydride	—	4	1	NR	4	NR	NR	NR	4	3	1	NR	1	1	1	1	1	Q	1	NR	NR	2	1	NR	Q
Acetone	—	3	1	NR	Q	NR	NR	NR	4	NR	1	1	1	1	1	1	1	1	1	NR	NR	4	Q	Q	NR
Aluminum Chloride	—	1	1	1	1	NR	3	1	2	1	1	NR	Q	Q	1	1	1	NR	1	1	1	1	1	1	3
Aluminum Fluoride	—	1	1	1	1	NR	3	1	2	4	1	NR	Q	Q	3	Q	NR	NR	1	1	1	1	1	1	3
Aluminum Sulfate	—	1	1	1	1	4	3	1	2	1	1	1	1	Q	1	1	1	1	1	1	1	1	1	1	3
Ammonia, Aqueous	—	1	1	1	4	NR	4	4	2	4	4	—	—	1	1	1	1	1	1	4	NR	1	1	1	—
Ammonium Carbonate	—	1	1	1	1	Q	3	1	2	3	1	Q	1	1	2	1	1	1	1	NR	4	1	1	1	—
Ammonium Chloride	—	1	1	1	1	4	3	1	2	1	1	Q	Q	Q	2	3	1	NR	1	2	1	1	1	1	3
Ammonium Hydroxide	—	1	1	1	1	4	4	NR	2	1	1	2	1	1	1	1	1	1	1	4	1	1	1	1	—
Ammonium Nitrate	—	1	1	1	1	4	3	1	2	1	1	Q	4	4	3	1	1	1	1	1	2	1	1	1	3
Ammonium Phosphate	—	1	1	1	1	4	3	1	2	4	1	NR	1	Q	1	1	1	Q	1	1	Q	1	1	1	3
Ammonium Sulfate	—	1	1	1	1	4	3	1	2	1	1	Q	Q	Q	1	1	4	Q	1	1	Q	1	1	1	3
Amyl Acetate	—	3	1	NR	Q	4	NR	NR	NR	NR	1	—	—	1	1	1	1	1	1	NR	NR	Q	NR	NR	Q
Amyl Alcohol	—	—	1	1	1	4	4	Q	2	4	1	Q	1	1	1	1	1	1	1	4	NR	4	2	3	3
Aniline	—	4	1	3	4	NR	NR	NR	2	NR	1	Q	1	1	1	Q	1	1	1	NR	2	2	Q	NR	Q
Aqua Regia	—	2	2	NR	4	NR	NR	Q	Q	NR	NR	NR	NR	NR	NR	Q	1	1	1	NR	2	NR	4	Q	Q
Arsenic Acid	—	1	1	1	1	NR	3	1	2	4	1	NR	1	Q	1	1	1	1	1	1	1	1	1	1	3
Barium Hydroxide	—	1	1	1	1	Q	3	1	2	3	1	—	—	1	3	1	1	1	1	1	1	1	1	1	—
Barium Chloride	—	1	1	1	1	4	3	1	2	1	1	—	—	4	1	1	1	Q	1	NR	1	1	1	1	3
Barium Sulfate	—	1	1	1	1	4	3	1	2	4	1	—	—	3	1	1	1	1	1	1	1	1	1	1	3
Benzaldehyde	NR	4	1	—	4	4	NR	NR	4	2	3	—	—	1	1	1	1	1	1	NR	NR	Q	NR	NR	Q
Benzene (Benzol)	NR	3	1	2	2	4	NR	NR	NR	3	1	1	1	1	1	1	1	1	1	NR	3	NR	NR	NR	3
Benzene Sulfonic Acid	—	3	1	3	4	Q	NR	NR	Q	1	1	—	—	1	1	1	1	1	1	NR	2	NR	NR	NR	—
Benzoic Acid	—	1	1	1	1	4	3	1	2	4	1	—	—	3	1	1	1	1	1	NR	2	NR	NR	NR	Q
Borax (Sodium Borate)	—	1	1	1	1	4	3	1	2	4	1	—	—	1	1	1	1	4	1	4	3	1	3	4	3
Boric Acid	—	1	1	1	1	4	3	1	2	4	1	—	—	2	1	1	1	1	1	2	2	1	2	1	3
Bromine Water	—	1	1	2	1	NR	3	4	NR	4	Q	NR	NR	NR	1	1	1	4	1	NR	1	Q	NR	Q	Q
Butyl Acetate	—	3	1	NR	4	4	NR	NR	NR	2	1	Q	1	1	1	1	1	Q	1	NR	NR	Q	NR	NR	NR
Butyl Alcohol	—	1	1	1	1	Q	4	Q	2	4	1	1	1	1	1	1	1	1	1	Q	Q	3	3	3	—
Butyl Amine	—	—	1	NR	4	Q	NR	Q	3	2	4	—	—	1	1	1	1	1	1	NR	Q	4	4	NR	—
Butyl Phthalate	—	—	1	3	3	Q	NR	NR	NR	3	4	—	—	1	1	1	1	1	1	NR	Q	4	NR	NR	—
Butyric Acid	—	1	1	1	1	4	4	NR	2	4	1	NR	1	3	1	1	1	Q	1	NR	4	3	NR	NR	NR
Cadmium Cyanide	—	3	1	1	1	Q	3	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	—
Calcium Bisulfite	—	1	1	1	1	NR	3	1	2	4	1	—	—	3	1	4	1	1	Q	1	1	4	1	1	3
Calcium Chloride	4	1	1	1	1	4	3	1	2	1	1	—	—	Q	1	1	1	Q	1	1	1	1	1	1	3
Calcium Hypochlorite	—	1	1	1	1	4	3	2	3	4	1	—	—	NR	2	1	1	1	1	4	1	Q	1	NR	3
Calcium Nitrate	—	1	1	1	1	Q	3	1	2	1	1	—	—	3	1	1	1	1	1	1	1	1	1	1	—
Calcium Phosphate	—	—	1	1	1	Q	3	1	2	—	1	—	—	3	1	1	1	1	1	1	1	1	1	1	—
Calcium Sulfate	4	1	1	1	1	4	3	1	2	1	1	—	—	3	1	1	1	1	1	1	1	NR	1	1	3
Carbon Disulfide	—	4	1	1	4	Q	NR	NR	NR	4	2	Q	Q	1	1	1	1	1	1	NR	1	NR	NR	NR	—
Carbon Tetrachloride	NR	1	1	1	Q	4	Q	NR	NR	NR	3	1	1	1	1	1	1	1	1	Q	3	NR	NR	NR	3
Carbonic Acid	—	1	1	1	1	4	2	1	2	4	1	Q	1	1	1	1	1	1	1	4	1	1	1	1	3
Cellosolve	—	1	1	1	4	Q	NR	NR	NR	2	1	4	—	1	1	1	1	1	1	NR	NR	Q	Q	2	—
Chloroacetic Acid	—	1	1	1	4	NR	4	Q	Q	NR	1	Q	1	NR	1	1	1	1	1	NR	NR	Q	1	Q	Q
Chlorine Water	—	1	1	1	1	NR	4	2	4	4	Q	1	NR	Q	3	1	1	4	1	NR	1	1	NR	NR	3
Chlorobenzene	—	3	1	2	4	NR	NR	NR	4	3	2	1	Q	1	1	1	1	1	1	NR	4	NR	NR	NR	Q
Chloroform	—	1	1	1	Q	4	NR	NR	NR	2	4	1	Q	1	1	1	1	1	1	NR	3	NR	NR	NR	Q
Chlorosulfonic Acid	—	4	1	NR	4	4	4	4	NR	2	NR	—	—	NR	1	1	NR	NR	1	NR	NR	NR	NR	NR	NR
Chromic Acid up to 30%	—	1	1	2	4	NR	4	3	4	NR	3	NR	NR	NR	1	1	1	3	1	NR	1	Q	2	NR	NR
Chromic Acid, 50%	—	1	1	2	4	NR	NR	4	NR	NR	Q	NR	NR	NR	1	1	1	NR	1	NR	1	Q	3	NR	NR
Citric Acid	—	1	1	1	1	4	3	2	2	4	1	—	—	2	1	1	1	1	1	2	1	1	1	1	3
Copper Chloride	—	1	1	1	1	NR	3	1	2	4	1	NR	NR	NR	1	1	1	1	1	2	2	1	2	1	3
Copper Cyanide	—	1	1	1	1	NR	3	1	4	4	1	1	1	1	1	1	1	1	1	2	4	1	2	1	3
Copper Nitrate	—	1	1	1	1	4	3	1	2	4	1	—	—	1	1	1	1	1	1	1	1	1	1	1	3
Copper Sulfate	—	1	1	1	1	NR	3	1	2	4	1	NR	1	1	1	1	1	1	1	1	1	1	1	1	3
Cresol	—	3	1	2	1	Q	NR	NR	Q	2	1	—	—	1	1	1	1	1	1	Q	1	NR	NR	NR	—
Cyclohexane	4	1	1	1	1	Q	NR	NR	NR	2	1	1	1	1	1	1	1	1	1	1	1	NR	NR	NR	—

GENERAL CHEMICAL RESISTANCE GUIDE (cont'd)

2900 MacArthur Blvd. Northbrook, IL. USA 60062 **WWW.SERFILCO.COM** (800) 323 - 5431

1. Good for 200°F (93°C)
2. Good for 185°F (85°C)
3. Good for 140°F (60°C)
4. Good for 70°F (21°C)

Q – Questionable
NR – Not recommended
— No data available

	PLASTICS											METALS					LINERS, RINGS and SEALS			ELASTOMERS					
	ABS	ECTFE (HALAR®)	PTFE (TEFLON®)	PVDF (KYNAR®)	ETFE (TEFZEL®)	POLYESTER*	PVC	CPVC	POLYPROPYLENE	NORYL®	RYTON®	CARBON STEEL	304 ST. STEEL	316 ST. STEEL	HASTELLOY® C	TITANIUM	CERAMIC (M1 x M2)	NICKEL GRAPHITE	G.F. TFE (RULON®)	BUNA N	VITON® A	EPDM (ETH. PROP.)	HYPALON®	NEOPRENE®	CORK-NITRILE
Decalin	—	—	1	—	1	Q	NR	Q	NR	—	1	—	—	1	1	1	1	1	1	NR	1	NR	NR	Q	—
Detergents	—	1	1	2	1	Q	3	1	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	—
Diesel Fuel	—	1	1	1	4	4	3	NR	4	2	1	1	1	1	1	1	1	1	1	1	1	NR	2	Q	—
Dowtherm	—	—	1	2	4	Q	NR	1	NR	2	1	1	1	1	1	1	1	1	1	NR	1	NR	4	Q	—
Ethanolamine	—	—	1	NR	1	Q	3	3	3	1	1	1	1	1	1	1	1	1	1	Q	Q	Q	1	1	—
Ether	—	—	1	3	4	Q	NR	NR	NR	NR	1	1	1	1	1	1	1	1	1	NR	NR	NR	NR	Q	—
Ethyl Acetate	NR	3	1	NR	4	4	NR	NR	Q	4	1	1	1	1	1	1	1	1	1	NR	NR	4	NR	NR	NR
Ethyl Alcohol (Ethanol)	—	—	1	—	1	4	4	Q	3	4	1	1	1	1	1	1	1	1	1	2	NR	4	1	3	—
Ethylene Dichloride	—	4	1	1	Q	Q	NR	NR	4	NR	3	—	—	1	1	1	1	1	1	NR	3	NR	NR	NR	—
Ethylene Glycol	—	1	1	1	1	4	4	Q	3	4	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3
Ferric Chloride	—	1	1	1	1	4	3	1	2	1	1	NR	NR	NR	Q	1	1	NR	1	1	1	Q	1	3	3
Ferric Hydroxide	—	—	1	1	1	Q	3	1	2	—	1	—	—	3	2	1	1	1	1	1	4	1	1	1	—
Ferric Nitrate	—	1	1	1	1	4	3	1	2	4	1	—	—	3	3	1	1	1	1	1	1	1	1	1	3
Ferric Sulfate	—	1	1	1	1	4	3	1	2	4	1	Q	NR	Q	1	1	1	1	1	1	1	1	1	1	3
Ferrous Chloride	—	1	1	1	1	4	3	1	2	4	1	NR	Q	NR	1	1	1	1	1	1	1	1	1	1	3
Ferrous Sulfate	4	1	1	1	1	4	4	3	1	2	4	1	NR	—	Q	1	1	1	1	1	1	1	1	1	Q
Fluoboric Acid	—	3	1	2	1	4	4	3	3	3	2	—	NR	Q	3	NR	NR	1	1	4	2	3	3	3	4
Fluosilicic Acid	—	1	1	1	1	Q	3	3	2	3	1	NR	Q	Q	2	NR	NR	1	1	3	4	Q	1	1	3
Formaldehyde	—	3	1	3	1	4	4	NR	2	1	1	Q	Q	Q	1	1	1	1	1	NR	NR	Q	4	4	3
Formic Acid	—	1	1	1	4	NR	NR	Q	2	1	1	NR	Q	1	1	1	1	3	Q	NR	Q	1	1	1	3
Freons (Fluorocarbons)	NR	3	1	1	2	4	Q	Q	Q	NR	4	1	1	Q	1	1	1	1	1	Q	Q	Q	1	1	3
Fuel Oils	—	—	1	1	4	4	Q	NR	4	4	1	1	1	1	1	1	1	1	1	1	1	NR	4	1	3
Furfural	—	—	1	—	4	4	NR	NR	Q	NR	1	1	1	3	1	1	1	1	1	NR	NR	Q	Q	Q	Q
Gasoline	NR	1	1	1	4	4	Q	NR	NR	NR	1	1	1	1	1	1	1	1	1	4	1	NR	Q	Q	3
Glycerine (Glycerol)	—	1	1	1	4	4	4	2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3
Heptane	—	1	1	1	3	4	4	2	4	4	1	1	1	1	1	1	1	1	1	1	1	NR	1	4	3
Hexane	—	1	1	1	3	4	4	2	4	NR	1	1	1	1	1	1	1	1	1	1	1	NR	1	4	3
Hydrobromic Acid, 20%	NR	1	1	1	1	NR	4	2	2	4	3	NR	NR	NR	4	4	4	Q	1	NR	4	1	1	NR	3
Hydrochloric Acid, 0 - 25%	NR	1	1	1	1	NR	4	2	3	3	3	NR	NR	Q	4	Q	4	4	1	Q	1	1	1	1	3
Hydrochloric Acid, 25 - 37%	NR	1	1	1	1	NR	4	2	4	3	3	NR	NR	NR	4	Q	Q	Q	2	NR	Q	Q	3	4	—
Hydrofluoric Acid, 10%	—	1	1	1	1	NR	3	NR	2	4	3	NR	NR	NR	2	NR	NR	2	NR	4	2	4	2	2	Q
Hydrofluoric Acid, 30%	—	1	1	1	1	NR	3	NR	3	NR	3	NR	NR	NR	3	NR	NR	4	NR	NR	3	4	2	3	Q
Hydrofluoric Acid, 50%	—	1	1	1	1	NR	Q	NR	Q	NR	3	NR	NR	NR	3	NR	NR	4	NR	NR	4	4	Q	NR	Q
Hydrogen Peroxide, 30%	—	3	1	1	4	NR	4	4	2	3	Q	NR	1	Q	1	3	Q	1	1	NR	1	NR	1	Q	3
Hydrogen Peroxide, 50%	—	3	1	—	4	4	Q	Q	Q	NR	NR	—	—	Q	1	Q	Q	NR	NR	NR	1	NR	1	NR	3
Kerosene	4	1	1	1	4	4	4	NR	4	NR	1	1	1	1	1	1	1	1	1	4	3	NR	NR	NR	3
Ketones	NR	—	1	NR	4	4	NR	NR	Q	NR	1	—	—	1	1	1	1	1	1	NR	NR	2	NR	NR	Q
Lactic Acid	—	4	1	—	3	4	NR	4	4	1	1	NR	NR	4	2	4	1	1	4	4	3	1	1	4	3
Lead Acetate	—	1	1	1	1	4	3	1	2	4	1	NR	1	1	1	1	1	1	1	4	NR	1	NR	NR	3
Lubricants	—	1	1	1	2	4	3	1	2	NR	1	1	1	1	1	1	1	1	1	1	1	NR	3	Q	3
Magnesium Chloride	—	1	1	1	1	4	3	1	2	1	1	NR	Q	Q	1	1	1	1	1	1	1	1	1	1	3
Magnesium Hydroxide	—	1	1	1	1	Q	3	1	2	3	1	Q	Q	1	1	1	1	1	1	3	1	1	1	1	—
Magnesium Nitrate	—	1	1	1	1	4	3	1	2	4	1	—	—	1	1	1	1	1	1	1	1	1	1	1	3
Magnesium Sulfate	—	1	1	1	1	4	3	1	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
Methyl Alcohol (Methanol)	—	—	1	3	1	4	NR	NR	4	4	1	1	1	1	1	1	1	1	1	4	NR	Q	1	1	3
Methyl Chloride	NR	1	1	—	Q	NR	NR	NR	NR	NR	4	—	—	1	1	1	1	1	1	NR	Q	NR	NR	NR	Q
Methyl Ethyl Ketone	NR	3	1	NR	4	4	NR	NR	4	NR	4	1	1	1	1	1	1	1	1	NR	NR	1	NR	NR	Q
Methylene Chloride	—	4	1	—	Q	NR	NR	NR	NR	NR	4	4	—	1	1	1	1	1	1	NR	Q	Q	NR	NR	3
Naphtha	4	1	1	1	4	4	4	Q	4	NR	1	1	1	1	1	1	1	1	1	4	3	NR	NR	NR	3
Nickel Chloride	—	1	1	1	1	4	3	2	2	4	1	NR	NR	Q	1	1	1	1	1	2	2	2	2	Q	3
Nickel Sulfate	—	1	1	1	1	4	3	2	2	4	1	NR	NR	1	1	1	1	1	1	1	1	1	1	1	3
Nitric Acid, 10%	—	1	1	2	1	4	3	2	4	2	3	NR	NR	1	2	1	Q	4	1	NR	1	Q	1	4	NR
Nitric Acid, 20%	—	1	1	3	2	4	3	3	4	3	Q	NR	Q	2	3	1	Q	4	1	NR	1	Q	3	Q	NR
Nitric Acid, 50%	—	3	1	3	3	NR	Q	4	Q	4	Q	NR	1	3	4	2	Q	Q	2	NR	3	Q	Q	Q	NR
Nitric Acid (Concentrate)	—	3	1	NR	4	NR	NR	NR	NR	4	Q	NR	4	3	4	1	Q	NR	1	NR	4	NR	NR	NR	NR
Nitrobenzene	—	3	1	3	4	4	NR	NR	4	NR	1	Q	1	1	1	1	1	1	1	NR	Q	4	NR	NR	NR
Oil, Vegetable	—	1	1	1	1	4	3	Q	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	—
Oil, Sour Crude	—	—	1	1	1	4	3	Q	4	NR	1	1	1	1	1	1	1	1	1	4	1	1	Q	Q	—
Oleic Acid	—	1	1	1	1	4	4	Q	4	4	1	NR	NR	3	3	1	1	1	1	Q	4	Q	Q	Q	3
Oxalic Acid	—	3	1	3	1	NR	4	1	3	4	1	—	4	4	3	4	1	1	1	4	1	2	2	4	3