



Water Management Systems

Filtration and Separation Systems

SGM-250A Sand and Gravel Filter

CSM Centri Separator

BFS Bag Filter

SWF Full Flow Strainers

Product Manual

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to a continuing program of product improvement.
Specifications, appearance, and dimensions described in this manual
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Safety Considerations

Sterling/Sterlco water management systems products are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personnel injury or equipment damage when installing, operating, or maintaining this equipment, use good judgment and follow these safe practices:

- ☑ Follow all **SAFETY CODES**.
- ☑ Wear **SAFETY GLASSES** and **WORK GLOVES**.
- ☑ Disconnect and/or lock out power before servicing or maintaining the system.
- ☑ Use care when **LOADING, UNLOADING, RIGGING, or MOVING** this equipment.
- ☑ Operate this equipment within design specifications.
- ☑ **OPEN, TAG, and LOCK ALL DISCONNECTS** before working on equipment. You should remove the fuses and carry them with you.
- ☑ Make sure that system equipment and components are properly **GROUNDING** before you switch on power.
- ☑ Do not jump or bypass any electrical safety control.
- ☑ Do not restore power until you remove all tools, test equipment, etc., and the system and related equipment are fully reassembled.
- ☑ Only **PROPERLY TRAINED** personnel familiar with the information in this manual should work on this equipment.

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1-1 General Description

Filtration is used on cooling tower systems or chilled water systems requiring removal of large, heavy-duty suspended solids. Four filtration systems are available; sand and gravel filters, centrifugal separators, bag filters, and strainers.

Sand and gravel filters use two layers of gravel and one layer of sand for filtration. It is piped in a by-pass configuration. A timer can be preset at any interval to automatically back wash the sand and gravel. The SGM-250A sand and gravel filter is designed to handle up to 250 ton tower systems and 500 ton chiller systems.

The Centri-Separator System uses centrifugal force by directing the water in a circular motion allowing suspended solids to drop out and be purged from the system. It is piped in a by-pass configuration and is supplied with an integral pump, electrically operated ball valve, and controls. A timer can be preset at any interval to automatically purge the separator. The CSM Centri Separator is available for cooling tower systems up to 400 tons and chiller systems up to 800 tons.

BFS bag filters use a 25-micron bag to filter suspended solids in either a by-pass or full flow piping configuration. A differential pressure alarm is available to warn when bag is full. BFS bag filters are available for tower systems up to 150 tons and chiller systems up to 200 tons.

SWF Series full flow filters use a strainer basket to filter the water. An 80-mesh strainer screen is standard. Other mesh sizes are available upon request. The filter housing, strainer basket, and flanges are made from 304 stainless steel. A differential pressure alarm and automatic purge valve are available as an option. SWF Series full flow filters are available for tower systems up to 650 tons and chiller systems up to 850 tons.

1-2 Sand and Gravel Automatic Backwash Filters

Sterling/Sterlco sand and gravel filters are shipped complete with:

- Tank
- Valve manifold
- Gauges
- Initial charge of sand and gravel

The system switches valves automatically. Two backwash control mechanisms are available. Backwash cycles can be based on a time cycle (SGM-250A) or pressure differential across the unit (SGM-250P).

SGM-250A sand and gravel automatic backwash filters are available in a 250-ton (756,000 Kcal/hr) model for cooling towers and a maximum-capacity 500-ton (1,512,000 Kcal/hr) chiller model. The SGM250A model is equipped with automatic valves operated from a timing device so that the backwash cycle automatically activates on a periodic basis.

Filters must be installed in a bypass line so that plugging of the filter or temporary shutdown required for back washing does not hinder process operation.

1-3 Centri-Separator Filter Systems

Sterling/Sterlco centrifugal separation systems are used on cooling tower or chilled water systems requiring large capacity, heavy-duty suspended solids removal.

The Centri-Separator System (CSM-150) is designed to handle up to 150-ton (567,000 Kcal/hr) cooling tower systems and up to 300-ton (907,200 Kcal/hr) chiller systems. The CSM-150 includes a centrifugal separator, $\frac{1}{3}$ hp (0.25 kW) pump, $\frac{1}{2}$ " PVC electrically-activated ball valve, and a 115 volt single-phase 60 hertz control station. The CSM-150 can be mounted on a pump tank or piped in a bypass line. The system performs all operations, including separator purging, automatically.

The CSM-400 is designed for larger tower water system applications; up to 400-ton (1,512,000 Kcal/hr) cooling tower systems and up to 800-ton (2,419,200 Kcal/hr) chiller systems.

Note: Centrifugal separation systems must not be used for closed-loop or chilled water systems; back flushing eliminates chemicals added to the system.

1-4 BFS Series Bag Filters

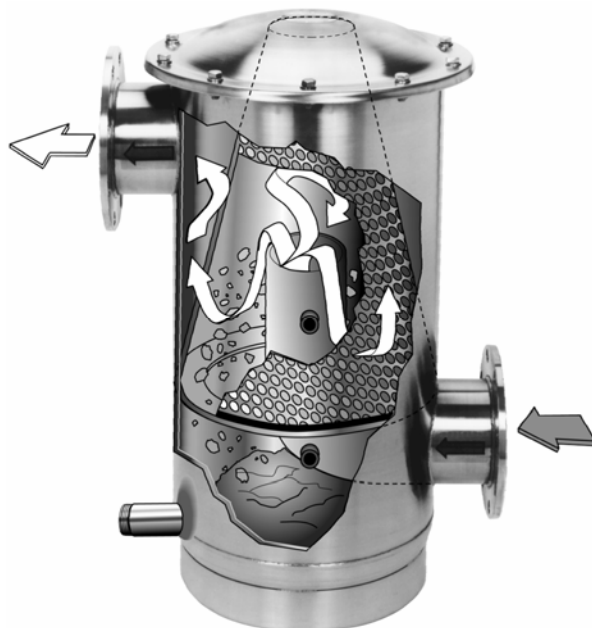
BFS Series bag filters can be used for full flow or bypass applications. BFS Series filters feature single cell 25-micron polyester filter bags, and include pressure gauges. BFS bag filters are available for tower systems up to 150 tons and chiller systems up to 200 tons.

1-5 SWF Series Full Flow Stainless Steel Filters

SWF Series full flow stainless steel filters feature 304 stainless steel construction of filter housings, strainer baskets, and flanges. Maximum working pressure is 100 psi (689.5 kPa/6.9 bars); 150 psi (1,034.5 kPa/10.3 bars) is available. Maximum operating temperature is 110°F (43°C); consult the factory for higher operating temperatures. 80-mesh screen size is standard for the stainless steel strainer basket; 40 mesh can be used for cooling tower water applications. Options include ΔP pressure alarm and automatic purge valve with timer.

Note: Valving and bypass are **not** included with SWF Series filters.

BFS Series and SWF Series full flow filters must be installed with bypass piping so that plugging of the filter or temporary shutdown required for back-washing does not hinder process operation.



2-1 Unpacking and Inspection

You should inspect your Sterling/Sterlco water management systems and products for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc. In case of breakage, damage, shortage, or incorrect shipment, refer to the following sections.

2-2 In the Event of Shipping Damages

Important!

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

The Carrier then assumes full responsibility of the shipment.

- ☑ Notify the transportation company's local agent if you discover damage.
- ☑ Hold the damaged goods and packing material for the examining agent's inspection. Do not return any goods to Sterling/Sterlco before the transportation company inspection and authorization.
- ☑ File a claim against the Transportation Company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.
- ☑ Advise Sterling/Sterlco. regarding your wish for replacement and to obtain an RMA (return material authorization) number.

2-3 If the Shipment is Not Complete

Check the packing list. The apparent shortage may be intentional. Back-ordered items are noted on the packing list. You should have:

- Sterling/Sterlco water management system equipment or chemical treatment products
- Bill of lading
- Packing list
- Operating and Installation packet
- Electrical schematic and panel layout drawings
- Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking. Determine that the item was not inadvertently taken from the area before you checked in the shipment. Notify Sterling/Sterlco immediately of the shortage.

2-4 If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the parts and service department immediately** at [262] 641-8610. Have the order number and item number available. *Hold the items until you receive shipping instructions.*

2-5 Returns

Important!

Do not return any damaged or incorrect items until you receive shipping instructions from Sterling/Sterlco.

3-1 Installing the Sand and Gravel Backwash Filter

Selecting an Installation Site

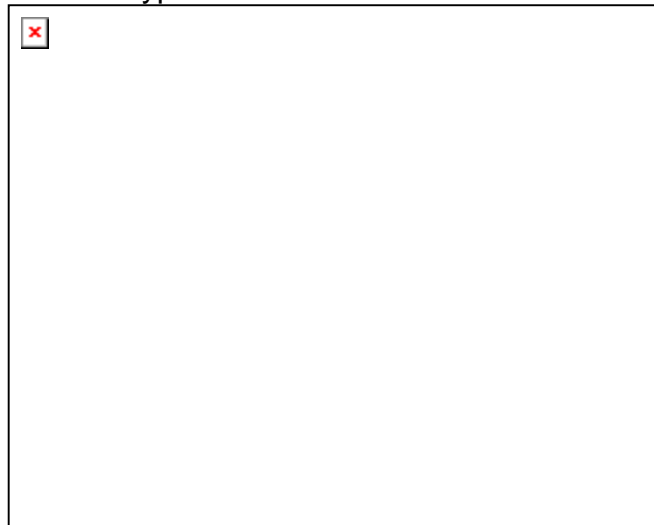
Place the unit on a suitable and level foundation, preferably a concrete floor or pad and near the pump for best operation. The location you select must also have an open drain to a sewer for backwash, a hookup to city water, and a 110-volt electrical source.

Use a fork lift truck when moving the unit to avoid damage.

Installing the Unit

Be sure that piping to the unit has a bypass circuit. The bypass circuit allows for removal of the unit for servicing without interrupting water service. Always run piping full size at 1½" NPT (approx. 38 mm). Connect the entering water connection of the filter unit to the process supply and the leaving connection to the tank. Use 2" NPT (approx. 51 mm) to hook up city water or process water to the backwash connector piping, as well as to connect back-flush connections to the city waste or sewer.

Figure 1
Typical Sand and Gravel Filter



Filling the Unit

Fill the water tank with water by opening valves ③ and ④. Valves ①, ②, ⑤, and ⑥ are automatically controlled by a timer. After you open valves ③ and ④, water flows and is filtered in the normal direction.

Take a moment **now**, while the filter is clean, to record pressure gauge readings at the inlet and outlet of the filter. You'll use these readings later to determine the cleanliness of the filter media.

Complete the installation of the sand and gravel filter by plugging the unit into a 110-volt source of electricity. The sand and gravel filter is now ready to use.

3-2 Installing the Centri-Separator System

Selecting an Installation Site

Place the unit on a suitable and level foundation, preferably a concrete floor or pad and near the pump for best operation. The location you select must also have an open drain to a sewer for purging and a 110-volt electrical source.

Use a fork lift truck when moving the unit to avoid damage.

Installing Piping

Be sure that piping to the unit has a bypass circuit. The bypass circuit allows for removal of the unit for servicing without interrupting water service. Part of your Centri-Separator system includes a three foot (about 1 m) suction leg, including a priming valve/connection for startup. Connect the pump suction leg to the pump suction connection. Sterling/Sterlco recommends that you use a hose at least 1½" (about 38 mm) in diameter for clean water flow to the pump tank. Your system includes a threaded barbed fitting and clamps to install the hose.

Priming the Pump and Preparing for Operation

Be sure that the pump on your Centri-Separator system is primed before you start up the system. To do this, connect a city water line to the priming valve. Allow enough time for the suction leg to fill with water, then close the priming valve.

Complete the installation of your Centri-Separator system by plugging the unit into a 110-volt source of electricity. The Centri-Separator system is now ready to use.

3-3 Installing the BFS Series Bag Filter

Selecting an Installation Site

Place the unit on a suitable and level foundation, preferably a concrete floor or pad and near the pump for best operation.

Use a fork lift truck when moving the larger units to avoid damage.

Installing Piping

Be sure that piping to the unit has a bypass circuit. The bypass circuit allows replacement of bag filter without interruption of service. Connect to the inlet and outlet as labeled on filter housing. Solids will collect inside the bag filter preventing spill over when the bag is removed. Always run piping full size. Filter housing maximum operating pressure is 150 psi.

3-4 Installing the SWF Series Full Flow Stainless Steel Filter

Selecting an Installation Site

Place the unit on a suitable and level foundation, preferably a concrete floor or pad and near the pump for best operation.

Use a fork lift truck when moving the larger units to avoid damage.

Installing Piping

Be sure that piping to the unit has a bypass circuit. The bypass circuit allows for removal of the unit for servicing without interrupting water service. Connect to the inlet and outlet as labeled on the housing. Solids will collect in the bottom of the housing where it will be purged out of the system. Always run piping full size. Filter housing maximum operating pressure is 100 psi.

Sand and Gravel Automatic Backwash Filters

- Model SGM-250A is equipped with automatic valves operated from a time device so that backwash is accomplished periodically on an automatic basis.

Model number	Dimensions in. (cm)						Shipping weight		Pressure differential backwash ①
	L		W		H		lbs.	Kg	
	in.	cm	in.	cm	in.	cm			
SGM-250A	40	101	48	122	39	99	1,800	818	SG-250P

① Model SGM-250P. Automatic valves are operated from pressure switch. Pressure switch monitors the pressure drop in the filter media and activates backwash cycle at preset pressure drop.

Centri-Separator Systems

Note: Not to be used for closed-loop or chilled water systems; back flushing eliminates chemicals added to the system.

Model number	Description	Dimensions in. (cm)						Shipping weight	
		L		W		H		lbs.	Kg
		in.	cm	in.	cm	in.	cm		
CSM-150	• 150-ton (453,600 Kcal/hr) tower maximum	29	74	19½	50	26	66	130	60
	• 300-ton (907,200 Kcal/hr) chiller maximum	29	74	19½	50	26	66	130	60
CSM-400	• 400-ton (1,209,600 Kcal/hr) tower maximum	26	66	20	51	41	104	150	69
	• 800-ton (2,419,200 Kcal/hr) chiller maximum	26	66	20	51	41	104	150	69

BFS Series Bag Filters

Note: Can be used for full flow or bypass.

Model ①	Max. flow		No. filter bags		Pipe size	
	gpm	lpm	required	supplied	inches	mm
BFS-30	30	113	1	3	1½" NPT	38 mm
BFS-65	65	246	1	3	2½" NPT	63 mm
BFS-90	90	340	1	3	2½" NPT	63 mm
BFS-200	200	757	1	3	3" (flanged)	76 mm (flanged)
BFS-300	300	1,135	2	6	4" (flanged)	102 mm (flanged)
BFS-450	450	1,703	3	12	5" (flanged)	127 mm (flanged)

① Single cell filters include bypass, pressure gauges and 25 micron filter bags. Multi-cell filters include pressure gauges and 25 micron filter bags.

SWF Series Full Flow Stainless Steel Filters

- Maximum working pressure is **100 psi** (689.5 kPa/6.895 bars); 150 psi (1,034.25 kPa/10.343 bars) is available.
- Maximum operating temperature is 110°F** (43°C). Consult factory for higher temperatures.

Model ①②	Maximum flow		Connection size/flange	
	gpm	lpm	inches	mm
SWF-100	100	378	2" flange	51 mm flange
SWF-200	200	757	3" flange	76 mm flange
SWF-350	350	1,325	4" flange	102 mm flange
SWF-750	750	2,839	6" flange	152 mm flange
SWF-1300	1,300	4,920	8" flange	203 mm flange
SWF-2000	2,000	7,570	10" flange	254 mm flange

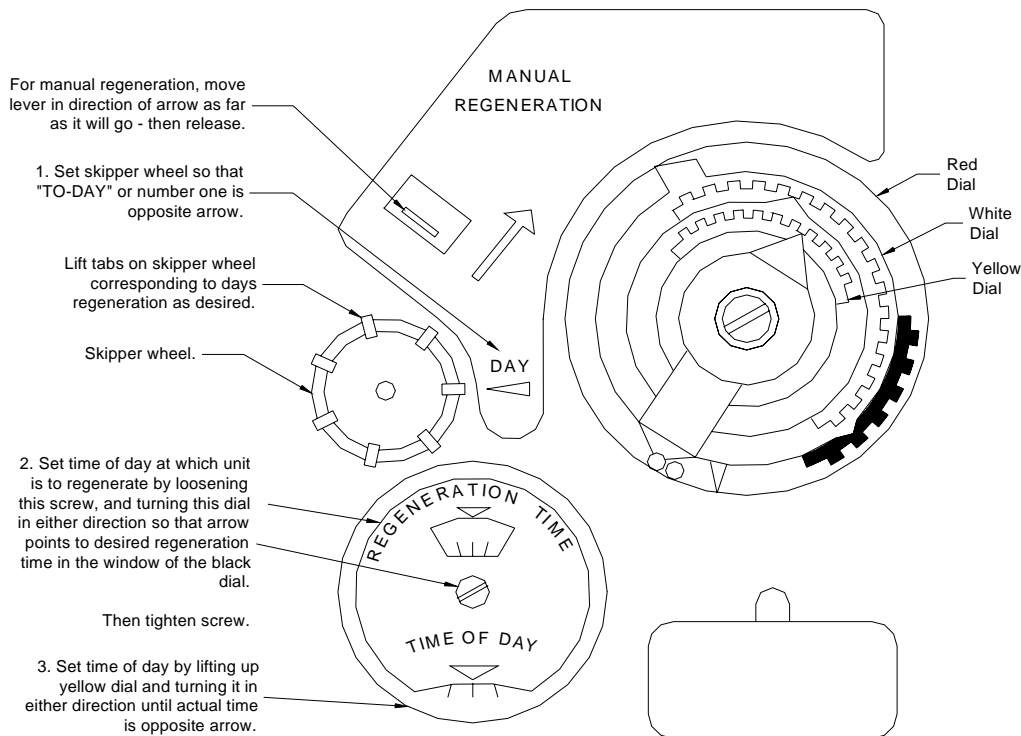
① 80 mesh screen size is standard for stainless steel strainer basket. 40 mesh can be used for tower water. **Specify mesh size.**

② Valving and bypass are **not** included with SWF Series stainless steel filters.

5-1 Sand and Gravel Automatic Backwash Filter

Adjusting Timer

Adjust the time control of the SGM-250A if desired. The factory set timer is set to backwash four minutes every 24 hours. Frequency and duration may be reset as required. See diagram below to adjust timer.



To change the length of backwash time, rotate the complete dial assembly until the red arrow is at 11:00. Loosen the center screw and lift the black, yellow, and white dials together pointing to the desired time to on the red scaled dial. Lift the black knob and the red dial pointer to 6 on the white-scaled dial. Then lift the black knob pointer to 6 on the yellow-scaled dial. Tighten screw. Rotate the complete assembly until the red arrow is pointing to the rib on the pressure box (6:00 position). The timer will now back wash for six minutes.

Important!

Make sure gears are engaged before tightening screw

The Model SGM-250P backwashes based upon pressure differential across the filter media. Additionally, an adjustable timer allows back washing for up to five minutes. The factory setting is four minutes.

The pressure differential switch is adjustable for pressure drop and dead band. Backwash will start when the pressure differential reaches set point plus the dead band. For example, if the pressure differential is set for 6 psi, the dead band for 4 psi, and the backwash timer for 4 minutes, then the backwash cycle will start at 10 psi for a duration of four minutes.

Replacing Sand and Gravel

Replace the sand and gravel every two years, when contaminated, or when sand has carried over from excessive water flow.

There are three layers of filter media. First, starting from the bottom, place 200 lbs. of ½" x ¼" round gravel. Second, place 300 lbs. of ¼" x 1/8" round gravel and third, the top final layer, place 700 pounds of #20 filter sand.

Anode Replacement

On top of the filter housing is a sacrificial anode made of magnesium. Inspect and replace when it has depleted.

5-2 Centri-Separator System

The CSM-150 and CSM-400 require a 120/1/60-power source and are provided with a standard plug. The separators are designed to operate to a prescribed flow range for maximum solid removal. The CSM-150 operates at a flow rate of 10 to 20 gpm and the CSM-400 operates at 45 to 70 gpm. Liquid enters the upper portion of the separator housing tangentially and the solids are drawn through internal slots to the bottom chamber. An electrically operated ball valve automatically back flushes the solids from the separator. Periodically inspect and ensure that the purge line is clear to flow freely.

5-3 BFS Series Bag Filters

Bags are easily removed from the top of the filter housing. Before removing the bag filter be sure that pressure has been relieved and that the filter housing has been isolated to prevent spill over.

! CAUTION

SEVERE INJURY WILL RESULT IF HOUSING COVER IS REMOVED UNDER PRESSURE. RELIEVE PRESSURE AND ISOLATE HOUSING BEFORE REMOVING COVER.

Loosen and unlatch the V-clamps or swing type bolts that fasten down the top of the filter housing. The top is hinged on one end and will swing open. Reach down and lift the bag handle and remove the filter bag. Unfold and install the new bag. Close the cover and tighten down the swing bolts.

5-4 SWF Series Full Flow Stainless Steel Filters

Periodically, solids that settle to the bottom of the filter housing will need to be purged out. The drainage port valve, which is piped to an open drain, will need to be opened to purge the debris from the reservoir. Over time, one should be able to accurately determine how often the valve should be opened. Do not allow the debris to collect beyond the capacity of the reservoir.

An optional automatic purge valve is available to open based upon an adjustable time cycle. Periodically inspect and ensure that the purge line is clear to flow freely.

! CAUTION

SEVERE INJURY WILL RESULT IF HOUSING COVER IS REMOVED UNDER PRESSURE. RELIEVE PRESSURE AND ISOLATE HOUSING BEFORE REMOVING COVER.

The cover of the SWF full flow filter is removable if the strainer is clogged with debris. A pressure drop of 10 psi, after purging debris from the reservoir, would indicate that the strainer requires cleaning. **Do not remove the cover under pressure.** Relieve the pressure and isolate the filter from the system first. Lift the strainer element out of the filter housing and scrub it carefully with a rigid nylon brush and water until clean. Wash it off with clean water,

Parts Department

Call toll-free 7am–5pm CST [800] 423-3183 or call [262] 641-8610 or fax [262] 641-8653

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Let us install your system. The Contracting Department offers any or all of these services: project planning; system packages including drawings; equipment, labor, and construction materials; and union or non-union installations.



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