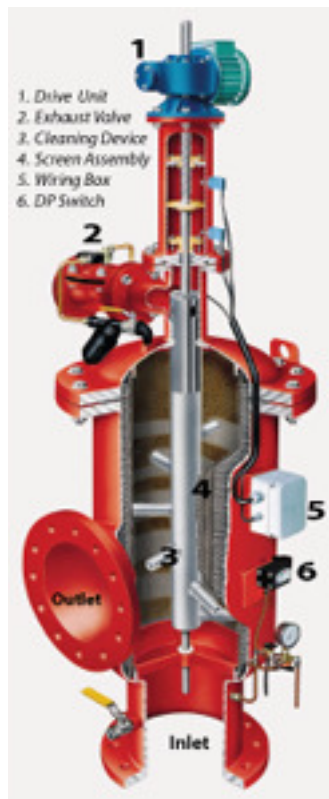


## Membranes Deserve Multi-Stage Protection

By Jim Lauria, Vice President, Sales and Marketing

### Amiad Filtration Systems

Membranes are extraordinarily effective at water purification at the sub-micron level – which is exactly why they need to be protected from particulate contamination. Membranes last longer, operate more productively, and require fewer cleaning cycles when they are shielded from the silt, sand, fibrous material, algae, bacteria, mollusk larvae, scale and the other contaminants that can cripple millions of dollars' worth of membranes in weeks or even days.



*Suction nozzles scanning just millimeters from the screen perform thorough cleaning of this Amiad filter without interrupting flow. The self-cleaning cycle can be triggered by a pressure differential, a timer, or both.*

Multi-stage filtration can be both efficient and cost-effective in protecting membranes. It's nearly

#### **Focused Back Flush Technology**

The heart of Amiad's self-cleaning filtration system is our suction-scanning technology. Highly efficient and chemical-free, this design breakthrough allows us several advantages:

- Fast, complete cleaning of the entire screen area
- Uninterrupted flow during cleaning
- Minimal energy and back flush water volume needed

Suction-scanning technology makes elegant use of simple physics. As the filter screen captures particles, the pressure differential between the inside surface (the inlet side) and the outside surface (the outlet side) of the screen increases. When that pressure differential reaches 7 psi, the Amiad system opens an exhaust valve. The exhaust valve drains the suction scanner, a hollow 316 stainless steel tube tipped with nozzles just millimeters from the screen surface.

Opening the exhaust valve to the unpressurized outside environment causes water to flow in a high-velocity stream backwards across the screen into the nozzles, carrying the captured particles, or filter cake, with it.

The nozzles concentrate the suction effect on less than one square inch of screen at a time, creating a powerful and highly effective cleaning force – a phenomenon we call “focused back flushing.” The suction scanner travels down the screen in a spiral pattern at a fixed speed, cleaning 100% of the screen surface in a 25-to-40-second stroke.

impossible to find a single filtration technology that can meet all needs, so filtration systems must be designed with a multi-pronged approach to protection, drawing on the strengths of various techniques to deliver water free of suspended solids to the final, membrane stage.



*Using an automatic self-cleaning screen filter to remove suspended solids before water reaches its RO membranes, this Virginia desalination plant uses its fine filtration more efficiently.*

### **Strengths and Weaknesses**

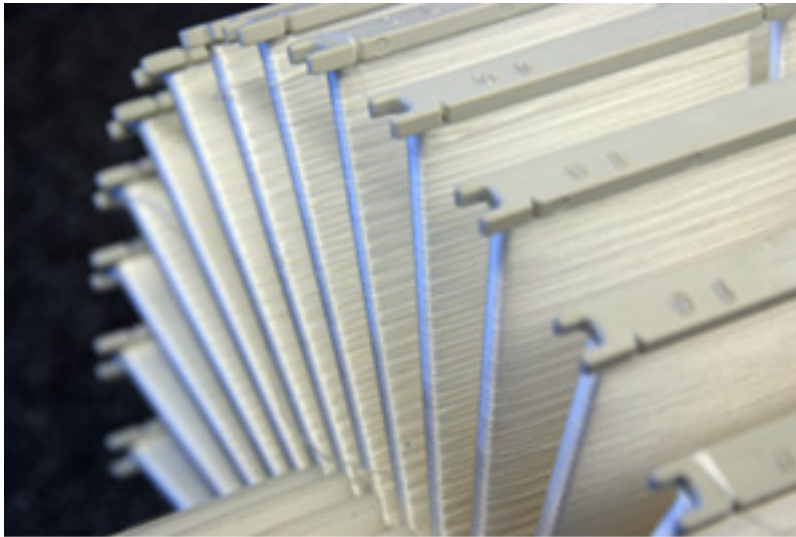
Fine cartridge filters provide excellent protection for membranes. However, inadequately protecting the cartridges themselves from larger contaminants simply moves the problem one step upstream. Relying on a fine filter for primary or even secondary filtration can leave significantly reduced surface area available for filtration, resulting in frequent cartridge replacement. The costs of consumables and disposal, labor for replacement and risks of opening the system immediately in front of the membranes can quickly add up to the unacceptable range.

Sand media systems can offer an impressive level of filtration, but they are large and – like cartridge or bag filters – cleaning them interrupts flow and can compromise the integrity of the system. Media carryover can threaten membranes or cartridges, and the volume of back flush water needed to clean sand media filters can be as much as four times the volume needed for automatic self-cleaning screen filters.

#### **Focused Back Flush Technology (cont.)**

The suction-scanning cleaning cycle can be initiated by a pressure-differential switch or by a timer. The spiral motion of the scanners may be powered by a motor (as in our SAF and EBS systems), by hydraulic flow (as in our FiltoMat M Series) or by hand.

The suction-scanning technology produces a very small amount of discharge water – less than 1% of the flow in most cases. The entire cleaning process can take place without interrupting system flow, which allows systems to be designed with less redundancy. And because there are no chemicals, polymers, or filter aids to be flushed with the filter cake, suction-scanning technology is truly clean technology.



***This innovative Automatic Microfiber (AMF) system is a self-cleaning thread filter that delivers filtration down to the 2-micron level. Placed before cartridge or bag filters, it can dramatically reduce operating costs by reducing expensive, labor-intensive, disruptive cartridge replacements.***

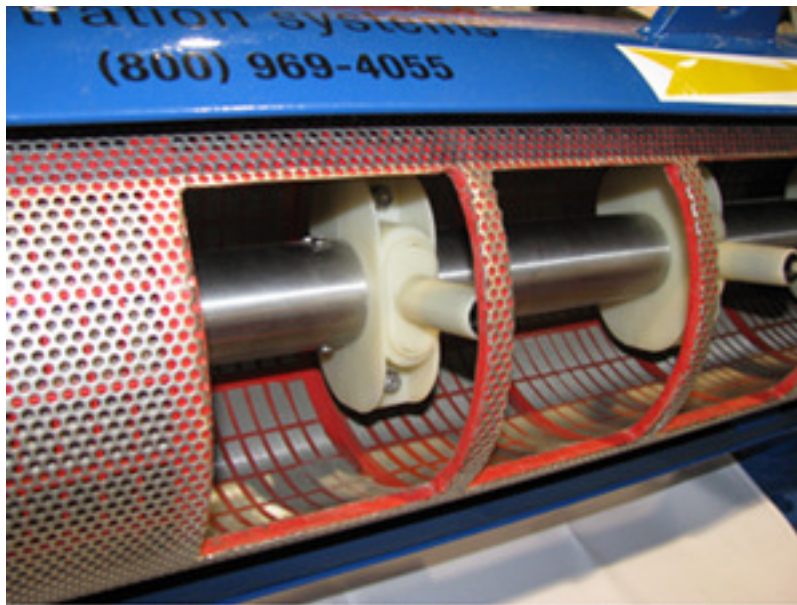
Automatic self-cleaning screen filters, such as the Amiad SAF or EBS series, initiate their focused back flush cycle without interrupting the flow of water through the system. Less than 1% of the flow is utilized as back flush water, and there are no consumables or chemicals involved. Automatic self-cleaning screen filters can be the cornerstone of a multi-stage filtration system, protecting separation systems downstream that guard against dissolved membrane contaminants such as oxidants, volatile organic compounds (VOCs) and hydrogen sulfide. The goal is to let each technology do what it does best, making the entire system more efficient.

Another benefit of the automatic self-cleaning screen filters is energy efficiency. Some of the systems use no electricity at all – water pressure drives the suction scanners. Most use a small electric motor, less than 1 horsepower in size. But the bigger energy savings occur inside the membrane vessel, where less pumping pressure is needed to treat cleaner water through unfouled membranes.

Amiad offers another automatic self-cleaning technology that is being employed in membrane installations around the world – a self-cleaning microfiber thread filter capable of performing down to the 2-micron level of filtration. As a stand-alone filter before membranes or a pre-filter that protects expensive cartridges, the AMF delivers outstanding results and reliability.

## Cost Savings

The costs of running a desalination plant, outlined in *The World's Water 2006-2007* from U.S. Bureau of Reclamation and SNL 2003 data, illustrate that a relatively modest investment in multi-stage filtration systems can pay off handsomely in short order.



*Using focused back wash technology, this Amiad EBS filter cleans itself without interrupting flow or disrupting the integrity of the system.*

According to the data, 5% of the cost of operating a desalination plant goes to replacing membranes; an additional 3% represents the cost of consumables. Energy is also a massive cost (and a lightning rod for criticism when RO and other membrane installations come under fire). Effective pre-filtration can extend the life of membranes, reduce the replacement of cartridges and other consumables, and lower energy usage. It's a win-win-win.

Amiad automatic self-cleaning filters are protecting membranes in staged-filtration systems around the world, from desalination plants to high-purity industrial applications.

Amiad Filtration Systems can help design multi-stage filtration systems that will enhance the performance of any membrane system. For more information, visit us online at [www.amiadusa.com](http://www.amiadusa.com) or call 1-(800) 969-4055.

### **Automatic Microfiber Filters (AMF)**

For filtration down to 2 microns, Amiad offers automatic self-cleaning thread filtration systems. Wound around a rigid cassette with a specially grooved base plate, densely placed polyester threads capture tiny particles as water flows across them toward collector pipes.

As dirt builds up on the filter threads, the pressure differential between inlet and outlet sides of the stream increases. At a pre-set pressure differential, a high-velocity cleaning stream is directed through the threads. The stream bounces off of the specially grooved base plate, pushing the high-velocity water back through the threads and taking the particles with it to a drain valve.

Amiad automatic self-cleaning thread filtration systems are excellent for protecting membranes that are purifying either seawater or brackish water sources.