

Reservoirs and Accessories

Storage with a Difference



Guarantee the purity of your stored water

Pure water requires a storage system which prevents the degradation of your water quality. EMD Millipore's 30-, 60-, and 100-liter polyethylene (PE) reservoirs are designed to maintain consistent purity of stored water and provide effective protection against airborne contaminants.

A complete line of reservoirs is available, ranging in capacity from few liters to several hundred liters. Your nearest EMD Millipore office will be able to guide you in the choice of reservoir best suited to your needs.

Prevent bacterial growth

Water stagnancy can cause bacterial proliferation. Our optional Automatic Sanitization Module (A.S.M.) is the ideal solution for the prevention of bacterial growth and biofilm formation on the inner surface of the reservoir.

Distribute your stored water where it is needed

Laboratories use pure water to feed equipment such as Milli-Q® ultrapure water systems and washing machines. An optional distribution pump can be fitted into the reservoir base to enable feed to all laboratory equipment or simply to filter the pure water before use.

The main concern when storing purified water is degradation of water purity over time. Only a strict choice of reservoir materials, associated with careful design and appropriate protection against airborne contaminants, can ensure consistent water quality during storage.

Innovative design

EMD Millipore 30-, 60- and 100-liter polyethylene reservoirs incorporate the latest technical developments and advanced features to guarantee stored water of consistent purity:

Unique features

- Polyethylene selected for its minimum release of extractables
- Smooth inner surface prevents biofilm formation
- Cylindrical shape minimizes surface area in contact with water
- Conical bottom allows complete cleaning and rinsing
- Purified water smoothly fed in at the bottom of the reservoir prevents absorption of carbon dioxide
- Front valve for manual dispense of purified water
- Hermetically-sealed lid prevents air from entering the reservoir
- Large top opening allows manual cleaning during sanitization procedure
- Compact space saving design

Fail-safe protection

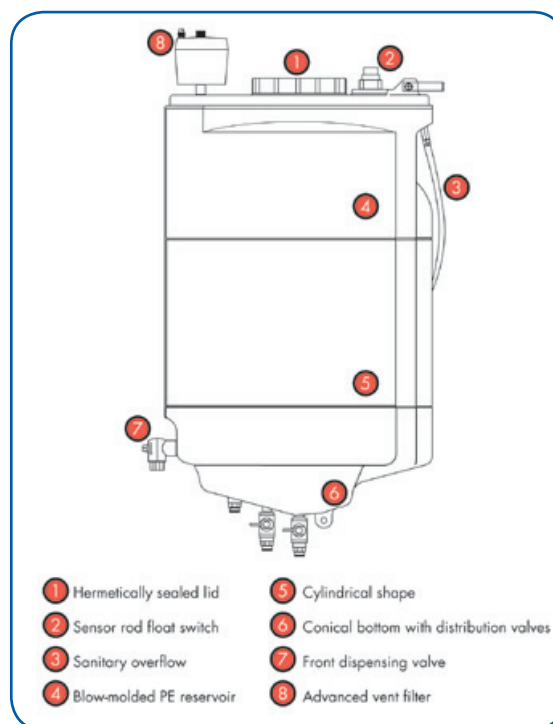
- Sensor rod float switch system for automatic reservoir refill and indication of water level (% full)
- Sanitary overflow in the unlikely event of a water system malfunction
- Direct display of stored water level on RiOs® or Elix® system units
- Water sensor (option with A.S.M. module) to prevent any leakages

Accessories & connections

- Choice of vent filters to protect stored water against external airborne contaminants
- Upgradeability: distribution pump, UV sanitization module (A.S.M.) and water sensor
- Two additional bottom valves enable connection to a polishing system and a washing machine

To find out about all the tests performed during the reservoir development process, request the publication "R&D Notebook 1: Optimizing the storage of purified water for laboratory applications" (Ref. No.: RD001EN00)

Designed for efficiency



Specifications

There are 3 different reservoir sizes available in this range.

30-liter Reservoir

Diameter	380 mm (14.82 in.)
Height	600 mm (23.4 in.)
Maximum Usable Capacity	25 l
Weight (full)	30 kg (66.14 lb)
Secured to Wall	Yes
Wall-Mounted	Yes

60-liter Reservoir

Diameter	380 mm (14.82 in.)
Height	840 mm (32.76 in.)
Maximum Usable Capacity	54 l
Weight (full)	59 kg (130.07 lb)
Secured to Wall	Yes
Wall-Mounted	Yes

100-liter Reservoir

Diameter	380 mm (14.82 in.)
Height	1255 mm (48.95 in.)
Maximum Usable Capacity	91 l
Weight (full)	98.5 kg (217.15 lb)
Secured to Wall	Yes
Wall-Mounted	Shelf recommended

Automatic Sanitization Module (A.S.M.)

Full flexibility for guaranteed results

- 254 nm low pressure mercury vapor UV lamp, selected for its germicidal effectiveness
- Pre-programmable intervals of 10-min / day automatic UV illumination for optimized efficiency
- Additional programmable and manual UV exposure possible to meet critical application requirements
- Up to 60 min / day of UV exposure for total flexibility
- Choice of language display and real time clock for maximum convenience

Additional accessories

The A.S.M. is also available with an added security option, where it can isolate the water system from the main line, should any leakage be detected. The A.S.M. display will show the time and date water was detected along with instructions on how to reset this function.

- Clear LCD display and control panel to program date and time settings, UV cycles and UV lamp operation
- UV lamp exchange alarm for easy maintenance
- Automatic recovery of all operating parameters in case of power failure
- Compact design to save laboratory space

Complete water purification chain with the A.S.M. and water sensor option



Automatic Sanitization Module control panel

Specifications

EMD Millipore's Automatic Sanitization Module is available in 120 V and 230 V options and is easily fitted onto the reservoirs.

A.S.M. specifications

Maximum height above tank	143 mm (5.58 in.)
Total length end to end	381 mm (14.86 in.)
Length of quartz housing	286 mm (11.15 in.)
Width	261 mm (10.18 in.)
Depth	379 mm (14.78 in.)
Minimum height above A.S.M. top	240 mm (9.36 in.)
Weight	2.2 kg (4.85 lbs)

Electrical requirements

120 V / 60 Hz or 230 V / 50 Hz
Fuse (120 V unit): 0.25 A, 5 x 20 mm
Fuse (230 V unit): 0.16 A, 5 x 20 mm

Water sensor option specifications:

A.S.M. water sensor cable	3.2 m (10.50 ft.)
A.S.M. solenoid valve cable	4.2 m (13.78 ft.)
Additional water sensor cable	3.5 m (11.48 ft.)

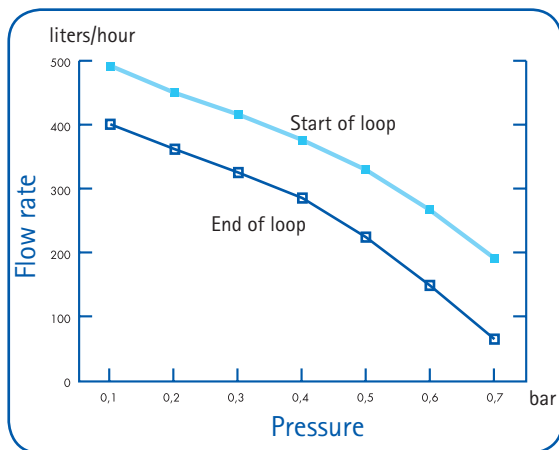
Advanced protection against airborne contaminants

Air is contaminated by carbon dioxide, particles, microorganisms, and volatile organic compounds that come mainly from the laboratory atmosphere itself. To protect purified water from all these contaminants, EMD Millipore has developed an advanced vent filter that includes:

- Activated carbon to adsorb volatile organics (including lab solvents such as acetone, chloroform and methanol)
- A soda-lime bed to remove CO₂
- A Durapore® hydrophobic membrane for particle and bacteria retention

This advanced vent filter is recommended for the protection of high-resistivity water, such as Elix® product water, during storage. A standard 0.65 µm membrane vent filter is available to protect reverse osmosis-quality water.

Distribution pump: typical performance (Water temp.: 22 °C, Loop length: 12 m)



Specifications

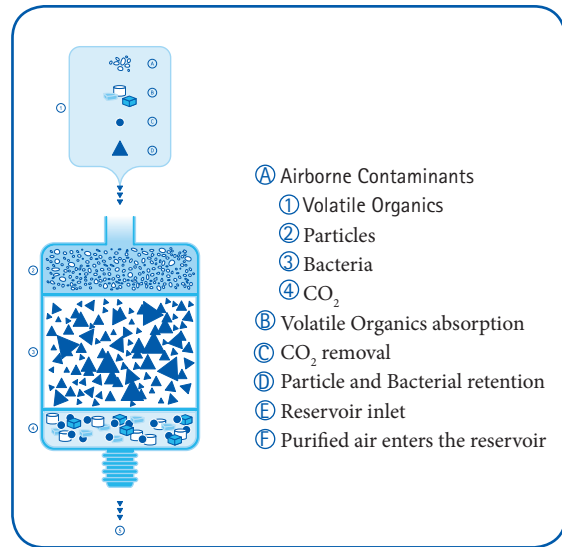
Pump specifications

Water temperature range	0–65 °C
Body maximum pressure	2.5 bar (35 psi)
Flow rate at 0.6 bar	5 l/min
Inlet/outlet connections	3/8 in. M BSP Threaded

Dimensions:

Total length	225 mm (8.78 in.)
Total height	145 mm (5.66 in.)
Total width	286 mm (11.15 in.)
Electrical requirements	230 V, single phase, 50 Hz, 0.4 A 100/120 V, single phase, 50/60 Hz, 0.8 A
Environmental protection	IP44

Advanced reservoir vent filter



Distribution pump meets increased demands

Compact in size, an optional distribution pump can be fitted into the reservoir base to meet various application demands, such as feed to a Milli-Q® ultrapure water system, feed to a washing machine or other equipment, and filtration at point-of-use.

Long service lifetime and quiet operation

The distribution pump is a magnetically-coupled centrifugal pump. This simple and safe operating principle ensures long service (up to 35,000 operating hours) and low noise level during operation. The pump has the ability to deliver water continuously without generating significant temperature increases.

Recirculation loop specifications:

Tubing material	Black PE
Maximum length	12 m (39.37 ft.)
Tubing diameter	12 mm (0.47 in.)

UV Sanitization:
A sound investment for stored water purity

Maintaining high purity water with low bacteria levels during storage is critical.

If left to proliferate, trace level of microorganisms present in purified water compromise water purity.

This bacterial contamination is responsible for the formation of a biofilm, an accumulation of organic material made up of active and dead organisms, on the inner walls of the storage reservoir.

Even though chemical sanitization and mechanical scrubbing may be periodically performed, this biofilm is difficult to remove and is a frequent source of recontamination in stored water.

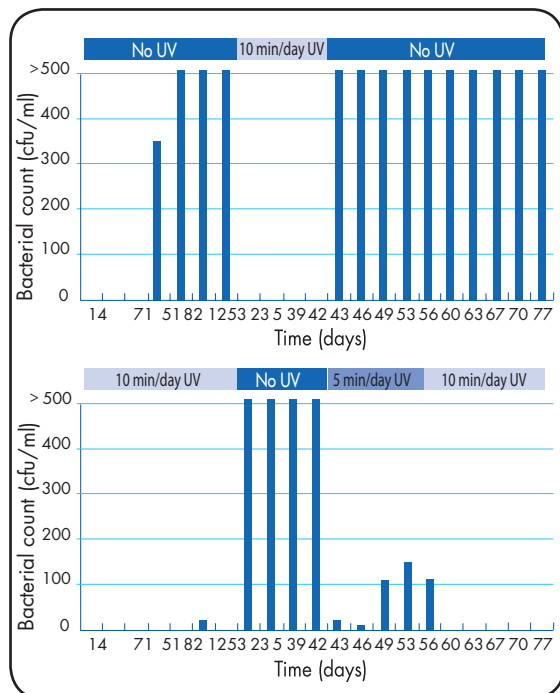
10 minutes/day of UV is enough!

During development of the A.S.M., the UV lamp exposure cycles were optimized by examining the resulting bacterial reduction after exposure.

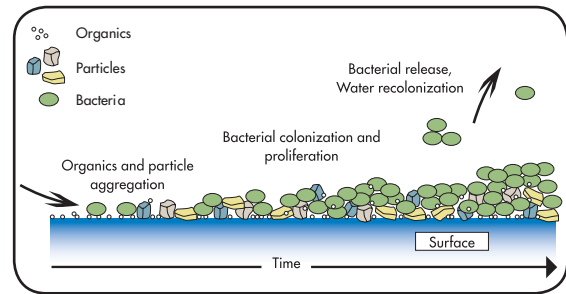
Two 60-liter reservoirs were fed by an intentionally contaminated reverse osmosis water purification system. The reservoirs were then emptied and refilled each day and alternately equipped with an A.S.M. into which variable illumination times were programmed.

As shown in the graphs, 10 minutes per day of UV exposure were enough to make the reservoirs return to their original low bacterial levels.

Germicidal effectiveness of the UV lamp



Biofilm formation over time



Say "No!" to bacterial proliferation

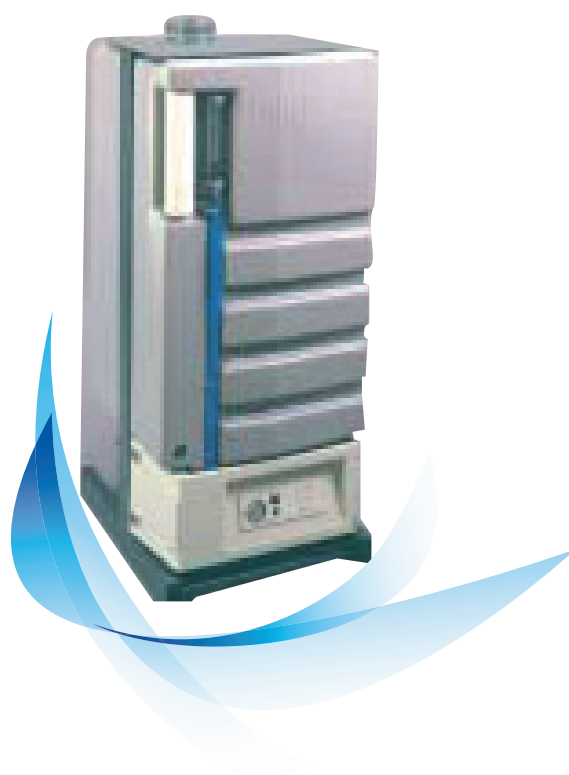
EMD Millipore's Automatic Sanitization Module (A.S.M.) is designed to prevent the growth and proliferation of bacteria and the resulting biofilm on the inner surface of EMD Millipore PE reservoirs. The A.S.M. makes use of the germicidal properties of an ultraviolet (UV) light at 254 nm, which is produced by a low-pressure mercury vapor lamp fitted inside the reservoir.

Ordering Information

Description	Catalogue No.
Polyethylene Reservoirs	
Reservoirs	
30-liter PE reservoir	TANK PE0 30
60-liter PE reservoir	TANK PE0 60
100-liter PE reservoir	TANK PE1 00
Accessories	
Vent Filter 0.22 µm	TANK MPK 22
Advanced vent filter (for Elix® water system)	TANK MPK 01
Standard vent filter (for RiOs™ water system)	TANK MPK 02
Reservoir wall-mounting bracket (for 30 L/60 L reservoirs)	TANK FIX 01
Automatic Sanitization Module	
120 V	
ASM (standard)	TANK S60 UV
ASM complete (with water sensor and solenoid valve)	TANK S6L UV
230 V	
ASM (standard)	TANK S50 UV
ASM complete (with water sensor and solenoid valve)	TANK S5L UV
ASM accessories	
Replacement UV lamp	ZFRE S00 UV
Water sensor with cable	TANK LK0 02
Distribution Pump	
Complete kit	
120 V/60 Hz distribution pump with connection kit	TANK REC 56
230 V/50 Hz distribution pump with connection kit	TANK REC 500
Distribution pump alone	
120 V/60 Hz	PUMP 056 01
230 V/50 Hz	PUMP 050 01
Pump connection kit alone	
(12 m long PE tubing: Ø = 12 mm , check-valve, connectors, elbows and tees)	PUMP KIT 01
Accessories	
12 mm-12 mm elbow connector	FTPF 070 34
1/2 "M -12 mm-12 mm tee	FTPF 070 36
12 mm x 9 mm black PE tubing (1 m length)	FTPF 070 38

S.D.S. and Accessories

Purified Water Storage and Distribution Systems



Complete, compact systems for the storage and distribution of purified water

Pure Water Storage and Distribution

Purified water for the laboratory is often produced by reverse osmosis and EMD Millipore's patented Elix® Technology. EMD Millipore's compact S.D.S. Storage and Distribution Systems are designed to store up to 350 liters of purified water, maintain consistent purity of stored water, provide effective protection against airborne contamination, and can distribute the purified water under pressure to multiple-use locations.

Maintaining water purity during storage is critical. EMD Millipore's Automatic Sanitization Module (ASM) prevents bacterial growth and the build-up of biofilm, an accumulation of active and dead bacteria on the inner surface of the storage reservoir.

EMD Millipore Service Support engineers can help to design the total water purification system (including pure water storage) best suited to specific needs, providing detailed specifications and information on all integral parts of the system.

Key Benefits:

- Built-in features to maintain pure water quality
- Programmable operation ensures consistent delivery of pure water to all required points
- Complete control of all storage and distribution functions via the main make-up water purification system
- Qualification program, preventive maintenance plans and full technical support available for peace of mind

Total Water Purification System

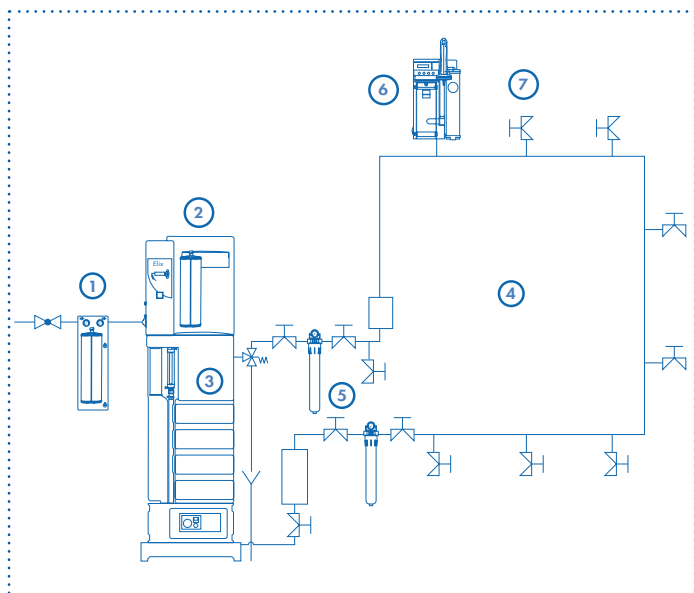


Figure 1: Example of a Total Water Purification System

A total water purification system requires the main water purification system to be integrated into a centralized system. For example:

1. Pretreatment
2. Make-up water purification system (Elix® system)
3. Storage reservoir
4. Distribution loop
5. Accessories (UV lamp, resistivity monitor, bacteria filter, etc.)
6. Milli-Q® system (point-of-use polisher)
7. Pure water point of use

The total water purification system must meet the expected performance levels by ensuring that all components have been designed and implemented according to strict guidelines. EMD Millipore provides this expertise throughout the project.

Purified Water Distribution to Multiple Locations

Pure water in larger volumes is needed for many applications including feed water to Milli-Q® and Super-Q® ultrapure water systems, equipment feed to dishwashers and autoclaves, and for direct use in rinsing and preparation of reagents, buffers and culture media. S.D.S. systems provide optimized storage of 200 to 350 liters of pure water ready for distribution. Built-in pump options can easily distribute water under pressure to multiple locations directly where it is needed.

Elix® and RiOs™ Systems – One Complete Purification and Control Unit

EMD Millipore has developed Elix® and RiOs™ systems for users requiring up to several thousand liters per day of purified water. These systems incorporate all water purification technologies needed to produce the required quality of purified water as well as the complete control functions for the Total Water Purification System.

Elix® and RiOs™ systems provide complete control of the:

- Distribution loop pump
- In-line distribution loop UV lamp
- Automatic Sanitization Module (ASM) on the storage reservoir
- Resistivity and TOC* monitoring of water in the distribution loop
- Distribution loop automatic drain valve
- Water detector
- Additional feed water booster pump if tap feed pressure is too low.

* Elix® systems only



Compact design requires minimal floor space and any Elix® or RiOs™ system can be installed directly on top of the storage reservoir.

Planning a water distribution loop that will meet desired flow rate and pressure needs requires engineering expertise to determine the adequate pump size based on calculated piping and equipment pressure losses. Strict design guidelines must be followed to avoid piping dead-legs and achieve minimum flow velocity through the distribution loop.

Distribution Pump Operation

The built-in stainless steel centrifugal distribution pump was specifically selected for its ability to operate continuously without generating significant temperature or noise level increases. EMD Millipore Elix® and RiOs™ systems provide complete programmable control of the distribution pump. The distribution pump operating mode can be preprogrammed for a seven-day cycle (with specific settings for each day), for intermittent operation (to take into account periods of non-use), or for continuous operation (by manually overriding the automatic settings).

Figure 2: Distribution pump performance

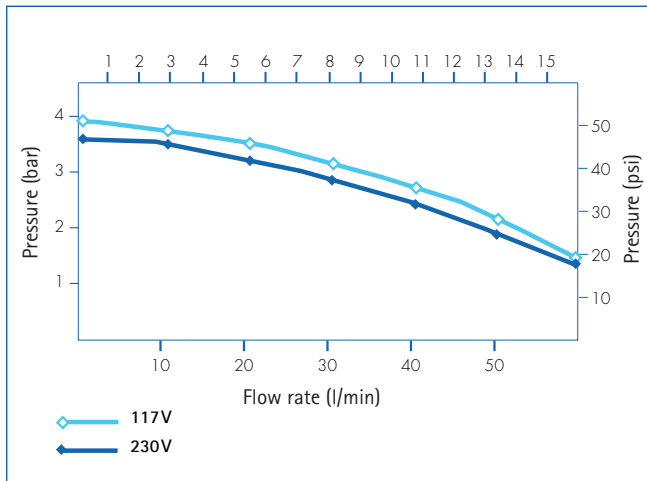


Figure 3: Recirculated water temperature during continuous or intermittent operation

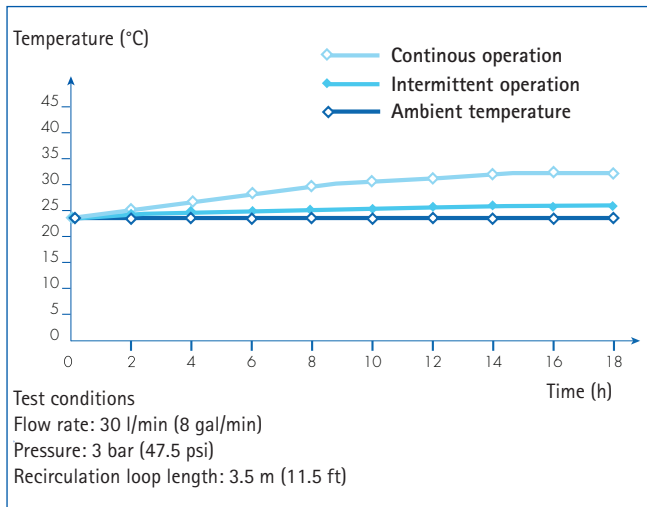


Table 1: Example - Typical distribution pump and distribution loop performance

Distribution loop flow rate	30 liters/min (8 gallons/min)
Distribution loop pressure	3.3 bar (47.5 psi)
Pump pressure	2.0 bar (29 psi)
Minimum loop pressure	
Distribution loop piping	50 m (160 ft)
Total length	25 mm (0.98 in)
External diameter	20.4 mm (0.80 in)
Internal diameter	nominal dn-25 (3/4 in)
Piping material	Thermally welded polypropylene
Flow velocity	1.5 m/s (5 ft/s)

EMD Millipore design experts can help determine the correct pump option to meet specific water flow rate, pressure and distribution requirements.

Advanced Protection Against Airborne Contaminants

Carefully designed reservoirs should incorporate advanced vent filtration and sanitary overflow devices as effective mechanisms to prevent the ingress of possible contaminants from the environment. These include carbon dioxide, particles, micro-organisms and volatile organic compounds that mainly come from the laboratory atmosphere. To protect the purified water from these contaminants, EMD Millipore has developed an advanced vent filter incorporating:

- Activated carbon to adsorb volatile organics
- A soda-lime bed to remove carbon dioxide
- An absolute membrane filter for particle and bacteria retention

The advanced vent filter is recommended to protect high resistivity water such as Elix® product water during storage. A standard vent filter using an absolute membrane is available to protect stored reverse osmosis quality water. The vent filter is easily installed in the built-in holder on the front of the S.D.S. reservoir.

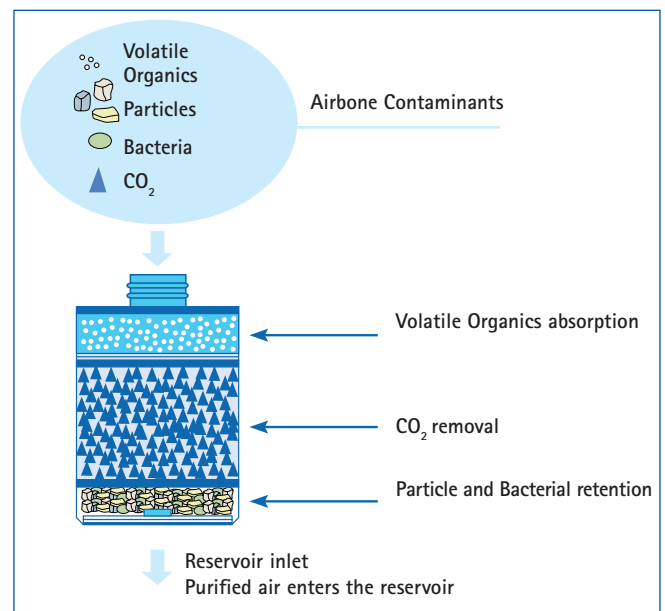


Figure 5: Advanced reservoir vent filter

UV Sanitization A Sound Investment for the Purity of Stored Water

Trace amounts of bacteria, present in purified water, can proliferate and result in the formation of a biofilm on the inner surfaces of the storage reservoir. This biofilm is difficult to remove, even with periodic chemical sanitization and mechanical scrubbing, and is a frequent source of recontamination in stored water. EMD Millipore's Automatic Sanitization Module (ASM) prevents bacterial proliferation and the resulting biofilm formation on the inner surface of S.D.S. reservoirs.

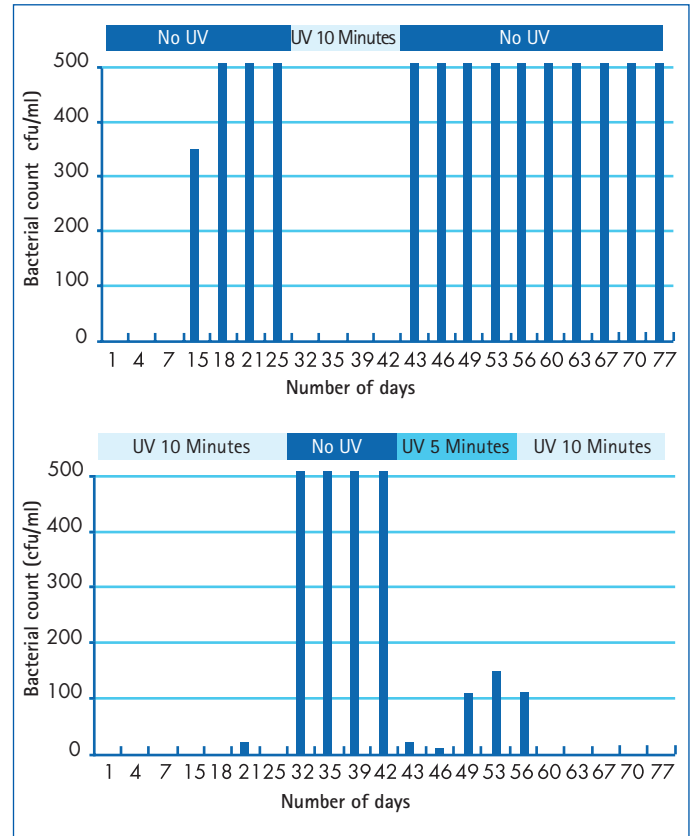
The ASM Module incorporates the following features to guarantee optimum performance:

- Ultraviolet (UV) light at 254 nm, generated by a low pressure mercury vapor lamp, selected for its germicidal effectiveness
- Compact design, allowing easy installation in the top of S.D.S. reservoirs
- Total control directly from EMD Millipore Elix® or RiOs™ systems for maximum effectiveness and ease-of-use, including:
 - pre-programmed, 10-minute daily automatic UV illumination
 - additional programmable and manual UV illumination cycles to meet critical application requirements
 - up to 60 minutes UV exposure per day for total flexibility
 - UV lamp exchange alarm for optimum performance and easy maintenance
 - recovery of all operating parameters in case of a power failure.

Optimized Pure Water Storage and Distribution

The main concern when storing and distributing purified water is the degradation of water quality over time. Strict choices in the storage reservoir material, reservoir design and appropriate protection against airborne contaminants will ensure consistent water quality during storage.

Figure 5: Germicidal effectiveness of the UV lamp



Unique Design Features Ensure Consistent Water Quality

EMD Millipore S.D.S. 200- and 350-liter systems incorporate the most advanced technological developments and innovative features to guarantee consistent purity of stored and distributed water.

1. Polyethylene reservoir ensures minimal release of organics and smooth inner surface prevents biofilm formation.
2. Conical bottom guarantees no dead volume and allows complete cleaning, draining and rinsing.
3. ASM Automatic Sanitization Module UV lamp easily added to minimize bacterial growth during storage.
4. Sanitary overflow prevents the ingress of contaminants from the drain.
5. Choice of vent filters to protect stored water against airborne contamination.
6. Sensor rod float switch for automatic reservoir refill.
7. Built-in pump options can distribute purified water to multiple locations.
8. Inlet and outlet connections and valves are all preplumbed for easy installation.

Figure 6: Direct display of stored water volume and level on Elix® or RiOs™ systems.

The diagram shows a reservoir with a conical bottom. Component 1 is the reservoir body. Component 2 is a float switch at the bottom. Component 3 is a vent filter. Component 4 is a sanitary overflow. Component 5 is a UV lamp. Component 6 is a sensor rod. Component 7 is a pump. Component 8 is an inlet/outlet connection. Arrows indicate the flow of water into and out of the reservoir.

Specifications

S.D.S. Specifications

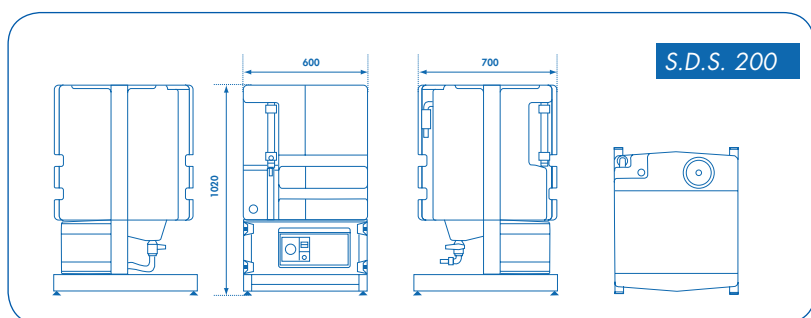
Characteristic	S.D.S. 200	S.D.S. 350
Water Volume	200 Liter (53 gal)	350 Liter (92 gal)
Weight (filled with water)	250 kg (550 lbs)	390 kg (860 lbs)
Dimensions H x W x D	1020 x 600 x 700 mm (40 x 24 x 27.5 in)	1420 x 600 x 700 mm 56 x 24 x 27.5 in)
Floor space required	0.42 m ² (4.5 ft ²)	0.42 m ² (4.5 ft ²)
Pump performance (for systems with standard pump)	30 liters/min at 3 bar pressure (8 gal/min at 45 psi). Pump operation is controlled by Elix [®] or RiOs [™] water systems	

EMD Millipore Application Specialist will optimize pump to meet specific requirements.

ASM Specifications

Total length:	320 mm (12.6 in)
Length of lamp quartz housing:	215 mm (8.5 in)
Length of cable for direct connection to Elix [®] or RiOs [™] system	5 m (16.4 ft)
Install and UV lamp replacement requirement	250 mm (9.8 in) above SDS tank

ASM operation is controlled and powered directly from Elix[®] or RiOs[™] water system.



Electrical Specifications*

- 117 V/60 Hz (10 A Slo-Blo[®] fuse)
- 230 V/50 Hz (5 A Slo-Blo fuse)
- Relay output rating: 3 pole dry contact, 240 VAC max, 50/60 Hz, 2200 VA

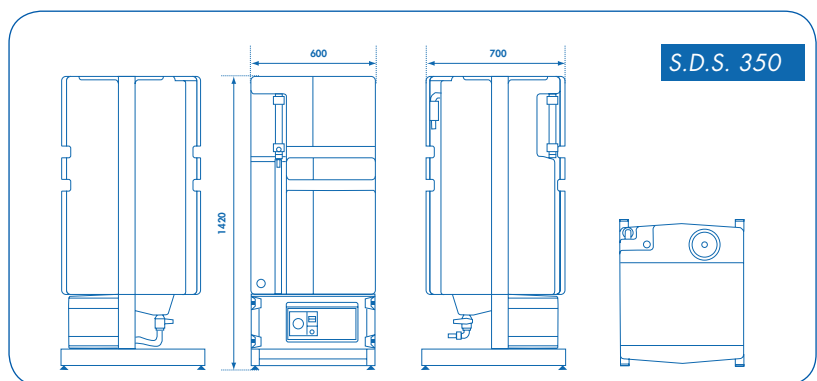
* standard pump version

Materials:

Reservoir	Polyethylene
Frame	Epoxy painted passivated steel
Valves and fittings	Polypropylene
Tubing	Polyethylene
Pump wetted parts	316 SST and tungsten carbide/ carbon and EPDM seals
Pressure gauge	316 SST

Drain Capacity

200 l/h at max height of 200 mm above floor



Level Sensor Specifications

5 m (16.4 ft) cable for direct connection to RiOs[™] or Elix[®] system

Plumbing Connections

Pure Water inlet to reservoir	8 mm female quick connect
Reservoir Drain and main outlet	20 mm hose barb fitting
Reservoir loop return inlet	3/4-in NPT
Vent filter	Standard 12-in code-O O-ring
Overflow connection	20 mm tubing

(2 3/4 in ball valves and 5 m of 20 mm tubing with fittings are included)



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