Synergy®
Water Purification Systems

Ultrapure water at the point of use - with easy and convenient dispense!

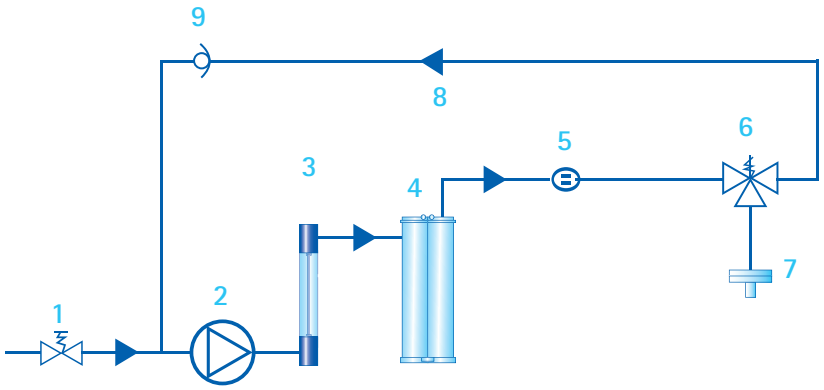
Merck Millipore is a division of MERCK

Ultrapure water at the point of use - with easy and convenient dispense!

Your water purification needs	Our solution: the Synergy® range of water purification systems
Ultrapure water easily accessible wherever you need it in your lab	With the Synergy® range of water purification systems, you benefit from a choice of ultrapure water dispensing possibilities. The innovative, space-saving Remote dispenser offers you water delivery solutions to best fit the way you work, with easy and convenient remote delivery up to two meters away from your water production unit.
Point-of-use system to supply ultrapure water	Synergy® water purification systems produce ultrapure water using feed water from an existing pretreated pure water supply (such as a RiOs™ system).
Compact design for the most efficient use of your lab space	A small footprint makes it easy to install the Synergy® systems wherever you want to — on the bench, bench-integrated or on the wall.
Flow rates adapted to your ultrapure water needs	Systems in the Synergy® range can dispense more than 1.5 liters of ultrapure water per minute.
High quality water to meet the requirements of your most critical applications	Options such as a UV lamp and a range of Application Pak point-of-use polishers are available to fine-tune your ultrapure water.
Easily accessible information on system operation	The user-friendly display provides system status at a glance; the concise *Quick Reference Guide* is a handy guide for daily operation.
Simple, low-level self-maintenance	SynergyPak® purification cartridges enable easy and rapid replacement.

Synergy® Systems Water Purification Pathway

1. Inlet Solenoid Valve
2. Booster Pump
3. UV Lamp 185/254 nm (UV System)
4. SynergyPak® 1, 2 or 3
5. Product Resistivity Cell
6. Point-of-Use (POU) Solenoid Valve
7. Final Filter
8. Recirculation Loop
9. Check valve



Choose the solution that's right for you

Easy installation

Installing the Synergy® system is so easy you can do it yourself. Just connect the system to a pretreated water supply (e.g., from a RiOs™ system), plug it in, and insert the SynergyPak® purification cartridges. Then, if you have chosen the system with a Remote dispenser, follow the simple setup procedure – and your system is ready to use!

Optimized lab space

The Synergy® system's small footprint will allow you to find a space for it anywhere in your laboratory, either on or under the benchtop, or wall-installed. You choose the best location for your Synergy® system.

High ultrapure flow rates to match your requirements

With high flow rates above 1.5 liters per minute, the systems provide ultrapure water on demand in the volumes required to satisfy critical applications. When not in use, your Synergy® system will recirculate water in order to maintain water quality, so that you do not have to wait when sourcing ultrapure water. For your convenience, and to save time, you can also set the system to automatically deliver your selected volume of ultrapure water on demand.

The high quality ultrapure water produced by Synergy® systems is suitable for applications such as production of mobile phase for chromatographic separations; preparation of blanks and standard solutions for spectrophotometry; spectroscopy or other analytical techniques; and preparation of buffers for biochemical and molecular biology experiments.

Fine-tune your water quality

Point-of-use ultrapure water

For laboratories with an existing access to pure water, Synergy® systems provide a solution to point-of-use ultrapure water needs. The high quality ultrapure water produced by Synergy® systems is suitable for applications such as HPLC mobile phase preparation and sample dilution; buffer and cell culture media preparation; preparation of chemical solutions used with titrators, spectrophotometers, and electrophoresis systems.

Organic-sensitive applications

If you work with organic-sensitive applications such as HPLC, LC, GC or TOC analyses, the Synergy® UV system contains a built-in 185/254 nm UV lamp to reduce TOC to less than 5 ppb. Water with low TOC provides important benefits to HPLC users such as higher sensitivity and longer column lifetime. The same UV lamp also destroys bacteria.

Application Pak point-of-use polishers

Merck Millipore's range of Application Pak polishers makes it possible to fine-tune your ultrapure water quality to match your research. Are your applications sensitive to bacteria, particulates, pyrogens, nucleases, endocrine disruptors or Volatile Organic Compounds? If so, just choose the appropriate final polisher from our range of Application Paks to provide optimal water quality for your requirements.
Please see www.millipore.com/labwater for more information.

Stay focused on your work

Versatile remote dispenser

Designed to fit perfectly into your lab environment, the versatile Remote dispenser can be placed up to two meters from your Synergy® water purification unit. Select the free-standing or wall-installed model according to your needs – their ergonomy will make either one a welcome addition to your lab, giving you the freedom to focus on your research, while dispensing ultrapure water exactly where you need it. Alternatively, Synergy® systems are also available with an integrated dispenser for use on the benchtop.

Merck Millipore offers more than water

Just the information you need

The intuitive color graphic display shows key system parameters at a glance, enabling easy water quality and maintenance warning monitoring; the screen rotates for easy viewing wherever the system is located. Additional information on system operation and maintenance is provided by the *Quick Reference Guide* and *User Manual* stored on the water production unit.

User-friendly maintenance

The SynergyPak® purification cartridges integrate all the main purification technologies. The Synergy® system will automatically tell you when it's time to change the SynergyPak®, and "plug-and-use" design makes this easy to do in just a couple of minutes!

Watercare Pact Service portfolio

To optimize the performance and lifetime of your water purification system, Merck Millipore offers a complete portfolio of Service plans ranging from a single annual checkup to a full system cover. For more information, please check with your Merck Millipore applications specialist or visit our website: www.millipore.com/labwater

Specifications

Ultrapure (Type I) Product Water Quality*	Synergy® Systems
Resistivity	18.2 MΩ·cm @ 25 °C
Instant flow rate (with Application Pak final filter)	> 1.5 l/min
TOC (w/o 185/254 nm UV lamp)	< 10 ppb
TOC (with 185/254 nm UV lamp)	< 5 ppb
Particulates (size > 0.22 µm)**	< 1 particulate/ml
Bacteria**	< 0.1 cfu/ml
Endotoxin (pyrogens)***	< 0.001 EU/ml
RNases***	< 0.01 ng/ml
DNases***	< 4 pg/µl

* In regular operating conditions

** With Millipak® Express 20 (0.22 µm) membrane filter
or with BioPak® ultrafiltration cartridge as final polisher

*** Only with BioPak® ultrafiltration cartridge as final polisher

Feed water for use with Synergy® systems should be pretreated Type 2 or Type 3 grade water delivered at 0.3 bar maximum pressure. Recommended sources: RiOs™ system reverse osmosis water, and distilled or DI water.

System Information	
Dimensions (H x W x D)	54 x 29 x 38 cm (21.3 x 11.4 x 15 in)
Net weight (Synergy® system w/o 185/254 nm UV lamp)	6.7 kg (14.8 lb)
Net weight (Synergy® system with 185/254 nm UV lamp)	7.2 kg (15.9 lb)
Operating weight (Synergy® system w/o 185/254 nm UV lamp)	9.7 kg (21.4 lb)
Operating weight (Synergy® system with 185/254 nm UV lamp)	10.2 kg (22.5 lb)
Net weight (Remote dispenser)	2.15 kg (4.8 lb)
Operating weight (Remote dispenser)	2.68 kg (5.91 lb)
Electrical feed voltage	100-250 V +/- 10 %
Electrical feed frequency	50-60 Hz +/- 10 %
Tap (feed) water connection	½" Gaz M
Tap (feed) water pressure	< 0.3 bar

Storage Tanks and Accessories

Storage with a Difference

Guarantee the purity of your stored water

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

Prevent contamination

Water stagnancy can cause bacterial proliferation. Our optimal Automatic Sanitization Module (ASM) provides the ideal solution for the prevention of bacterial growth and biofilm formation on the inner surface of the storage tank. In addition, our advanced vent filter protects pure water from airborne contamination.

Distribute your stored water where it is needed

To provide pure water for use with all of their applications, laboratories need to be able to distribute stored water from their water purification system storage tanks.

- For distribution of **non-pressurized pure water,** a valve is conveniently located on the front of the Merck Millipore storage tanks.
- For convenient **distribution** of **pressurized pure water** from the storage tank, an E-POD® point-of-delivery dispenser can be connected to an Elix® Advantage or Milli-Q® Integral water purification system.
- For **automatic feed** of pure water, distribution valves on the base of the storage tank allow connection to other laboratory equipment such as glassware washing machines. Distribution pumps are also available if needed.

** A complete line of storage tanks is available, ranging in capacity from a few liters to several hundred liters. Your nearest Merck Millipore office will be able to guide you in the choice of the tank best suited to your needs.*

Optimized pure water storage

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

Innovative storage tank design

Merck Millipore 30-, 60-, and 100-liter polyethylene storage tanks incorporate the latest technical developments and advanced features for stored water of consistent purity.

All tanks have a small footprint and are designed for wall-mounting if required. Underbench installation is also possible for some models.

Unique features

- Polyethylene selected for its minimum release of extractables
- Opaque walls block sunlight to prevent algae development
- Smooth inner surface prevents biofilm formation
- Cylindrical shape minimizes surface area in contact with water
- Conical bottom allows complete draining for cleaning and rinsing
- Pure water smoothly fed in at the bottom of the tank prevents absorption of carbon dioxide
- Front valve enables manual dispense of pure water
- Distribution valves permit connection to other laboratory equipment
- Hermetically sealed lid blocks air from entering the tank
- Large top opening allows manual cleaning during sanitization procedure
- Compact space-saving design

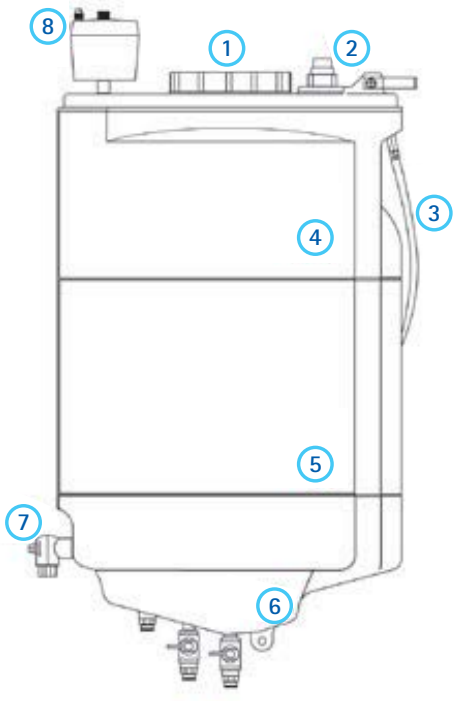
Fail-safe protection

- Sensor rod float switch system for automatic storage tank refill and indication of water level (% full)
- Overflow connected to the drain, in the unlikely event of a water system malfunction
- Direct display of stored water level on water purification system units
- Water sensor

Storage tanks designed for efficiency

Designed for efficiency

1. Hermetically sealed lid
2. Sensor rod float switch
3. Sanitary overflow
4. Blow-molded storage tank
5. Cylindrical shape
6. Conical bottom with distribution valves
7. Front dispensing valve
8. Advanced vent filter



For details of the tests performed during the storage tank development process, please request the publication "R&D Notebook 1: Optimizing the storage of purified water for laboratory applications" (Ref. No.: RD001EN00) from your local Merck Millipore representative.

Storage Tank Accessories

In order to help ensure optimum purity and distribution of your stored water, Merck Millipore offers a range of accessories and connections for your storage tank, including the following items:

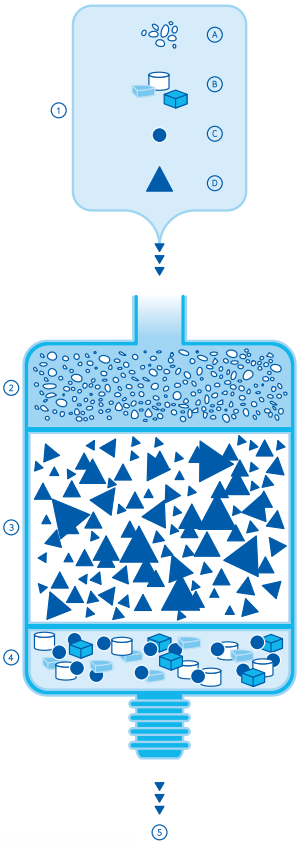
- Advanced Vent Filter
- Automatic Sanitization Module
- Air Gap Device
- E-POD® pure water remote dispenser
- Washer Distribution Kit
- Water Sensor
- Lab Close Kit

Advanced vent filter: important protection against airborne contaminants

Air is contaminated by carbon dioxide, particles, microorganisms, and volatile organic compounds that come mainly from the laboratory atmosphere. To protect pure water from all these contaminants, Merck Millipore has developed an advanced storage tank 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 CO_2
- 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. To protect RiOs™ reverse osmosis-quality water, a Durapore® 0.45 µm hydrophobic membrane vent filter is also available.



Advanced storage tank vent filter

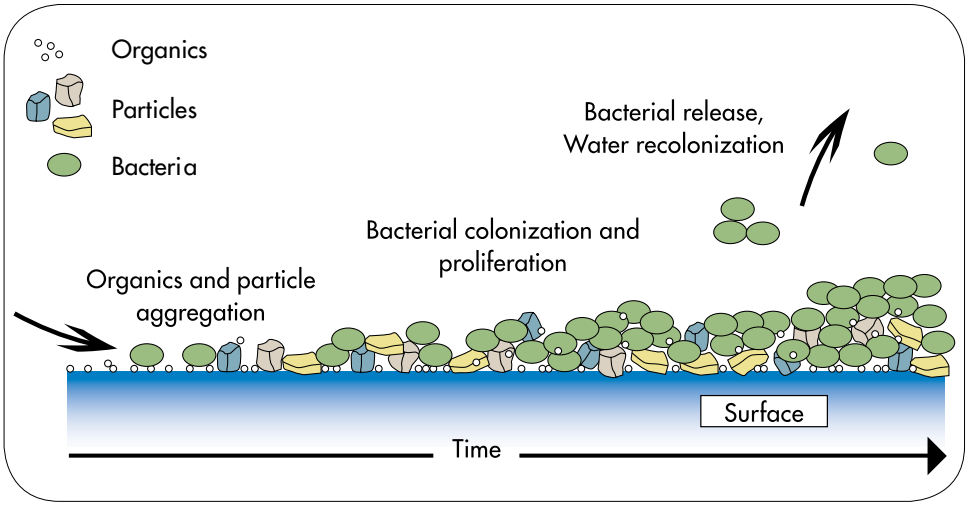
1. Airborne Contaminants
   - A. Volatile Organics
   - B. Particles
   - C. Bacteria
   - D. CO_2
2. Volatile Organics absorption
3. CO_2 removal
4. Particle and Bacterial retention
5. Storage tank inlet
   Purified air enters the storage tank

Complete Merck Millipore water purification chain with the ASM and water sensor

Automatic Sanitization Module (ASM): say "No!" to bacterial proliferation

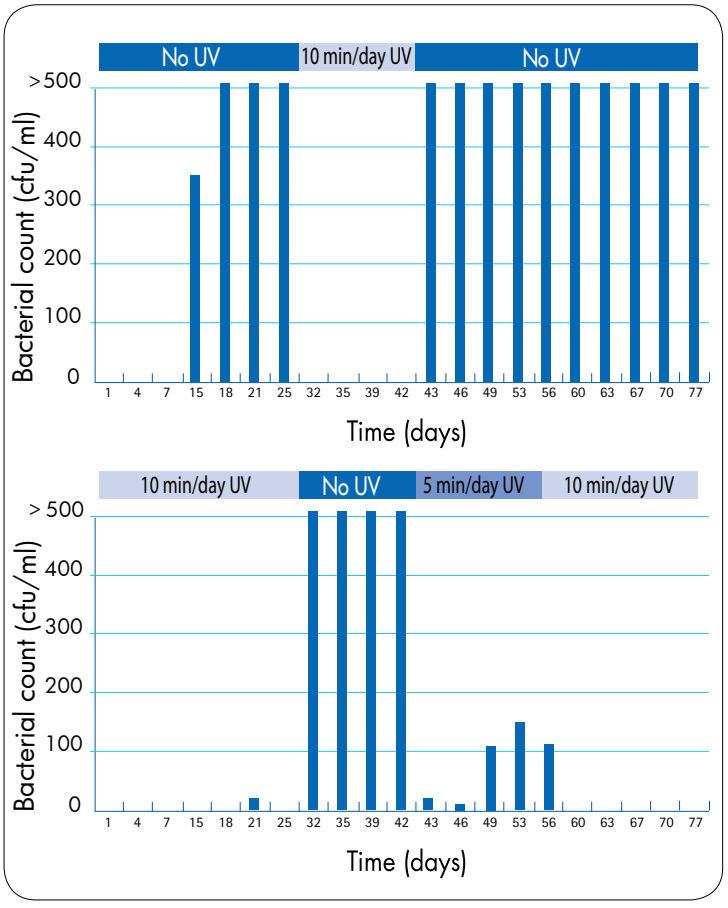
Maintaining high purity water with low bacteria levels during storage is critical. If left to proliferate, trace levels of microorganisms present in pure water compromise water purity. This bacterial contamination is responsible for the formation of a biofilm – an accumulation of organic material made up of active and dead organisms, on the inner walls of the storage tank.

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.



Biofilm formation over time

Merck Millipore's ASM is designed to prevent the growth and proliferation of bacteria and the resulting biofilm on the inner surface of Merck Millipore PE storage tanks. The ASM makes use of the germicidal properties of an ultraviolet (UV) light at 254 nm, which is fitted inside the tank.



Germicidal effectiveness of the UV lamp

The ASM provides full flexibility for guaranteed results

- 254 nm UV lamp; selected for its germicidal effectiveness
- Pre-programmed 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 45 min /day of UV exposure for total flexibility
- Program daily time settings, UV cycles, and UV lamp operation displayed on the Millitrack® e-Solution dashboard
- UV lamp exchange alarm for easy maintenance
- Compact design allowing installation on top of the storage tank

10 minutes of daily UV exposure is sufficient

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

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

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

Air gap device for protection against bacteriological contamination

Water purification systems and storage tanks sometimes require a connection to the drain.

Drains are typically dirty environments contaminated by microorganisms, and in particular, bacteria. Therefore, when the outlet of the water system reject tubing is pushed into the drain, there is a risk that bacteria could contaminate the inside of the reject tubing, and then progressively move to the water system.

One way to prevent this from occurring is to install an air gap device on the reject tubing. This allows the reject water flow to move through the tubing without touching the inside of the contaminated drain environment. Installing an air gap device is an easy and safe way to prevent the development of bacteria above the air gap level.

Air Gap Device

E-POD® pure water remote dispenser: pure water where you need it

The E-POD® Elix® water point-of-delivery unit can be connected to an Elix® Advantage pure water system or Milli-Q® Integral pure and ultrapure water system to dispense pure water wherever it is needed in the lab.

Advantages of the E-POD® remote dispenser include:

- Improved bacterial water quality (less than 0.1 cfu/mL, with final filter)
- Versatility enabling use for multiple applications or users when a Millipak® or Biopak® polisher is fitted to the dispenser outlet
- Volumetric dispensing to save time
- Ergonomic design and ease of use
- Flexibility, with installation of up to three E-POD® units per system
- Information at a glance thanks to the color backlit screen on the dispenser base
- Space-saving small footprint

E-POD® pure water remote dispenser

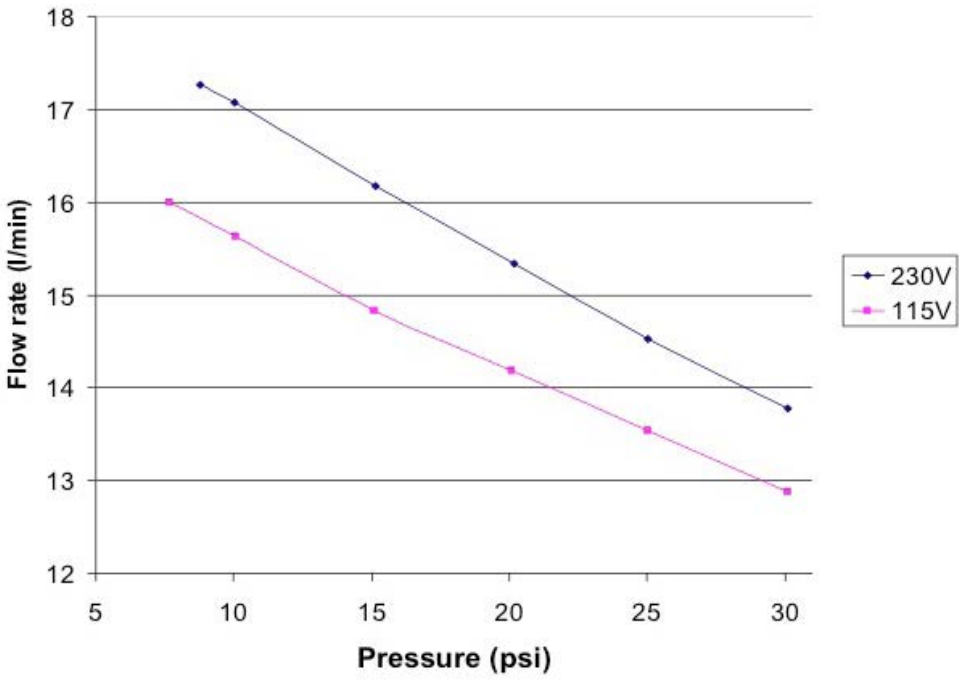
Distribution pumps to meet increased demands

Washer Distribution Kit

A key use of pure water is as feed to laboratory appliances such as glassware washers, autoclaves, sterilizers and weathering devices.

The Merck Millipore Washer Distribution Kit provides cost-effective and convenient distribution of pure water to common laboratory appliances, with flow rates between 12.5 – 13.5 L/min (at 2 bar or 30 psi, depending on voltage).

Installation of the small-footprint kit is fast, easy, and universal, with bench, underbench, or wall-mounted options. Users profit from a silent, automatic supply of pure water when required.



The graph shows characteristics of Merck Millipore distribution pumps. Pumps provide a long service lifetime and quiet operation.

Washer Distribution Kit

Water sensor for control over feed water supply

If there is water on the floor, the water sensor enables shutdown of the feed water supply in order to prevent a lab flood.

Lab Close Kit keeps your system in top condition when you're away

When your facility is closed for an extended time – such as vacation periods – the Lab Close Kit will avoid water purification system standstill during these long periods. The Lab Close Kit intelligently optimizes the consumption of water and electricity by your system, preventing the negative effects of nonuse, such as bacteria buildup. Your water purification system remains in top condition, ready for immediate use upon your return.

Specifications & Ordering Information

Specifications for Polyethylene Storage Tanks

There are several different storage tank sizes available in this range:

30-liter Storage Tank*

Diameter	380 mm (14.82 in.)
Height	600 mm (23.4 in.)
Maximum Usable Capacity	25 L
Weight (full)	30 kg (66.14 lb)

60-liter Storage Tank

Diameter	380 mm (14.82 in.)
Height	840 mm (32.76 in.)
Maximum Usable Capacity	54 L
Weight (full)	59 kg (130.07 lb)

100-liter Storage Tank*

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)

* For 30-liter and 100-liter storage tanks, underbench models are also available.

Ordering Information

Description	Catalogue No.
Polyethylene Storage Tanks	
30-liter PE tank	TANKPE030
30-liter PE underbench tank	TANKBI030
60-liter PE tank	TANKPE060
100-liter PE tank	TANKPE100
100-liter PE underbench tank	ZBITANK01

Accessories

Description	Catalogue No.
Advanced Vent Filter	
Advanced vent filter (for Elix® water purification systems)	TANKMPK01
Standard vent filter (for RiOs™ water purification systems)	TANKMPK02
Automatic Sanitization Module	
Milli-Q® Integral; Milli-Q® Direct, Elix® Advantage, and Elix® Reference water purification systems	TANKASMIN
ASM for RiOs™ / Elix® / AFS® Essential water purification systems	TANKASMES
Air Gap Device	
Air Gap Device	AIRGAP001
E-POD® Pure Water Remote Dispenser	
E-POD® pure water dispenser	ZRXSP0D01
Washer Distribution Kit	
Washer Distribution Kit (Left) 230 V	ZWDK5L100
Washer Distribution Kit (Left) 115 V	ZWDK6L100
Washer Distribution Kit (Right) 230 V	ZWDK5R100
Washer Distribution Kit (Right) 115 V	ZWDK6R100
Water Sensor	
Connection from the system	ZFWATDET4
Connection from the tap water source	ZFWATDET1 (120 V) or ZFWATDET2 (230 V)
Water sensor with cable	TANKLK002
Lab Close Kit	
Milli-Q® Integral; Elix® Advantage; Elix® Reference; and Milli-Q® Direct water purification systems	LABCL0SE1
RiOs™ / Elix® / AFS® Essential water purification systems	Included, setting to be activated

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