

Milli-Q® Direct Water Purification System

Pure & ultrapure water directly from tap water



Pure & ultrapure water from a single water system

Scientists' needs:

Scientists need a system that can deliver pure and ultrapure water directly from tap water at the right price:

- meeting increasing quality standards
- providing convenience
- optimizing lab space
- allowing low running costs

The Milli-Q® Direct answer:

The Milli-Q® Direct is designed as a single water system which produces pure and ultrapure water directly from tap water. The system:

- exceeds the requirements of the most demanding norms
- provides manual and volumetric water dispense at low and high flow rate
- has a low footprint: wall-or bench-integrated installation
- allows optimized global costs

Optimum water production

Pure water

Tap water is first purified to pure (Type 3) water by reverse osmosis (RO) using techniques designed and optimized by Merck Millipore:

- Progard® pretreatment cartridge validated to extend the lifetime of the RO cartridge.
- Reject recirculation loop that recycles reject water treated by the Progard® to minimize tap water usage (recovery up to 66 %)* and extend Progard® lifetime while avoiding fouling or scaling issues that might shorten the RO cartridge lifetime.
- Unique system adaptation to feed water temperature in order to avoid flow rate decrease during the wintertime when tap water is colder.
- Unique safety device ensuring that only low ionic permeate water will be sent to the tank in order to warrant adequate pure water quality and to increase the lifetime of the ion-exchange cartridge used to produce ultrapure water.
- Complete process monitoring system that systematically checks water temperature, pressure, conductivity and RO rejection using calibrated meters at different steps.

Ultrapure water

- Water is purified in a first step using unique Jetpore® ion-exchange resin, synthetic activated carbon and UV lamp to reach a resistivity of 18.2 M Ω .cm at 25° and a TOC value below 5 ppb; both values are monitored by advanced analytical techniques.
- This water is sent through a small recirculation loop to the Application-Pak, where a final purification step, critical for specific expriments, removes contaminants just before water leaves the system.

*depending on feed water quality

The pure water produced by reverse osmosis is stored in a tank designed to minimize risks of contamination during water storage. Merck Millipore's tank level sensor will allow the system to automatically start or stop producing water when you want to and will accurately display the tank's water level on the system's screen. Safety devices prevent overflow or the system from running dry.

From the reservoir, water can be sourced though a front valve, sent by a delivery pump to feed instruments such as a glassware washing machine, or further processed by the Milli- Q^{\otimes} Direct to produce ultrapure (Type1) water.



Convenience in water delivery



Easily prepare solutions with the low flow function to precisely adjust the meniscus in volumetric flasks.



The 75 cm long tubing reaches the sink for easy glassware washing at mid or high flow (up to 2 l per mn).

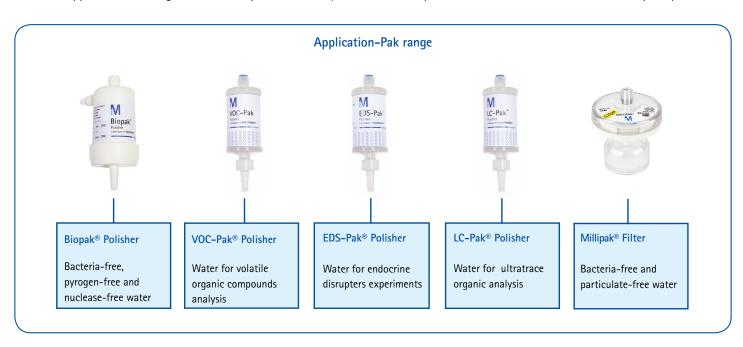


Save time with the volumetric function automatically delivering the water volume you need, and the dispensing arm designed to fit the height and shape of all laboratory glassware.

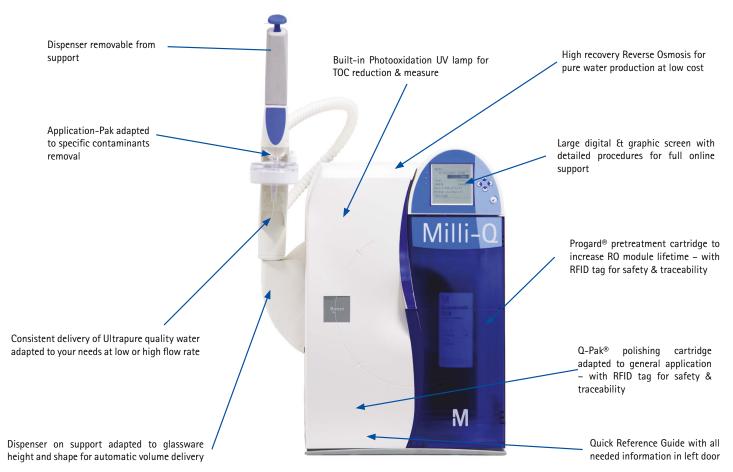


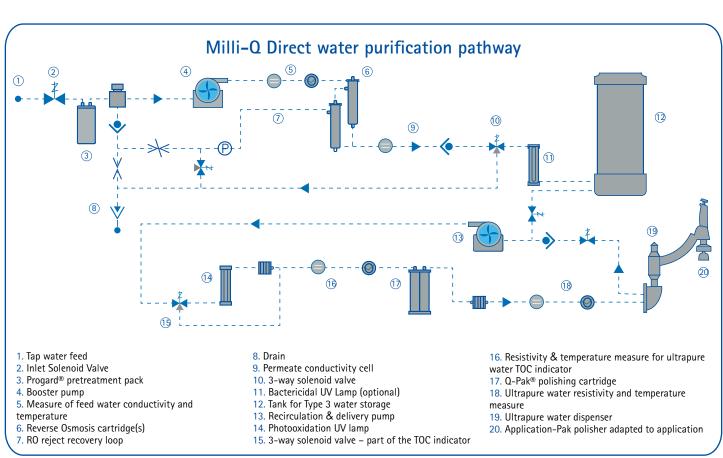
Deliver water hands-free using the footswitch option for more convenience.

Select an Application-Pak to get the best adapted media for your research: Biopak®, VOC-Pak®, EDS-Pak®, LC-Pak®, Millipak® polishers.



Milli-Q® Direct System at a glance





Easy access to information



- Simplified and detailed information in (local language).
- Alerts & alarms (which can be enhanced by a buzzer) are visible on the system's main screen, with complete information on actions required accessible at the touch of a finger.
- Sensors regularly monitor the operation of the system to ensure it operates within specifications. For instance, if ionic contamination of feed water exceeds specifications, causing high conductivity, the built-in Feed Water Conductivity Meter will trigger an alarm to alert you.



 Clear graphics help you perform specific tasks such as maintenance. From the same screen, you can even print reports on the system's water quality and history.



- Critical information such as set points or units is accessible only to the designated responsible user and is protected by a login and a password.
- Automatically stop ultrapure water dispense after a fixed time period set by the user, in order to avoid water loss or lab flooding.

A Quick Reference Guide located in the door of the Milli-Q® Direct water system provides all the information required to understand the operation and maintenance of the system.

The system comes with a complete and detailed user manual in 8 languages on CD-ROM. A printed manual contains essential information in (local language).



Easy and reduced maintenance

Maintenance frequency is minimal, and the procedures are simplified.



Progard® Pack replacement



QPAK® polishing cartridge replacement



Millipak® Express 40 replacement

- Progard® pretreatment pack or the QPAK® polishing cartridge replacement takes less than 5 minutes.
- Quick and easy traceability thanks to RFID tag which automatically registers the catalog and other new consumables in the system's memory.
- The system will alert you to replace consumables or schedule service visits at least 15 days before maintenance is actually required.

Service

Merck Millipore provides a comprehensive range of service programs performed by certified Merck Millipore field service support engineers to thoroughly maintain and qualify your Milli-Q® system for full compliance with your industry's regulatory standards.

The service program portfolio covers all maintenance requirements such as installation, customized user training, scientific and technical support, troubleshooting, preventive maintenance visits, and all validation requirements using ad hoc calibrated equipment, procedures, workbooks and suitability tests within a GXPs environment.

Safety

The Milli-Q® Direct system is tested by an independent and accredited company for compliance with the CE directives related to safety and electromagnetic compatibility.

A certicate is delivered with the system and the report can be consulted on request at the manufacturing site.

The Milli- Q^{\otimes} Direct system is built using components and practices recommended by UL and has been cUL marked. The registration can be verified on the UL web site (http://www.ul.com).

Certification

The Milli-Q® Direct system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Merck Millipore Standard Operating Procedures, and a Certificate of Calibration for the temperature and resistivity meters built in the system. The Milli-Q® Direct consumables are automatically delivered with a Certificate of Quality.

Merck Millipore's manufacturing site is ISO® 9001 v.2000 and ISO® 140001 certified.

Milli-Q® Direct specifications

Feed Water Specifications

Parameter	Value & Unit
Feed water quality	Potable Tap Water Feed
Feed Water Conductivity	< 2000 μS/cm at 25°C
Feed Water TOC	< 2000 ppb
Feed Water Pressure	1 – 6 bar
Feed Water Temperature	5 – 35 °C
Feed Water Chlorine	< 3 ppm(*)
Feed Water Fouling Index	< 12
Feed water pH	4 to 10 pH units
Feed Water Connection	1/2 in Gaz M

^(*) Feed Water Chlorine < 1ppm with Progard® T3 and < 3ppm with Progard®

Type 1 Product Water Quality

Value & Unit
18.2 MΩ.cm at 25 °C
≤ 5 ppb (µg/l)
< 0.01 CFU/mL
< 0.001 EU/ml (pyrogen-free)
< 1 pg/mL (RNase-free)
< 5 pg/mL (DNase-free)

 $^{^{1}}$ Resistivity can be displayed temperature-compensated at 25 $^{\circ}\text{C}$ or nontemperature-compensated as required by USP

Type 1 Water Delivery

Parameter	Value & Unit
Manual dispense flow rate	Adjustable between 50 and 2000 ml/min
Automatic dispense volume	100 ml, then 250 ml to 5 l by 250 ml increments; 5 l to 60 l by 1 l increments
Volumetric dispense accuracy	3% for volumes between 250 ml and 60 l
Volumetric dispense dispersion	CV < 3% for volumes between 250 ml and 60 l

Value & Unit
97 to 98% with new RO cartridge
> 99% for MW > 200 Dalton
> 99%

Type 3 Water production and delivery

Parameter	Value & Unit
Production Flow Rate	8 l/hour (Milli- Q^{\otimes} Direct 8) 16 l/hour (Milli- Q^{\otimes} Direct 16)
Delivery Flow rate	From tap: up to 2.5 I/min From optional pump: up to 15 I/min at 1 bar

Milli-Q® Direct System Dimensions

Parameter	Value & Unit
System footprint	1606 cm ² (249 in ²)
System height • Cabinet (base) • Dispenser arm (top)	497 mm (19.56 in) 713 mm (28.07 in)
System width Cabinet (base) Dispenser arm (top)	332 mm (13.07 in) 413 mm (16.25 in)
System depth • Cabinet (base) • Dispenser arm (top)	484 mm (19.05 in) 581 mm (22.87 in)
System weight (packaged) 8/16	24/25 kg (52.91/55.11 lb)
System weight (empty) 8/16	20/21 kg (44.09/46.29 lb)
System weight (with water) 8/16	27/28 kg (59.52/61.73 lb)
Dispenser delivery loop length	750 mm (29.52 in)
Electrical power supply cable length	290 cm (114.1 in)
Electrical power supply voltage	100 – 230 V ± 10 %
Electrical power supply frequency	50 - 60 Hz ± 10 %
Feed water connection	1/2 in. Gaz F
Data connection	Ethernet (RJ45)

Q-POD ® Accessory Dimensions

Parameter	Value & Unit
Q-POD® height	579 mm (23.50 in)
Q-POD® diameter	230 mm (9.05 in)
Dispenser delivery loop length	800 mm (31.49 in)
Q-POD® weight (packaged)	7.2 kg (15.87 lb)
Q-POD® weight (empty)	5 kg (11.02 lb)
Q-POD® weight (with water)	5.5 kg (12.12 lb)
Loop & cable to system length	290 cm (114.1 in)
Data connection Parallel Port	(25-pinD-Sub) for print-out

A report on conformity of Milli-Q® Direct water quality with Type 1 water quality as described by ASTM®, ISO® 3696 and CLSI® norms and to Purified Water as described in USP and EP is available upon request.

^(*) Feed Water SDI < 5 with Progard® T3 and < 12 with Progard® T3 + Prepak 1

² TOC specs – Test Conditions: Milli-Q® Direct System equipped with Progard® T3 pretreatment pack and QPAK® TEX polishing cartridge and with feed (tap) water quality within specifications. Product water quality may vary due to local feed water conditions.

³ Results with Millipak® Filter

⁴ Results with Biopak® final polisher in place

Accessories

Customize your Milli-Q® Direct system to meet your specific needs.

Reservoirs

Select from the range of Merck Millipore tanks from 30 l to 350 I designed for optimum pure water storage.

Wall Mounting Bracket

Save space by installing the Milli-Q® Direct on the wall or under the bench.

Q-POD® Dispenser: Ultrapure water delivery at your fingertips

Save your bench space by removing the arm and dispenser from the Milli-Q® Direct system and mounting it on the Q-POD® support.

Q-POD® dispenser key features:

- Variable water flow (slow flow to 2 I/min) controlled by
- Volumetric water delivery controlled from the Q-POD® base.
- Designed to accommodate all sizes of glassware 250 ml cylinder, 5 I flask or even a 30 I carboy.
- specifications and all critical information you need (resistivity, TOC level, alerts, alarms, etc.).





Protectors:

- Water Sensor placed on the floor, this sensor stops water feed to the system if there is water on the floor.
- Tank Level Sensor transfers tank level information to the system to start & stop pure water production at levels selected by the user. A safety level prevents air from entering the ultrapure water part when the tank is empty.
- Silicone Cover to protect your Q-POD® from harsh chemicals, such as strong acid & bases, aggressive solvents or etchants.
- UV lamp 254 nm: installed upstream from the inlet to the tank, this optional UV lamp allows reduction of the level of bacteria in the permeate water by a factor of 1000.

Footswitch

Connect the footswitch to the base of the Q-POD® dispenser or directly to the Milli-Q® system for hands-free water delivery: press once to start and once to stop.

For more information, please visit our website: www.merckmillipore.com/labwater

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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

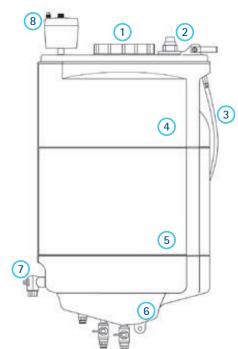
Fail-safe protection

- 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
- Sensor rod float switch
- 3. Sanitary overflow
- 4. Blow-molded storage tank
- Cylindrical shape
- 6. Conical bottom with distribution valves
- 7. Front dispensing valve
- 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:

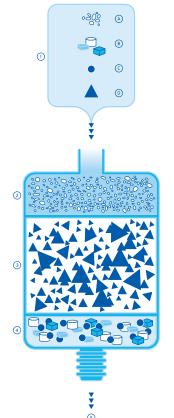
- Advanced Vent Filter
- Automatic Sanitization Module
- Air Gap Device
- E-POD® pure water remote dispenser
- Washer Distribution Kit
- Water Sensor
- Lab Close Kit

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 CO₃
- 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

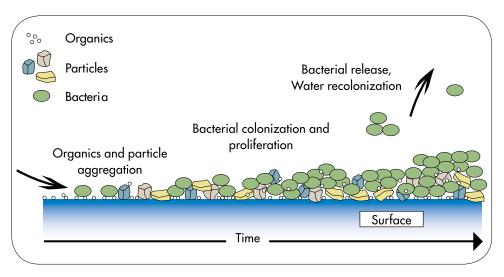
- 1. Airborne Contaminants
 - A. Volatile Organics
 - B. Particles
 - C. Bacteria
 - D. CO₂
- 2. Volatile Organics absorption
- 3. CO₂ removal
- 4. Particle and Bacterial retention
- 5. Storage tank inlet Purified air enters the storage tank



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

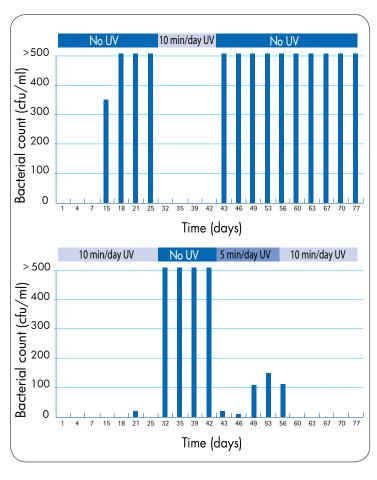
Maintaining high purity water with low bacteria levels during storage is critical. If left to proliferate, trace levels of microorganisms present in pure water compromise water purity. This bacterial contamination is responsible for the formation of a biofilm — an accumulation of organic material made 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.



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



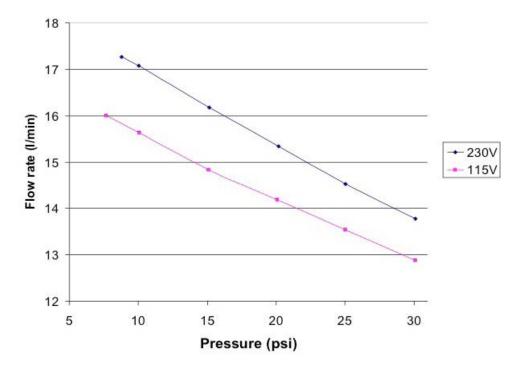
Distribution pumps to meet increased demands

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

Description

Catalogue No.

Accessories

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- $Q^{\text{@}}$ Integral; Elix[®] Advantage; Elix[®] Reference; and Milli- $Q^{\text{@}}$ Direct water purification systems

LABCLOSE1

RiOs[™] / Elix[®] / AFS[®] Essential water purification systems

Included, setting to be activated



Pricing on any accessories shown can be found by keying the part number into the search box on our website.

The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

www.wolflabs.co.uk

Tel: 01759 301142

Fax: 01759 301143

sales@wolflabs.co.uk

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