

Millipore water purification system



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Laboratory grade water definitions

- **Type 1 (ultrapure water):** It is required for critical laboratory applications such as blanks and sample dilution in GC, HPLC, ICP-MS etc.; preparation of buffers and culture media for mammalian cell culture; production of reagents for molecular biology applications (DNA sequencing, PCR); and preparation of solutions for electrophoresis and blotting.
 - Requires use of 0.2 μm membrane filter
- **Type 2 (pure water) :** It is used in general laboratory applications such as buffers, pH solutions and microbiological culture media preparation; as feed to Type 1 water systems, cell culture incubators; and for preparation of reagents for chemical analysis or synthesis.
 - Prepared by distillation or deionization
- **Type 3 (primary grade water) :** It is the lowest laboratory water grade, recommended for glassware rinsing, water baths and filling autoclaves, or to feed Type 1 lab water systems.
 - Requires the use of 0.45 μm membrane filter.

Water specifications based on the different lab water grades

Contaminant	Parameter and unit	Type 3	Type 2	Type 1
Ions	Resistivity (MΩ•cm @ 25°C)	>0.05	>1.0	>18.0
Organics	TOC (ppb)	<200	<50	<10
Particulates	Particulates > 0.2 µm (units/mL)	NA	NA	<1
Bacteria	Bacteria (cfu/mL)	<1000	<100	<1
Pyrogens	(EU/mL)	NA	NA	<0.03

Reference standards: ASTM and ISO 3696

Milli-Q Water (type 1) quality

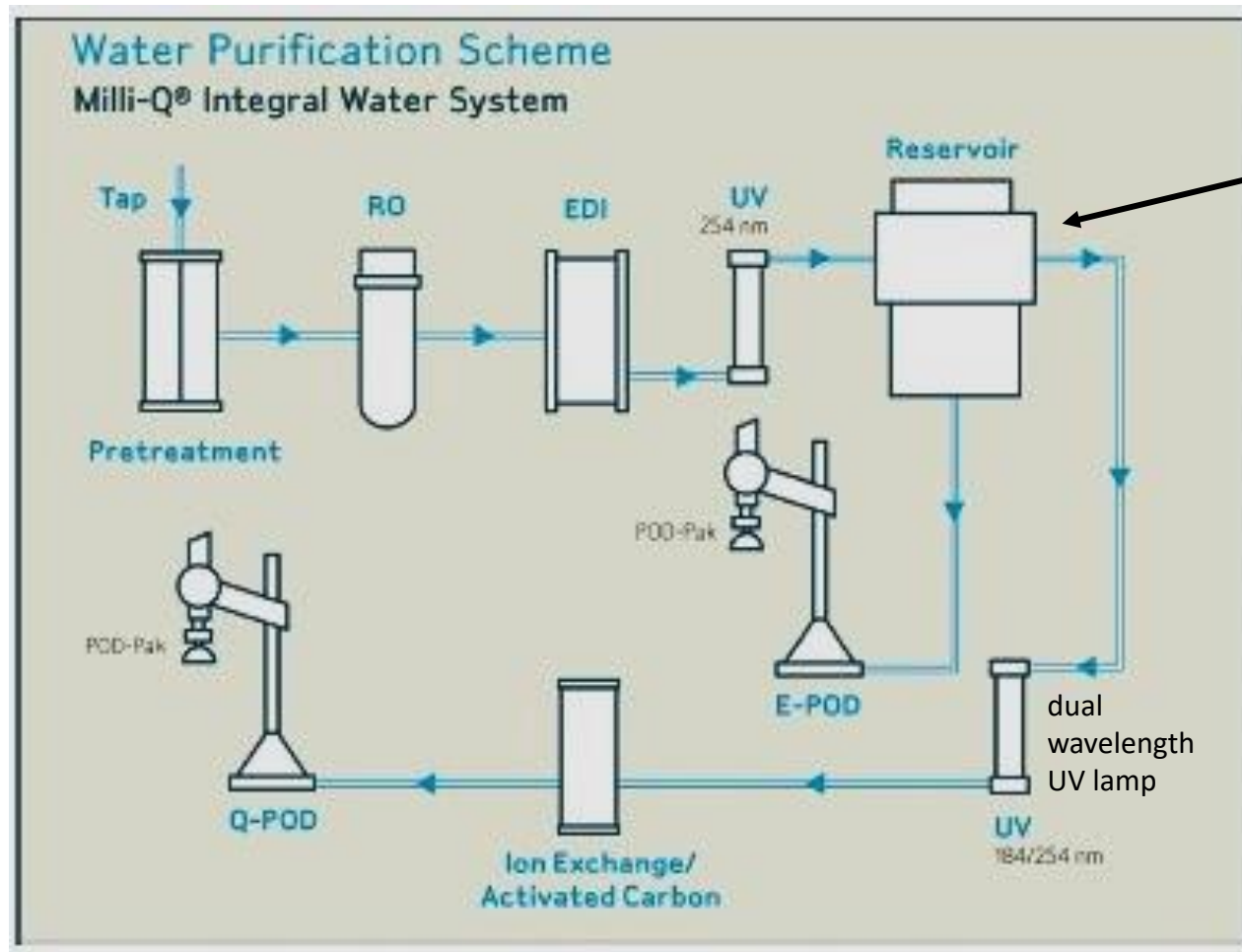
Parameter	Specification
Resistivity	18.2
TOC	< 5
Particulates > 0.22 µm**	< 1
Bacteria**	< 1
Pyrogens*	< 0.001
RNases*	< 0.01
DNases*	< 4
Flow Rate**	0.05 – 2

(*) With BioPak Final Filter

(**) With Millipak or BioPak Final Filter

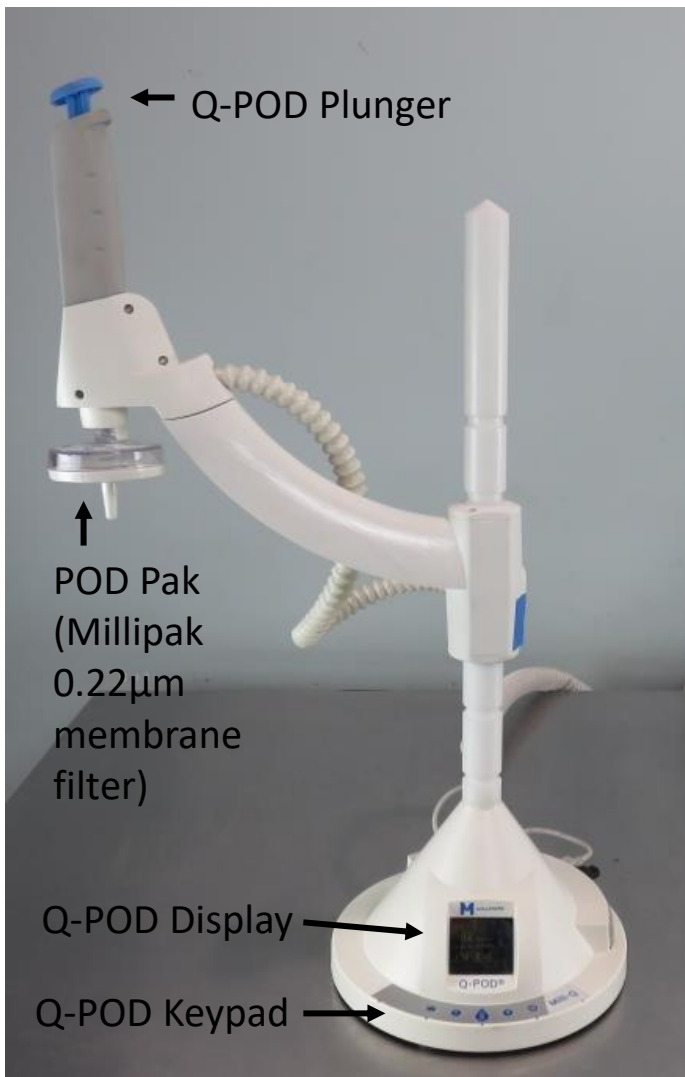


The water flow through a Milli-Q System



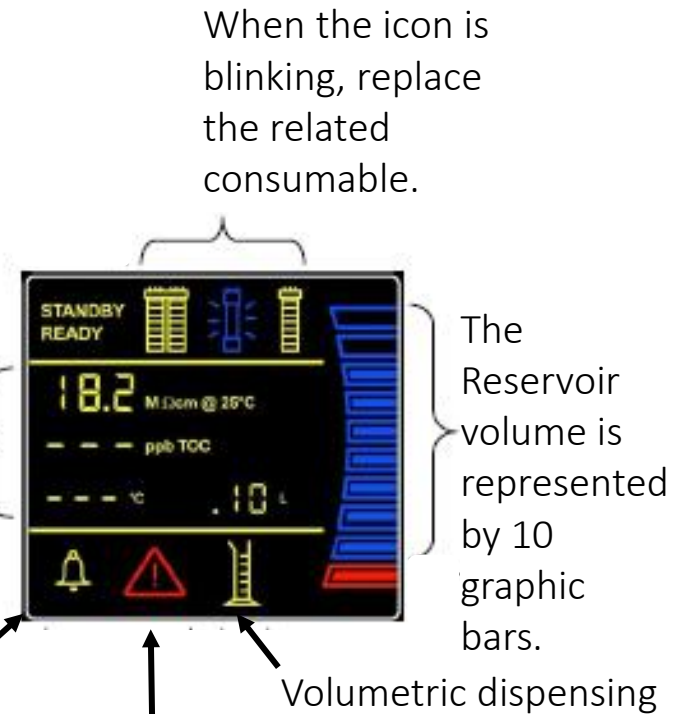
Milli-Q® Integral pure water (Type 2)

- Resistivity at 25 °C: 10-15 MΩ•cm
- TOC:< 30 ppb



- Resistivity ($M\Omega \cdot cm$ or $\mu S/cm$)
- TOC (ppb)
- Temperature ($^{\circ}C$)
- Volumetric dispensing (L)

If blinking,
MAINTENANCE needed.
Water quality is still
adequate.



If blinking,
IMMEDIATE ACTION
needed. Water
quality out of
specification or
hardware problem.



Thank you!