ROTEK Australia

Puris EXPE-CB Combination RO-Polishers

Features

- Produces ASTM Type I and III water from one system
- Large LCD display
- Easy to use and simple maintenance
- Reliable and consistent water quality
- ISO9001, ISO14001 and certified CE and NEP

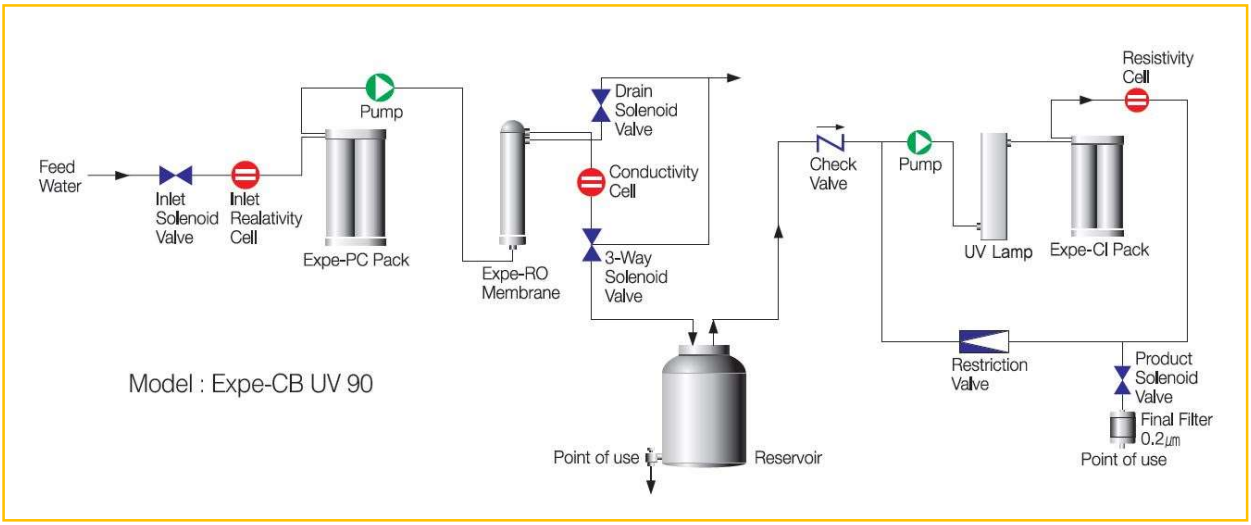
Specifications

Item	*Model EXPE-CB Ele 10*	*Model EXPE-CB Ele 20*	*Model EXPE-CB UV 90*	*Model EXPE-CB UF 90*	*Model EXPE-CB VF 90*
Flow Rate (up to)					
RO (l/hr) UP (l/hr)	10/2.0	20/2.0	10/2.0	10/2.0	10/2.0
Product Quality					
Conductivity (RO), µs/cm @25°C	1-25	1-25	1-25	1-25	1-25
Resistivity (UP), MΩ cm @25°C	18.2	18.2	18.2	18.2	18.2
TOC, ppb (µg/l)	<10	<10	<5	<10	<5
Particles (0.2µm), ea/ml	<1	<1	<1	<1	<1
Bacteria cfu/ml	<1	<1	<1	<1	<1
Endotoxin Eu/ml	-	-	-	<0.001(*)	<0.001(*)
Rnase ng/ml	-	-	-	<0.01(*)	<0.01(*)
Dnase pg/ml	-	-	-	<4(*)	<4(*)
Inorganics ppb	<0.05	<0.05	<0.05	<0.05	<0.05
Display	Wide Graphic LCD (128 x 64 digits)				
System Monitoring & Monitoring	• RO Membrane cleaning timer			• Automatic flush for low quality	
	• Volumetric time dispensing setting			• Filter pack exchange message	
	• Protection for high temp. & low feedwater quality				
Utilities					
Electrical Power	120/240V, 50/60Hz, 1.6A 1 Ψ				
Dimensions	W330 x D490 x H510 (mm)				
Operating Weight	25-29kg				
Standard Accessories					
	EXPE-PC Pack			EXPE RO Membranes	
	EXPE-CI Pack			Cable and Tubing Kit	
	Final Filter, 0.2µm	Final Filter, 0.2µm UV Lamp (85/254nm)		UF Filter	UF Filter UV Lamp (185/254nm)
Optional Accessories	35l Reservoir with Level Sensor				

(*) with Dio-UF Filter as final polisher

Puris EXPE-CB Combination RO-Polishers

Flow Diagram



35 Litre Storage Tank

The recommended storage tank for smaller laboratories features:

- 35 litre capacity with overflow protection and automatic level control feedback
- Sterile vent filter to prevent microbial re-contamination
- A gas trap to prevent adsorption of CO_2 in the stored water

Water may be drawn directly from the tank using the dispensing tap and options are available for direct connection to equipment.

Optional dual-place cartridge filtration systems are available and are recommended for poor quality feedwaters with high suspended solids content or chlorination >0.5ppm as FAC.

Water Quality Standards

When selecting a water purification system, first determine the water quality required in terms of performance data. Despite decades of marketing by some manufacturers, generic product branding is not a defacto measure of treated water quality. After specifying water quality, the volume of treated water required on an hourly or daily basis is determined. Once these two major factors are confirmed, then the best system for your application may easily be selected. In practice, chemically pure water does not exist. In the context of water, purity has meaning only when related to the final use of that water. Water may be "pure" enough to drink but unsuitable for laboratory use.

To resolve the use of this term, several professional organisations have drawn up water quality standards graded according to the intended use for the water. These specifications enable end users to define their needs more precisely and evaluate the myriad of purification technologies available without reliance on manufacturer's bias or non-specific brand name classification systems. Typical of the currently recognised standards are those of the American Society for Testing and Materials (ASTM), the College of American Pathologists (CAP), the American Chemical Society (ACS), the National Committee for Clinical Laboratory Standards (NCCLS) and the British Pharmacopoeia (BP).

Classification of laboratory water falls into four broad groups:

Type 1 Reagent Grade Water (10-18 mΩ/cm resistivity @ 25°C) for trace metal analysis and other critical procedures that require the absence of organic and inorganic impurities, suspended solids and micro-organisms. A case is also present for life science applications requiring pyrogen, endotoxin or bacteria-free water. These are included in the Type 1 category with specific reference to micro-organism content. Type A water has <1 cfu/ml, Type B has <10 cfu/ml and Type C has <100 cfu/ml.

Type 11 Analytical Grade Water (at least 1.0-2.0 mΩ/cm resistivity @ 25°C) for general laboratory use and some analytical applications.

Type 111 General Laboratory Grade Water *(*0.2-0.5 mΩ/cm resistivity @ 25°C), suitable for some routine non-critical qualitative analysis, glassware rinsing and as pre-treatment stage prior to reagent grade polishing

Organic-Free Water is a special class of water purity first described in the early 1980's and not yet encompassed by most recognised standards. Current analytical instrumentation such as HPLC will resolve ppb levels for some organic compounds. Detection limits for commercially available TOC analysers now routinely reach below 5 ppb. Aqueous mobile phases used for this type of work require organic purity beyond current Type 1 Reagent Grade standards. These applications represent a great challenge for any high-grade polishing system.

Note that the predominant measure used in these classification systems and throughout most discussions of "purity" refer to the resistivity or conductivity of the water under question. Since minerals form ions in solution, they increase the electrical conductivity of that solution. Water that is low in dissolved ions has a higher resistance to conducting an electrical current. The calculated theoretical resistivity of chemically pure water is 18.3 MΩ/cm @ 25°C and most high-quality polishers produce ≥18.0 MΩ/cm @ 25°C.

Water Quality Standards

The historical focus on resistivity as a measure of water quality presupposes that dissolved minerals are the main concern in laboratory environments. While this is often true, it should be noted that resistivity is the more easily measured characteristic of water. Resistivity measurements are not necessarily the most reliable in determining suitability or otherwise of a purification system for applications. In current practice, other water quality parameters may be of greater importance depending on which type of contaminant is of greatest concern.

Note that most standards do not specify any specific method of producing water of a particular quality to meet each of their standards.

That said, for production of NCCLS Type I water, systems must include granular activated carbon treatment for organics and chlorine removal, mixed-bed deionisation to meet resistivity and silica specifications, and 0.2µm post-filtration for bacteria and particle control. Type II water can generally be produced by distillation, deionization, or reverse osmosis with polishing deionisation or electro-deionisation (EDI). Reverse osmosis technology is generally able to provide Type III reagent grade water depending on feedwater quality and the design and operation of the reverse osmosis system.

Table 1.
National Committee for Clinical Laboratory Standards
Reagent Grade Water Specifications

Parameter	*Type I*	*Type II*	*Type III*
Bacteria max (CFU/ml)	10	1000	NS
pH units	NS	NS	5-8
Resistivity min. (megohm)	10	1.0	0.1
Silica max (mg/l)	0.05	0.1	1.0
Particles	0.22µm filtration	NS	NS
Organics	carbon filtration	NS	NS

Table 2.
American Society for Testing and Materials
Reagent Grade Water Specifications

Parameter	*Type I*	*Type II*	*Type III*	*Type IV*
Resistivity min. (megohm)	18.0	1.0	4.0	0.2
pH units (25°)	NA	NA	NA	5-8
TOC max (ug/l)	50	50	200	NS
Sodium max (ug/l)	1	5	10	50
Chloride max (ug/l)	1	5	10	50
Total Silica max (ug/l)	3	3	500	NA
	Type A	***Type B***	***Type C***	
Bacteria max (CFU/100ml)	1	10	1000	
Endotoxin (EU/ml)	<0.03	0.2	NA	

Note that reverse osmosis is a membrane-based separation process and as such will only remove a percentage of incoming contaminants from the feedwater supply. According to the type of membrane used and operating pressure, contaminant rejection ratios may vary between 95% and 99.95%. What this means is that if feedwater conductivity is >100µS/cm, the RO system will have to reject >95% of feedwater contaminants to meet ASTM Type 4 specification. At higher feedwater conductivities RO by itself will not meet this standard. Some form of polishing by de-ionisation (resin or EDI process) will also be required.

ROTEK Australia

ROtek Australia Pty Ltd
11/38 Corporate Boulevard
Bayswater VIC 3153

Phone +61 3 9738 2488
Mobile 0430 397 644
email: rotekaustralia@bigpond.com
Web site: www.rotekaustralia.com.au