

MILLIPORE

Elix<sup>®</sup>

The Standard for Analytical-Grade Water



WaterPurification  
Systems

Quality water is the key to all laboratory applications.

## the requirements

Use of consistently-pure water quality is crucial for successful reproducibility in laboratory applications. This is the reason why, depending upon your activity, regulatory bodies have defined several levels of water purity.

Elix system water meets or exceeds Type II water quality (corresponding to analytical-grade water) as defined by CAP, NCCLS and ISO® 3696/BS 3997. Elix UV system water also complies with the Purified Water requirements from the European and U.S. Pharmacopoeia and ASTM®. These high standards have to be met every day in many fields of activity, including:

- Food and Beverage industries
- Chemical industry
- Cosmetic industry
- Electronic industry
- Metalworking industry
- Pharmaceutical industry
- Synthesis industry
- Clinical area



*You can rely on the quality of Elix system water!*

## Elix systems

The water produced by Elix systems meets the highest standards and ensures consistent quality. With easy operation and maintenance, Elix systems have set a new trend in the pure water market.

### Technical assets of Elix systems

- No softener required (or softening ion-exchange resin cartridges)
- Ion-exchange resins are continuously regenerated by an electrical current
- Constant flow-rate and high water recovery
- Complete 4-step purification process using complementary technologies
- Excellent control of water quality at each purification step

### Resulting in direct day-to-day benefits

- Ease-of-use (no question about water hardness or when the cartridge change is due)
- Peace-of-mind (no time wasted on changing cartridges, regeneration and cleaning)
- Safe and clean
- Pure water available on demand (constant flow-rate in all seasons)
- Low running costs
- Optimum inorganic, organic and microbiological purity - all types of contaminants are eliminated
- Reliable water quality

The following pages give a detailed overview of the Elix system and its advantages in daily laboratory use.

### Characteristics of Elix system water

Resistivity	> 5 M $\Omega$ ·cm*, typically 10 to 15 M $\Omega$ ·cm
Conductivity	< 0.2 $\mu$ S/cm*, typically 0.067 to 0.10 $\mu$ S/cm
TOC typically	< 30 ppb
Bacteria count	< 1 cfu/ml**

\* [CO<sub>2</sub>] ≤ 30 ppm in feed water  
\*\* only valid for Elix systems with UV lamp

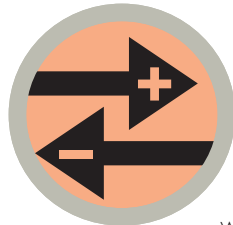


# The difference: patented Elix module



*A unique technology  
guarantees pure water at  
minimal costs.*

## principle

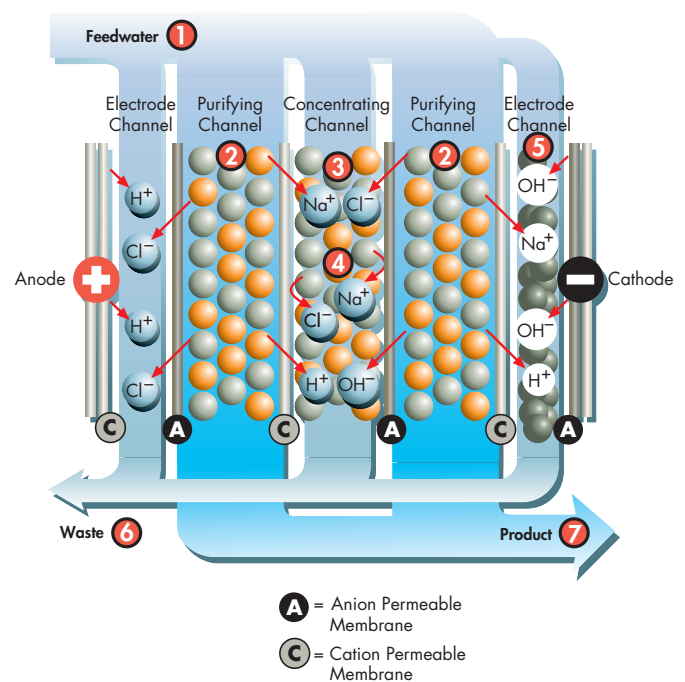


While water passing through the Elix module is purified, ion exchange resins are continuously regenerated via an electrical current applied within the module itself.

This process only requires a very low amount of water and energy, and needs no special maintenance or chemical regeneration that would deteriorate the resin beads.

All these advantages have made Elix technology the new standard for the production of pure water that is replacing both distillation and conventional deionization units in the laboratory.

- 1 Feedwater enters the Elix module and is split into three flow channels. One part flows over the electrodes (electrode channels), another through the resin-bed sandwiched between an anion-permeable membrane and a cation-permeable membrane (purifying channels), and the third part flows through the concentrating channel.
- 2 Electronic-grade mixed bed ion-exchange resin captures dissolved inorganic ions.
- 3 Electrical current across the module pulls captured cations out of the purifying channels through the cation-permeable (C) membranes towards the cathode, and anions through the anion-permeable membrane (A) towards the anode. Ion exchange resins on both sides of the membrane enhance the transfer of ions through the cation and anion-permeable membranes.
- 4 The cation-permeable membrane prevents anions from proceeding towards the anode, and the anion-permeable membrane prevents cations from proceeding towards the cathode. The result is a concentration of ions in this compartment.
- 5 Activated carbon beads next to the cathode avoid scaling issues by lowering the local pH at the electrode surface.
- 6 Concentrated ions are flushed from the system into the waste stream.
- 7 Purified water leaves the module.





# Detailed specifications of Elix systems

## Feedwater Requirements

Water quality	Potable tap water
Conductivity	< 2000 $\mu\text{S}/\text{cm}$ for maximum performance
Temperature	2 – 35 °C
Fouling index	Progard 1: < 5 Progard 2: < 12*
Total chlorine	Progard 1: < 1 ppm Progard 2: < 3 ppm
Minimum feedwater pressure	1.0 bar (15 psi)
Maximum feedwater pressure	6.0 bar (90 psi)

\*If the Fouling index is > 12, additional prefiltration is recommended.

## Monitoring Standards

### Cell Constant of Measuring Cells

Feedwater conductivity	0.35 $\text{cm}^{-1}$
Permeate conductivity	0.35 $\text{cm}^{-1}$
Product water resistivity	0.01 $\text{cm}^{-1}$

### Additional Standard

Measuring and compensation of product water temperature	$\pm 0.1$ °C increments
Electronic connection	RS232 interface

## General System Specifications

Dimensions	455 x 255 x 315 (height x width x depth in mm) (18" x 10" x 12.4")		
Operating weight	Elix 3	15 kg (33.2 lb)	
	Elix 5	15 kg (33.2 lb)	
	Elix 10	16 kg (35.4 lb)	
Electrical data	120 V/230 V ~ 50/60 Hz		
Apparent output	100 VA Maximum		
Nominal output	80 W Maximum 35 W average nominal output in operation		



## Performance

	Elix 3	Elix 5	Elix 10
<b>Daily Needs</b>	<b>10 to 60 liters</b>	<b>50 to 100 liters</b>	<b>100 to 200 liters</b>
Product flow rate $\pm 15\%$ 7 °C < T < 30 °C	3 l/h	5 l/h	10 l/h
Resistivity of product water (compensated to 25 °C)*	> 5 M   -cm typically 10 to 15 M   -cm	> 5 M   -cm typically 10 to 15 M   -cm	> 5 M   -cm typically 10 to 15 M   -cm
Conductivity of product water (compensated to 25 °C)*	< 0.2 $\mu\text{S}/\text{cm}$ typically 0.067 to 0.10 $\mu\text{S}/\text{cm}$	< 0.2 $\mu\text{S}/\text{cm}$ typically 0.067 to 0.10 $\mu\text{S}/\text{cm}$	< 0.2 $\mu\text{S}/\text{cm}$ typically 0.067 to 0.10 $\mu\text{S}/\text{cm}$
TOC typically	< 30 ppb	< 30 ppb	< 30 ppb
Bacteria count**	< 1 cfu/ml	< 1 cfu/ml	< 1 cfu/ml
Silicate content	> 99.9 % retention	> 99.9 % retention	> 99.9 % retention
Water recovery	15 %	18 %	24 %

\*[CO<sub>2</sub>]  $\leq$  30 ppm in feedwater: typical resistance 10-15 M | -cm

[CO<sub>2</sub>] > 30 ppm in feedwater: typical resistance > 2 M | -cm

\*\*valid for Elix systems with UV lamp