



# BioPak™

## Point-of-Use Ultrafilter

**Final purification step at the ultrapure water point-of-delivery provides pyrogen- and nuclease-free water at a high flow rate when you need it**

### Key benefits

- ▶ Direct connection to all Millipore Type I water systems
- ▶ Pyrogen-free water (< 0.001 EU / ml) production
- ▶ RNase-free water (< 0.01 ng / ml) and DNase-free water (< 4 pg /  $\mu$ l) production
- ▶ Safe method that eliminates the need to treat water with DEPC
- ▶ Bacteria-free water (< 1 cfu / ml) production
- ▶ Warranty of results within specifications for a minimum of 90 days usage
- ▶ Maintenance-free

The BioPak unit is a disposable ultrafiltration cartridge typically used in cell culture, biochemistry or molecular biology applications. It can be installed at the outlet of Type I water purification systems such as the Milli-Q®, Direct-Q®, Simplicity® or Synergy® systems, to produce pyrogen- and nuclease-free ultrapure water for a period of up to three months.

The cartridge is composed of polysulfone hollow fibers in a white ABS housing. The BioPak ultrafiltration membrane is designed to optimize the rejection of pyrogens, nucleases and bacteria, while maintaining a high flow rate and minimizing the release of ionic and organic materials.

## Pyrogen removal

The most common pyrogens are endotoxins, i.e., lipopolysaccharides (LPS) from the walls of Gram-negative bacteria. The LPS have two major parts: a hydrophilic polysaccharide chain with antigenic regions and a hydrophobic lipid group. As the polysaccharide chain is variable in length, the LPS molecular weight ranges from 3,000 to 25,000 Dalton. In ultrapure water, the LPS sub-units aggregate to form higher molecular weight structures that can be removed by ultrafiltration membranes with cut off below 20,000 Dalton.

Pyrogens are known to affect cell culture and biochemistry experiments in numerous ways. It has been demonstrated that their interaction with cell membranes causes morphological changes and damage, as well as the secretion of specific substances such as tumor necrosis factor, cytokines or enzymes. Pyrogens also affect the cell division process (enhancing or reducing it) depending on the nature of the cell line. The presence of pyrogens also may affect analytical techniques such as electrophoresis. For these reasons, it is good laboratory practice to remove pyrogens from all solutions used in cell culture and other biochemical applications.

Experiments performed in Millipore R&D laboratories have demonstrated that the BioPak ultrafiltration cartridge can be used for at least 90 days to treat Milli-Q ultrapure water and obtain product water with a pyrogen level below 0.001 EU/ml.

## Nuclease removal

Challenge tests performed in Millipore R&D laboratories have demonstrated that the BioPak cartridge allows easy production of ultrapure water that is both RNase-free ( $< 0.01$  ng/ml) and DNase-free ( $< 4$  pg/ $\mu$ l). Previous experiments also have shown that ultrafiltration with a properly validated device is just as efficient as diethylpyrocarbonate (DEPC) for RNase removal from ultrapure water without the negative aspects of DEPC treatment: lengthy treatment time and contamination of the treated water by CO<sub>2</sub> and ethanol.

## Bacteria-free water production

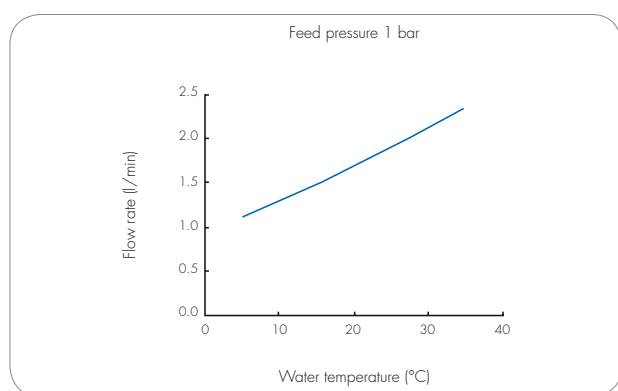
The validation protocol provided proof that the BioPak ultrafiltration cartridge enables delivery of bacteria-free ( $< 1$  cfu/ml) water, when used according to instructions with the filter outlet located in a clean environment.



## High flow rate

The large ultrafiltration membrane surface of the BioPak cartridge makes it possible to produce pyrogen-free ultrapure water without compromising the flow rate, as shown by the graph below.

The user can obtain ultrapure water on demand just before solution preparation, minimizing risks of recontamination.



**Figure 1:** BioPak ultrafiltration cartridge flow rate at different temperatures

## Certificate of Quality

Each BioPak unit has been individually tested for efficiency and flow rate and is delivered with a Certificate of Quality.



## Product water specifications

Pyrogen Level (EU/ml)	< 0.001
RNases* (ng/ml)	< 0.01
DNases* (pg/ml)	< 4
Bacteria* (cfu/ml)	< 1

\* When used according to instructions with the filter outlet located in a clean environment



# Ordering information

Description	Catalogue No.
BioPak Ultrafiltration Cartridge (1/pk), validated for pyrogen- and nuclease-free water production, delivered with a self-adhesive label (with space to note installation and replacement dates), Certificate of Quality and multilingual User manual.	CDUFB1001

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