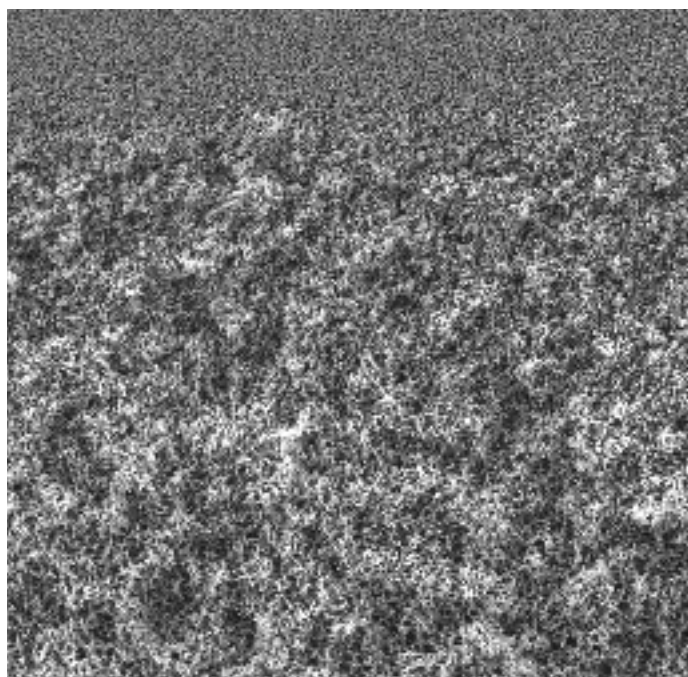


Biomax™ Membranes

- The membrane of choice for fast processing, and exceptional chemical resistance



Biomax. Composite Polyethersulfone with void-free structure

Biomax membranes are the membranes of choice for applications requiring high flux, low to moderate protein binding, and harsh chemical cleaning and/or sanitization.

Typical Applications

- Concentration, buffer exchange, and depyrogenation of protein solutions containing biomolecules such as albumin, IgG, IgM, monoclonal antibodies, hormones, and growth factors.
- Harvest, clarification, and concentration of vaccines.

The more open average pore size permitted by the void-free structure of the Biomax membrane results in higher fluxes with maximum retention.

Conventional UF membranes cast with macrovoids have tighter average pore sizes and must operate with reduced flux to keep retention high.

The high flux and high retention properties of the Biomax membrane result in faster processing speeds with higher yields, which means shortened processing times and a bioprocessing system that can be smaller and more compact.

Biomax membranes are composed of polyethersulfone and are resistant to harsh chemicals used in cleaning, biological decontamination, and sanitization. The polyethersulfone Biomax membrane has been modified to reduce non-specific protein binding compared to conventional polyethersulfone membranes.

Advantages of Choosing Biomax Membranes

- Void-free structure results in high flux, excellent retention and higher yields.
- Composite polyethersulfone membrane provides a stable hydraulic environment, resulting in excellent mechanical strength and integrity.
- Polyethersulfone membrane has superior resistance to harsh cleaning chemicals with no degradation of processing performance through multiple cleaning cycles.
- Biomax membranes are available in a wide range of molecular weight cut-offs to meet all of your application needs.

Tighter Retention Profile

The retention profile of Biomax 10 kDa membrane is much sharper than that of a conventional 10 kDa membrane, translating into improved protein retention in your process stream (Figure 1).

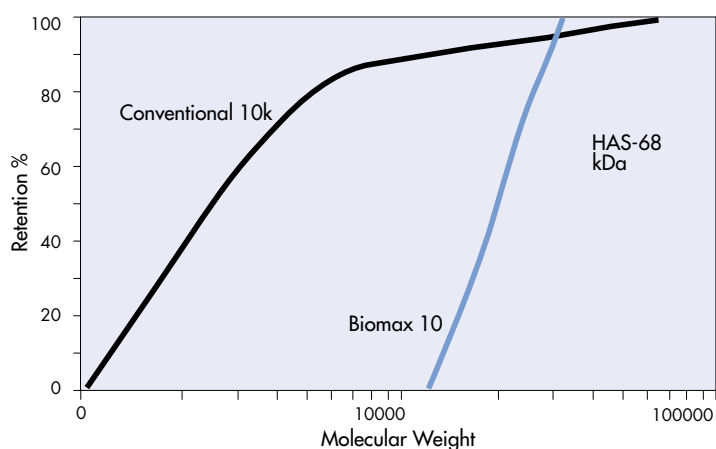


Figure 1. Protein retention of Biomax membrane versus conventional Polyethersulfone UF membrane

Improved Integrity

The void-free structure of the Biomax membrane significantly reduces the incidence of microdefects, resulting in improved membrane integrity (Figure 2).

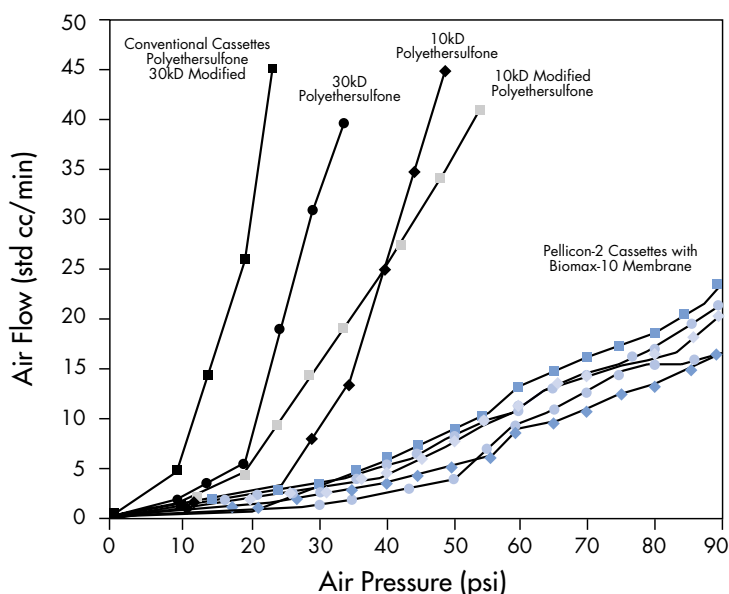


Figure 2. Integrity testing of Biomax membranes versus conventional Polyethersulfone UF membranes

Improved Process Yields

You can decrease the size of the system and improve your yield, thereby reducing your overall processing costs (Table 1).

Parameter	Biomax 10	Conventional Polyethersulfone (10 kDa)
Retention (%)	99.95	99.9
Flux (lmh)	118.0	80.0
Recirculation rate (lpm)	4.0	6.0
Pipe diameter (inches)	1.5	2.5
Hold-up volume (liters)	8.4	20.8
Yield improvement (%)	2 – 3	—

Table 1.

Superior Flux

At working concentrations of protein, Biomax membranes have higher flux for a given protein retention than conventional polyethersulfone UF membranes. In this example, Biomax 10 membrane demonstrates a 40% improvement in process flux over a conventional 10 kDa polyethersulfone membrane using 10% BSA (Figure 3).

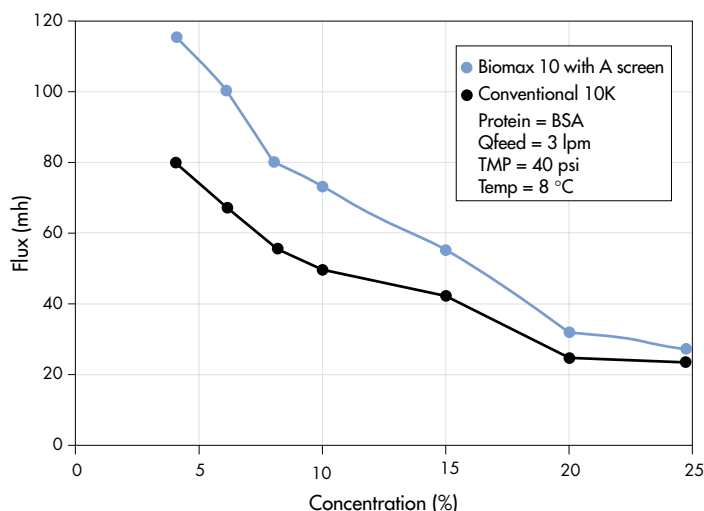


Figure 3. High flux of Biomax membrane versus conventional Polyethersulfone UF membrane

Superior Chemical Resistance Results in Excellent Cleanability

After 380 hours in 1 N NaOH at 50 °C, Biomax membranes show consistently better retention and integrity than competitive polyethersulfone UF membranes. Caustic cleaning regimens have no effect on the ability of the Biomax membrane to retain proteins and do not adversely affect integrity (Figure 4).

A rigorous cleaning regimen of caustic plus hypochlorite restores normalized water permeability (NWP) to near initial values following sequential process runs (Figure 5).

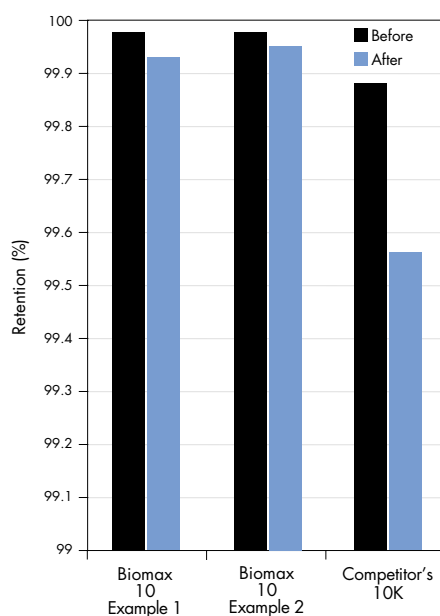


Figure 4. Caustic resistance of Biomax membrane versus conventional Polyethersulfone UF membrane

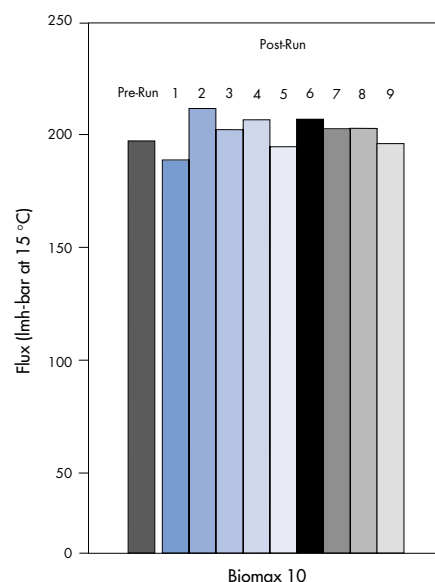


Figure 5. Consistent return of water permeability after cleaning

Results

After 100 hours in 600 ppm chlorine, the Biomax 10 membrane showed no appreciable change in air integrity or BSA retention (Table 2).

	Sample A	Sample B
Air integrity (sccm) prior to exposure	7	8
BSA retention % prior to exposure	99.97	99.97
Air integrity (sccm) after exposure	3	10
BSA retention % after exposure	99.97	99.97

Table 2.

Biomax Membrane Dextran Rejection

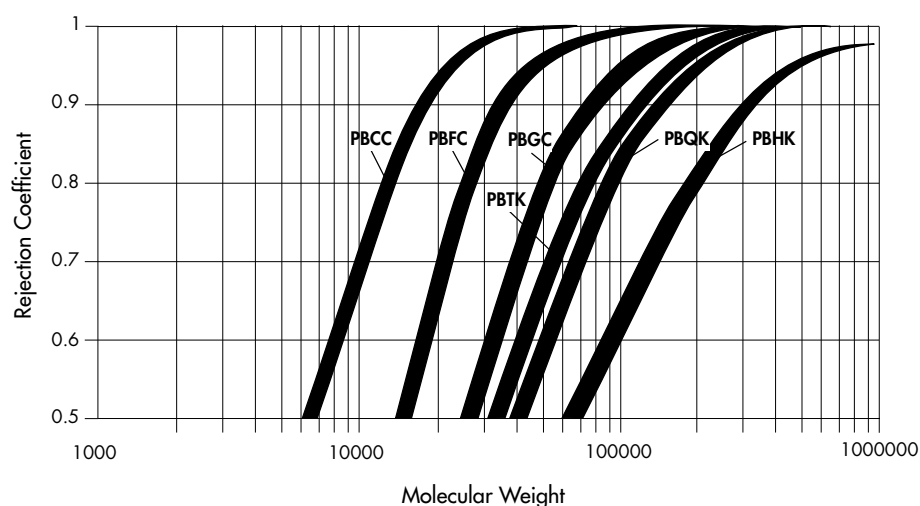


Figure 7. UF membrane Dextran retention profile

Specifications

Membrane

Composite polyethersulfone with void-free structure, compatible with solutions having a pH between 1 and 14.

Relative protein binding

Low to moderate, for use with protein solutions containing more than 0.1 mg/mL of protein.

Biomax Applications

Biomax Type	Membrane Code	NMWL* (kDa)	Typical Application
Biomax 5	PBCC	5	Growth factors, hormones
Biomax 8	PBFC	8	Growth factors, hormones
Biomax 10	PBGC	10	Albumin, hemoglobin
Biomax 30	PBTK	30	Enzymes
Biomax 50	PBQK	50	IgGs
Biomax 100	PBHK	100	Small viruses, antigens
Biomax 300	PBMK	300	IgMs, large viruses
Biomax 500	PBVK	500	Large viruses, colloids, particulates
Biomax 1000	PBXK	1000	Large viruses, cells, colloids, particulates

* Nominal Molecular Weight Limit

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MILLIPORE

Product Usage

Biomax membranes are found in Pellicon® XL devices and Pellicon 2 Cassettes from Millipore.

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