solutions for industrial biotechnology separations
Membranes have always been an integral part of biotechnology solutions and have been used for size-based separations with high throughput. They are used in many applications which can include:

**Process Separations**
- Purification of organic acids and base monomers post fermentation
  - Acetic acid
  - Glucaric acid
  - Succinic acid
  - 1,3-Propanediol
  - Propylene glycol
  - Lactic acid
  - 1,4-Butanediol
- Separation of dissolved chemicals from an aqueous stream
- Ion separation

**Sustainability**
- Purify condensates (if applicable) to recover water and energy
- Remove COD and salts to enable water reuse
- Concentrate effluents to reduce waste volume

**SUEZ membrane center of excellence**
SUEZ has a long history in membrane innovation and research. We have a world class Membrane "Center of Excellence" (COE) for manufacturing microfiltration, ultrafiltration, nanofiltration and reverse osmosis spiral-wound membranes in Minnetonka, Minnesota.

SUEZ can also supply various sizes of membranes from lab scale for screening tests, up to a full size industrial plant.

A SUEZ COE brings together the company’s most advanced capabilities and expertise to focus on a key technology sector. The Minnetonka Membrane COE integrates technology development, manufacturing capacity and quality control for membrane production, all under one roof.

**membrane solutions for biotechnology**
SUEZ has developed a complete spectrum of membranes and spiral elements, including Microfiltration (MF), Ultrafiltration (UF), Nanofiltration (NF) and Reverse Osmosis (RO) to offer a wide variety of membrane separations for biotechnology applications. The figure at the left details the pore size of each membrane type—MF, UF, NF, RO—as well as the application that suits each membrane best.

**application expertise**
SUEZ has been providing membrane solutions to process separation applications for decades:
- Dairy Industry
- Pharmaceutical
- Food Ingredient Industry
- High Value Extracts
- Chemical Processing
- Sugar Separation

**technology capabilities**
- Cross Flow Filtration
  - Reverse Osmosis
  - Nanofiltration
  - Ultrafiltration
  - Microfiltration
- Electrodialysis
- TOC Analyzer
- High Flow Depth Filtration
- Fermentation Broth Clarification
SUEZ membrane construction

Not only does SUEZ offer a wide spectrum of membranes, but these are also available in diverse configurations to meet fluid characteristics such as temperature, viscosity, solid content as well as the specific process requirements like pressure and sanitation.

Our unique three-layer membrane construction, shown below, improves separation characteristics and reduces fouling potential.

benefits

Retain more solids: Through advanced chemistry and membrane element design SUEZ’s high-efficiency UF elements retain more solids than competitive brands.

High flows, less fouling: From membrane casting through element rolling, SUEZ’s manufacturing and quality control capabilities create a reliable, high-performance membrane element. As a result, fouling is reduced and consistent, high flows are achieved. Less fouling allows longer run times between cleaning, which reduces downtime and cleaning expenses.

Certified Food Safe Membranes: When requested, SUEZ can provide membranes with materials which are certified safe for food contact.

Global applications support: With 8000 employees in over 130 countries, SUEZ has contacts in region to solve challenges quickly.

Global Research Centers SUEZ: is innovating around the clock through our eight global research centers.