



## Membralox<sup>®</sup> ceramic membrane applications

### Biopharmaceuticals

- ✓ Biomass recycling
- ✓ Clarification of fermentation broth for the production of antibiotics, enzymes, vitamins
- ✓ Purification of vitamin, enzyme solutions
- ✓ Production of pharmaceutical grade water
- ✓ Perfume decolorization
- ✓ Separation in the liposome production process
- ✓ Effluent treatment

### Chemicals

- ✓ Pigment, hydroxide and catalyst recovery
- ✓ Latex concentration
- ✓ Solvent recovery
- ✓ Oil/water separation
- ✓ Reverse osmosis pretreatment
- ✓ Refinery effluent treatment
- ✓ Hydrochloric acid clarification
- ✓ Effluent treatment

### Electronics

- ✓ Particle removal from ultrapure gases
- ✓ Ultrapure water polishing
- ✓ CMP process sludge recovery
- ✓ TMAH solutions recovery / clean up
- ✓ Dicing saw cooling water clean up
- ✓ Wafers

### Food & Beverage

#### ◆ Sugars, sweeteners and derivatives

- ✓ Saccharification liquor clarification
- ✓ Clarification of fermentation broths in the production of aminoacids, organic acids, polyols
- ✓ Clarification in sugar cane refining



◆ **Drinking milk and cheese production**

- ✓ Bacteria removal for extended shelf life (ESL) milk
- ✓ Bacteria removal from milk for cheese processing and baby food
- ✓ Concentration of fresh cheese
- ✓ Milk protein concentration
- ✓ Milk casein standardization
- ✓ Bacteria removal in whey processing
- ✓ Whey defatting
- ✓ Whey protein isolates (WPI) concentration

◆ **Beverages**

- ✓ Beer recovery from yeast
- ✓ Clarification of spirits, ciders, fruit juices
- ✓ Bacteria and/or iron removal, drinking water production

◆ **Food ingredients and additives**

- ✓ Clarification and/or concentration of gelatin, arabic gum
- ✓ Bacteria removal
- ✓ Protein concentration and fractionation
- ✓ By-product protein recovery
- ✓ Tank bottom recovery
- ✓ Used cooking oil recovery
- ✓ Fractionation, dewaxing and fat retention
- ✓ Clarification of vinegar

◆ **Waste streams**

**Miscellaneous**

◆ **Pulp and paper – printing**

- ✓ Pigment and ink recovery
- ✓ Dewaxing
- ✓ Effluent treatment

◆ **Textiles**

- ✓ Printing dye and pigment recovery
- ✓ Effluent treatment



◆ **Nuclear industry**

- ✓ Radioactive mud concentration
- ✓ Washing wastewater decontamination
- ✓ Effluent treatment

◆ **Mechanicals and metal treatment**

- ✓ Degreasing baths recovery (oil/water separation)
- ✓ Cutting fluid recovery
- ✓ Clarification of precision part rinse water
- ✓ Vehicle wash-water recycling
- ✓ Bilge water treatment
- ✓ Effluent treatment (oil/water separation, COD reduction)

◆ **Others**

- ✓ Oxygenation, gas diffusion
- ✓ Cryogenic fluid sterilization
- ✓ Solvent separation

## **Effluents**

◆ **Removal of suspended solids**

◆ **COD, BOD and suspended solids reduction by membrane bioreactor**

◆ **Industrial laundry wash-water recycling**

◆ **Oil/water separation**

◆ **Brine recycling**

◆ **Cleaning in place (CIP) chemicals clarification for recycling**

◆ **Solvent recovery**

◆ **Tank bottom recovery**

◆ **Effluent treatment for recycling in zero-waste plant**

◆ **Waste water**