

SanRO[®] and SanRO[®]-HS

**Membrane elements for use in USP-purified water and bio-pharm systems.
SanRO[®]-HS is a hot-water sanitizable option.**

SanRO[®] and SanRO[®]-HS elements are USP (United States Pharmacopoeia)-compliant and are typically used in producing purified water in pharmaceutical, medical, biotechnology, food, beverage and semiconductor processes. Elements meet all requirements for purified water (PW) and conform to FDA Regulation CFR, Title 21.

SanRO[®] and SanRO[®]-HS elements feature a net-type outer wrapping that allows easy access for cleaning in place, reducing the potential for element fouling and residual accumulation of contaminants on the element's exterior. Sites where microbial growth might occur are thereby eliminated when compared with fiberglass-wrapped elements. Heat sanitization reaches areas where biocides may not be able to reach and is also a process that is easy to monitor and control.

SanRO[®]-HS elements provide all the benefits of SanRO with the advantage of being able to be sanitized at the element at temperatures of up to 85 °C. Users of SanRO[®]-HS elements save the costs of unnecessary cleaning chemicals in a "green" approach to cleaning membrane elements, also eliminating chemical handling and disposal costs.

SanRO[®] Product Offerings:

SanRO[®]

Membranes for high performance USP water purification systems. Elements conform to FDA Regulation CFR, Title 21 and are used for operating temperatures up to 45 °C.

SanRO[®]-HS

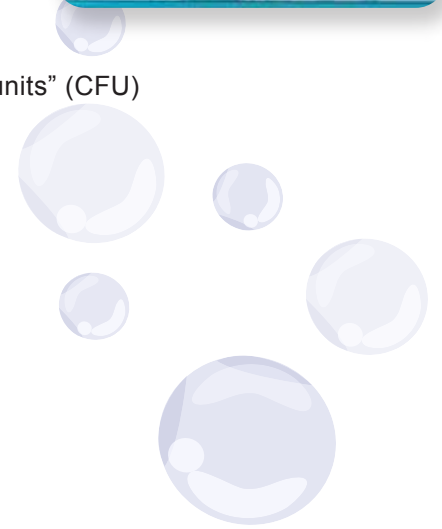
A heat-sanitizable version, sanitizable at 85 °C.

SanRO[®]-HS2

A higher fluxing version of the HS with slightly less rejection.

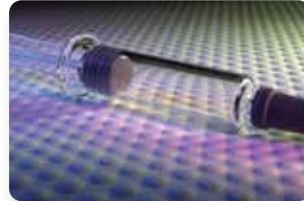
Applications:

- ✓ Reduction of bacterial endotoxins and microbes
- ✓ Ophthalmic and inhalation product production
- ✓ Reduction of TDS, TOC and colloids from high purity water
- ✓ Removal of algae, fungi, mold, yeast and bacteria as measured in "colony forming units" (CFU)
- ✓ Removal of bacteria from cell walls of polysaccharide compounds
- ✓ Reduction of microbial growth by minimizing nutrients
- ✓ Electronics-grade ultrapure water
- ✓ Water for cosmetic production
- ✓ Nutraceutical production
- ✓ Food and beverage production
- ✓ Container rinsing
- ✓ Production of ultrapure or PW (Purified Water)
- ✓ Wine de-alcoholization
- ✓ Replacement of distillation systems, providing lower energy usage and costs



Key Features:

- ✓ Specially selected components for durability in daily sanitization
- ✓ Largest possible active membrane area for high flux and low energy costs
- ✓ Energy-saving, highly permeable, high rejection membrane
- ✓ All elements are heat-set at factory for predictable flows at outset of installation
- ✓ 100% of elements are wet-tested to ensure performance accountability, traceability, and adherence to flow and rejection standards
- ✓ ISO 9001-compliant manufacturing
- ✓ Computerized application design provided by Hydranautics' IMSDesign software program
- ✓ Conformance with CGMPs



Key Benefits:

- ✓ No "stagnant" areas between vessel wall and membrane for improved cleaning, sanitizing and bio-control compared to fiberglass-wrapped elements
- ✓ Crystal-clear permeates
- ✓ Elements employ a highly permeating, low pressure RO membrane for maximum energy savings compared to higher pressure RO membranes
- ✓ Stable, high flux from first installation and after repeated sanitation cycles
- ✓ Heat-sanitizable (HS and HS-2) elements are heat-set at 90 °C and 25 psig at factory, providing assured performance at start-up as well as excellent TOC rinse-out
- ✓ Elements meet EPA potable water standards
- ✓ Typical conductivity: less than 2.1 uS/cm
- ✓ Typical microbial action limit of 100 CFU/ml
- ✓ Reliable and consistent element flow and rejection throughout element lifespan
- ✓ 24/7 global access to expert assistance

Products:

Membrane Type	Description	Element Performance*			System Performance**	
		Permeate Flow GPD (m ³ /day)		% Rejection	Applied Pressure psig (MPa)	Permeate TDS, PPM
		8040	4040			
SanRO-HS	Heat Sanitizable, High Rejection Composite	8800 (33.3)	2200 (8.4)	99.7	180 (1.24)	6.6
SanRO-HS2	Heat Sanitizable, High Flux, High Rejection Composite	14,000 (53)	3000 (11.4)	99.6	129 (0.89)	12.5

* Element Performance is at 225 psig (1.55 MPa), 1500 mg/L NaCl, 15% Recovery, 77 F (25 C).

** Applied Pressure and Permeate TDS are projected values for a 2:2:1 array system operating at 15 GFD (26 LMH) average flux with 500 mg/L TDS feed (NaCl), 80% Recovery, pH 7, 77 F (25 C).

For more technical information please refer to SanRO specification sheet.

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