

# SanRO<sup>™</sup> Pharmaceutical Membranes



## Maximize Performance in USP Water Systems

- Bulk pharmaceutical process water
- Cosmetic formulations
- Container rinsing

SanRO membranes from Hydranautics provide reliable, sanitary membrane performance in USP Classified water systems. SanRO's unique design eliminates "dead flow" areas - potential breeding grounds for bacterial growth - and ensures maximum ion removal with minimal fouling.

SanRO-HS, and the new SanRO-HS2, provide all the benefits of SanRO in a heat-sanitizable membrane, designed for sanitizing at 85° C. Users enjoy enhanced convenience by eliminating chemical handling and disposal concerns.



- **SanRO<sup>™</sup> - Membranes for high performance USP water purification systems. Conforms to FDA Regulation CFR, Title 21**

- **SanRO-HS<sup>™</sup> - A heat sanitizable membrane designed for 85° C**

- **SanRO-HS2<sup>™</sup> - New**  
A high flux, heat sanitizable membrane designed for 85° C



### USP 24 Water Classifications

Bacteria Limit  
Endotoxin Limit, (EU)  
TOC Limit, (ppb)  
Conductivity Limit, (uS)

### Purified Water<sup>1</sup>

100 cfu/mL  
None  
500  
0.6 - 4.7

<sup>1</sup>PW - Purified water for medication dosage, pharmaceutical processing, container rinsing and cosmetic formulations



**HYDRANAUTICS**  
A Nitto Denko Corporation  
www.membranes.com

# SanRO<sup>™</sup>

## Specifications

### SanRO Type & Application Data

Configuration . . . . . Sanitary Spiral Wound  
Membrane Polymer . . . . . Composite Polyamide  
Maximum Applied Pressure, psi (MPa) . . . . . 600 (4.14)  
Maximum Pressure Drop per Vessel, psi (MPa) . . . . . 60 (0.41)  
Maximum Pressure Drop per Membrane, psi (MPa) . . . . . 10 (0.07)  
Maximum Chlorine Concentration, PPM . . . . . <0.1  
Maximum Operating Temperature, °F (°C) . . . . . 113° (45°)  
Operating pH Range . . . . . 3.0 - 10.0  
Cleaning pH Range . . . . . 2.0 - 11.0

### SanRO-HS and SanRO-HS2

#### Type & Application Data

Configuration . . . . . Sanitary Spiral Wound  
Membrane Polymer . . . . . Composite Polyamide  
Maximum Applied Pressure, psi (MPa) . . . . . 600 (4.14)  
Maximum Pressure Drop per Vessel, psi (MPa) . . . . . 60 (0.41)  
Maximum Pressure Drop per Membrane, psi (MPa) . . . . . 10 (0.07)  
Maximum Chlorine Concentration, PPM . . . . . <0.1  
Maximum Operating Temperature, °F (°C) . . . . . 113° (45°)  
Sanitizing Temperature/Pressure Max., °C (psig) . . . . . 85° (25)  
Operating pH Range . . . . . 3.0 - 10.0  
Cleaning pH Range . . . . . 2.0 - 11.0

### Membrane Types

#### SanRO

SanRO ESPA2 . . . . . High Rejection Energy Saver  
SanRO CPA3 . . . . . High Rejection Composite  
SanRO LFC3 . . . . . Low Fouling Composite  
SanRO CPA4 . . . . . Maximum Rejection Composite

#### SanRO-HS

SanRO-HS . . . . . High Rejection Composite  
SanRO-HS2 . . . . . High Flux, High Rejection Composite

### Nominal Element Performance

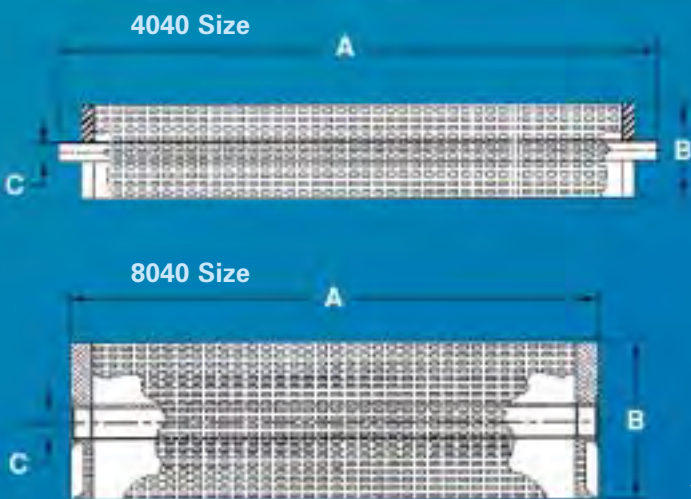
Element Performance at 225 psig (1.55 MPa), 1500 mg/L, 15% Recovery, 25° C.

Model	Permeate Flow – GPD (m <sup>3</sup> /day)		% Rej.
	4040	8040	
SanRO ESPA2	. . .3300 (12.5)	. .13,000 (49.2)	. . . .99.7
SanRO CPA3	. . . .2600 (9.8)	. .10,500 (39.7)	. . . .99.7
SanRO LFC3	. . . .2300 (8.7)	. . .9000 (34.1)	. . . .99.6
SanRO CPA4	. . . .1400 (5.3)	. . .5500 (20.8)	. . . .99.6
SanRO-HS	. . . .2200 (8.4)	. . .8800 (33.3)	. . . .99.7
SanRO-HS2	. . . .2800 (10.6)	. .11,200 (42.4)	. . . .99.6

### Nominal System Performance

Applied Pressure and Permeate TDS are projected values for a 4:2:1 array system operating at 20 GFD average flux, 500 mg/L TDS feed (NaCl), 85 % Recovery, pH 7, 25° C.

Model	Applied Pressure psig (MPa)	Permeate TDS mg/L
SanRO ESPA2	. . . . .165 (1.14)	. . . . .9.5
SanRO CPA3	. . . . .195 (1.35)	. . . . .7.4
SanRO LFC3	. . . . .220 (1.52)	. . . . .9.2
SanRO CPA4	. . . . .330 (2.27)	. . . . .5.4
SanRO-HS	. . . . .225 (1.55)	. . . . .6.0
SanRO-HS2	. . . . .185 (1.28)	. . . . .8.6



Size	Area ft <sup>2</sup> (m <sup>2</sup> )	A inches (cm)	B inches (cm)	C inches (cm)
4040	. . . .90 (8.3)	. . . .40 (102)	. . . .3.98 (10.1)	. . . .0.750 (1.9) O.D.
8040	. . .380 (35.2)	. . . .40 (102)	. . . .7.90 (20.1)	. . . .1.125 (2.9) I.D.



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Elements are vacuum sealed in a polyethylene bag containing less than 1.0% sodium meta-bisulfite solution, and then packaged in a cardboard box. Hydranautics believes the information and data contained herein to be accurate and useful. The information and data are offered in good faith, but without guarantee, as conditions and methods of use of our products are beyond our control. Hydranautics assumes no liability for results obtained or damages incurred through the application of the presented information and data. It is the user's responsibility to determine the appropriateness of Hydranautics' products for the user's specific end uses.