Solutions You Need. Technologies You Trust.

HYDRAcap® Ultrafiltration

NITTO DENKO

HYDRANAUTICS
www.membranes.com
A Nitto Denko Company

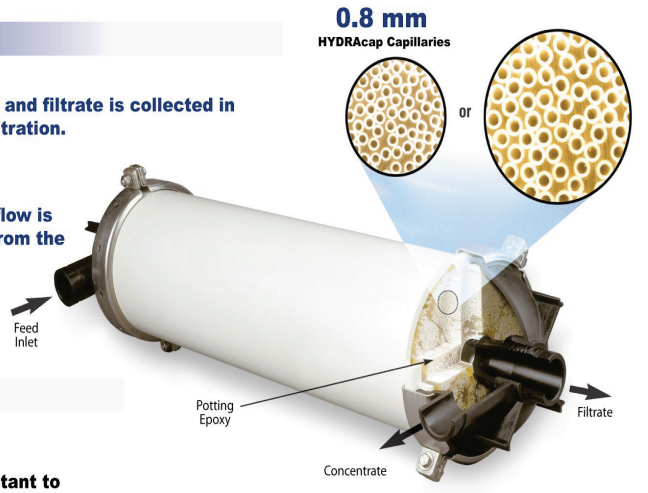
Superior Ultrafiltration

HYDRAcap is used to treat surface water, ground water, seawater and waste waters as either primary treatment or as pretreatment to reverse osmosis (RO) and nanofiltration (NF). Compared to conventional pretreatment, HYDRAcap allows for higher fluxes for RO and NF systems while maintaining longer intervals between cleanings. In some cases it replaces conventional pretreatment for potable applications, ground water recharging and water recycling.

Membrane Operation

Filtration Mode: Feed water flows inside fiber and filtrate is collected in the central core tube. This is known as inside/out filtration.

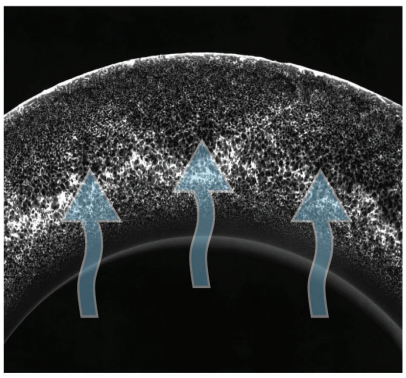
Backwash Mode: Filtrate is pressurized and flow is reversed such that accumulated solids are purged from the fibers.



A choice of two unique hollow-fiber capillary membranes provide superior ultrafiltration.

HYDRAcap Advantage

- Low fouling hydrophilic polyethersulfone membrane
- Tolerant to chlorine, peroxide and other oxidants. Resitant to pH extremes
- Exhibits 5 log (99.999%) removal for bacteria, giardia, cryptosporidium and 4 log removal for viruses, and reduces turbidity to <0.06 NTU
- Operating flexibility, direct or cross-flow filtration
- DHS (CA), DEP (MA), NSF/EPA, ACS (France), DWI (U.K.) certifications for materials of construction, operation and pathogen removal efficiency



Uniform structure with inside/out flow configuration

Capillary Technology vs. Conventional Pretreatment

- Significantly better filtrate quality when compared to conventional pretreatment, exhibiting 100% removal of colloidal material
- Product quality is stable even during feedwater variations
- Single-step treatment reduces operating costs and increases efficiency
- Can significantly reduce use of pretreatment chemicals
- Backwash disposal is less problematic
- Increased efficiency of RO membrane system design and operation, contributing to reduced capital and operational cost
- Maximizes RO performance by allowing elements to operate longer with less cleaning
- Low pressure operation

Integrated Membrane Solutions® (IMS)

-**South Houston Green**, Texas City, TX. 7.5 MGD (28,400 m^3/d) of UF using 264 HYDRAcap 60 modules followed by 3.6 MGD (13,700 m^3/d) of RO using 900 of Hydranautics' LFC3 elements for boiler feed water. Start-up July 2003.

-**Calpine Los Medanos Energy Center**, Pittsburg, CA. 2.1 MGD (8,000 m^3/d) of UF using 108 HYDRAcap 40 modules followed by 1 MGD (3,800m^3/d) of RO using 234 of Hydranautics' ESPA1 & ESPA2 elements for a high pressure boiler feed application. Start-up August 2001.

-**Caltex Refinery**, Cape Town, South Africa. 2.4 MGD (9,100 m^3/d) of UF using 225 HYDRAcap 60-LD modules followed by 1.6 MGD (6,100 m^3/d mld) of RO using 308 of Hydranautics' LFC3 elements treat wastewater for boiler feed. Start-up Oct 2005.

Typical Process Conditions

Operating Transmembrane Pressure (TMP):	2-20 psig (0.14-1.4 bar)
Max Backwash Pressure:	20 psig (140 kPa) or 1.4 bar
Backwash Flux:	100-150 GFD (170-255 lmh)
Backwash Frequency:	Once every 15-60 minutes
Backwash Duration:	25-60 seconds
Chemically Enhanced	Maximum: same as backwash
Backwash Frequency:	Minimum: 1-2 times per day
Chemically Enhanced	
Backwash Duration:	1-30 minute soak
Disinfection Chemicals:	NaOCl (sodium hypochlorite) or H_2O_2 (hydrogen peroxide)
Cleaning Frequency:	Once every 1-6 months
Cleaning Chemicals:	NaOCl + NaOH, Citric Acid

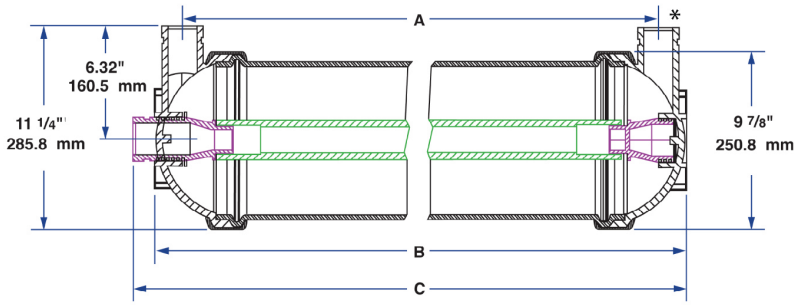
Specifications

Configuration. . . . . Capillary (Inside-out)
Membrane Polymer. . . . . .Hydrophilic polyethersulfone
Nominal MWCO, Daltons 150,000
Nominal Membrane area, ft2 (m2)
HYDRAcap 40, 320 (30) . . . . . .HYDRAcap 60, 500 (46)
HYDRAcap 40-LD, 210 (19.5). . . . . HYDRAcap 60-LD, 325 (30)
Capillary ID, inches (mm)
HYDRAcap. 0.031 (0.8)
HYDRAcap LD. 0.047 (1.2)
Capillary OD, inches (mm)
HYDRAcap. 0.051 (1.3)
HYDRAcap LD. 0.08 (2.0)

Application Data:

Typical Filtrate Flux Range, GFD (l/m2/hr). . . . . 30 – 75 (51 – 128)
Flow Rate Range, (gpm)
HYDRAcap 40, 7-9 . . . . . HYDRAcap 60, 11-30
HYDRAcap 40-LD, 5-12.3 . . . . . .HYDRAcap 60-LD, 7.8-19
Operating ph Range. 4-10
Cleaning pH Range. 2-13
Instantaneous Chlorine Tolerance, PPM. 100*
Total Chlorine Tolerance, PPM•HR 200,000
Instantaneous Hydrogen Peroxide Tolerance, PPM. 200*
Operating Mode. . . . . Cross-flow or dead-end, backwashable
Maximum Operating Temperature, °F (°C). 104 (40)
Maximum Feed Pressure, psig (bar) 73 (5)
Transmembrane Pressure (TMP) range, psig (bar). . . . . .2-20 (0.14 - 1.4)
Maximum Turbidity, (NTU)
HYDRAcap. 100
HYDRAcap LD. . . . . Consult Technical Department

*5 minutes or as advised by Technical Department



Module Length:	A**	B	C
HYDRAcap 40/HYDRAcap 40-LD	43" (109.2 cm)	46 1.8" (117.2 cm)	47 ¼" (120.0 cm)
HYDRAcap 60/HYDRAcap 60-LD	63" (160.0 cm)	66 1/8" (168.0 cm)	67 ¼" (170.8 cm)

* 2" Grooved Fitting at all ports
** ± 1/8"

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