HYDRAcap®

LENNTECH
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Superior Ultrafiltration Membrane Treatment Technology

HYDRAcap® – High Performance Ultrafiltration
HYDRAcap ultrafiltration membrane modules represent state-of-the-art capillary technology, providing greater removal efficiency of viruses and other pathogens when compared to microfiltration.

Responding Effectively to a Range of Regulatory Requirements HYDRAcap modules are designed to respond effectively to the requirements of the Surface Water Treatment Rule and Drinking Water Inspectorate regulations for potable water use.

Superior Treatment for Surface Water HYDRAcap treats high-fouling surface water and municipal effluents as either the primary treatment method or as a pretreatment step to RO, completely replacing conventional pretreatment for potable applications, ground water recharging and water recycling.

Providing Reliable and Cost-Effective Integrated Membrane Solutions (IMS™)
HYDRAcap enhances RO and NF element system design and operating conditions when used as a pretreatment step for desalination, treatment of surface waters and municipal and industrial effluents.

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HYDRAcap Specifications

Type

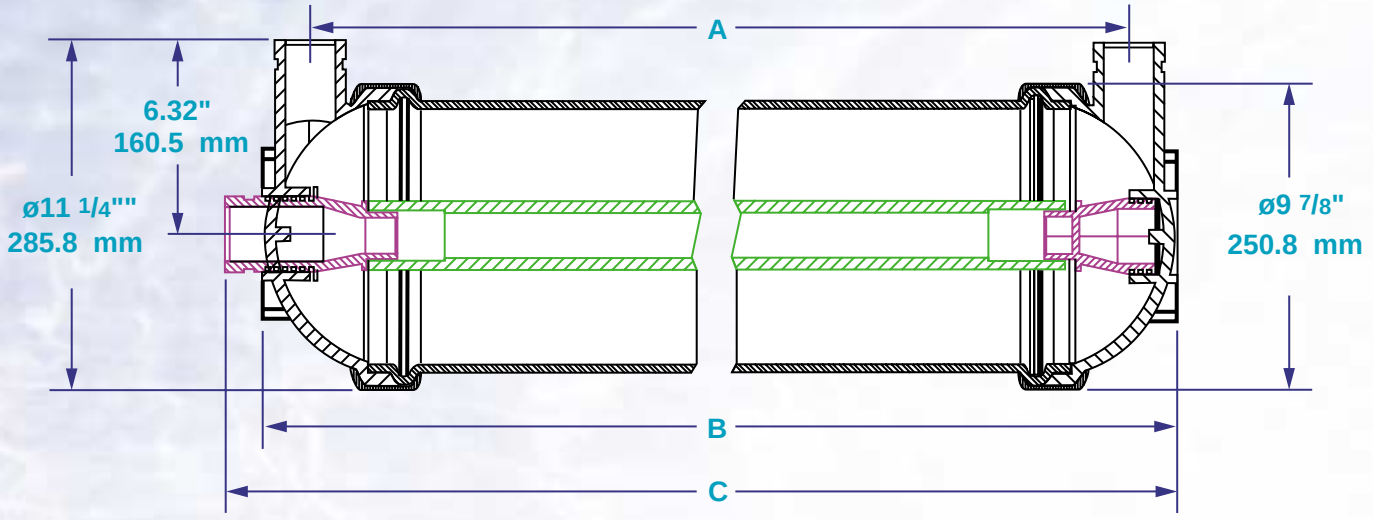
Configuration . . . . . .Capillary (Inside-out)
Membrane Polymer . . . . . .Hydrophilic polyether sulfone
MWCO, Daltons nominal 150,000
Nominal Membrane area, ft2 (m2) . . . .40-inch - 320 (30), 60-inch - 500 (46)
Capillary ID, inches (mm) 0.031 (0.8)
Capillary OD, inches (mm) 0.051 (1.3)

Application Data

Typical Filtrate Flux Range, GFD (l/m2/hr) . . . . . 35 - 85 (59 - 145)
pH Range . . . . . 2 - 13
Instantaneous Chlorine Tolerance, PPM 200
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 (kPa) . . . . . .4 - 22 (27 - 152)

Typical Process Conditions

Operating Transmembrane Pressure (TMP):	4 - 22 psig (27 - 152 kPa)
Backwash Pressure:	35 psig (242 kPa)
Backwash Flux:	175 - 200 gfd (298 - 340 l/m²/hr)
Backwash Frequency:	once every 15 - 60 minutes
Backwash Duration:	30 - 60 seconds
Chemically Enhanced Backwash Frequency:	Maximum: same as backwash Minimum: 1 - 2 times per day
Chemically Enhanced Backwash Duration:	1 - 10 minutes
Disinfection Chemicals:	NaOCl (hypochlorite) or H2O2 (peroxide)
Cleaning Frequency:	once every 1 - 2 months
Cleaning Chemicals:	NaOCl + NaOH, Citric Acid



Module Length	A*	B	C
HYDRAcap 40	43" (109.2 cm)	46 1/8" (117.2 cm)	47 1/4" (120.0 cm)
HYDRAcap 60	63" (160.0 cm)	66 1/8" (168.0 cm)	67 1/4" (170.8 cm)

ISO 9001 quality system certified

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The HYDRAcap® Advantage

- Low fouling hydrophilic polyethersulfone membrane
- Durable fiber structure, robust module design with lightweight and compact construction
- Resistant to chlorine, peroxide and a wide range of cleaning agents
- Exceeds the requirements of the Surface Water Treatment Rule (SWTR) and other European standards by exhibiting over 5 log removal efficiency for bacteria and viruses, and reducing turbidity levels to <0.06 NTU
- Direct or cross-flow service provides operating flexibility and higher recovery rates
- CADHS, NSF/EPA and DWI (U.K.) certifications for materials of construction, operation and pathogen removal efficiency
- Over 20 years of capillary membrane manufacturing experience

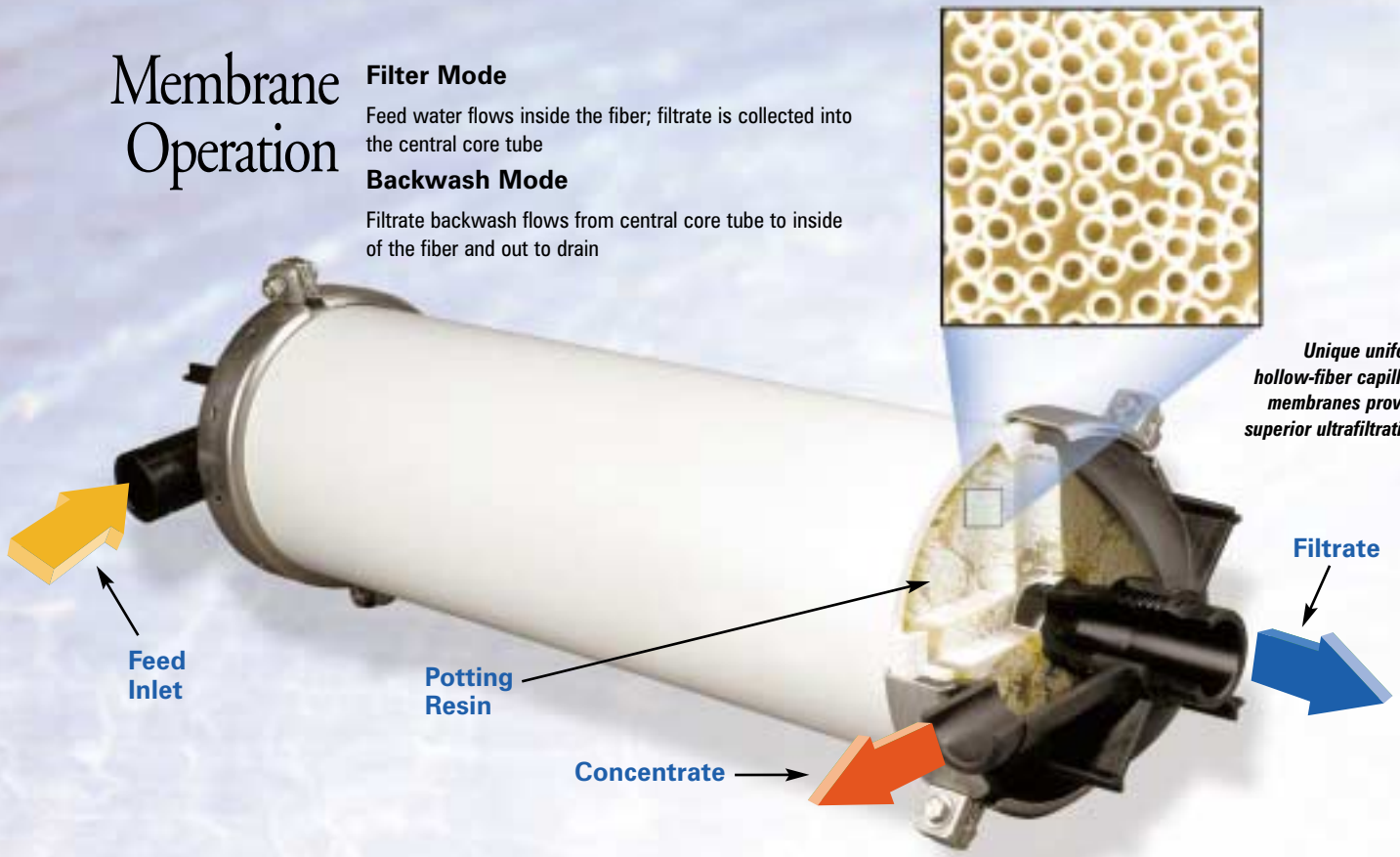
Membrane Operation

Filter Mode

Feed water flows inside the fiber; filtrate is collected into the central core tube

Backwash Mode

Filtrate backwash flows from central core tube to inside of the fiber and out to drain



Unique uniform hollow-fiber capillary membranes provide superior ultrafiltration.

HYDRAcap Capillary Technology vs. Conventional Pretreatment

- Significantly better filtrate quality as compared to conventional pretreatment, exhibiting 100% removal of colloidal material
- Single-step treatment reduces operating costs, increases efficiency
- "Chemical Free"– Dramatically reduces 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
- Low pressure feed and backwash operation

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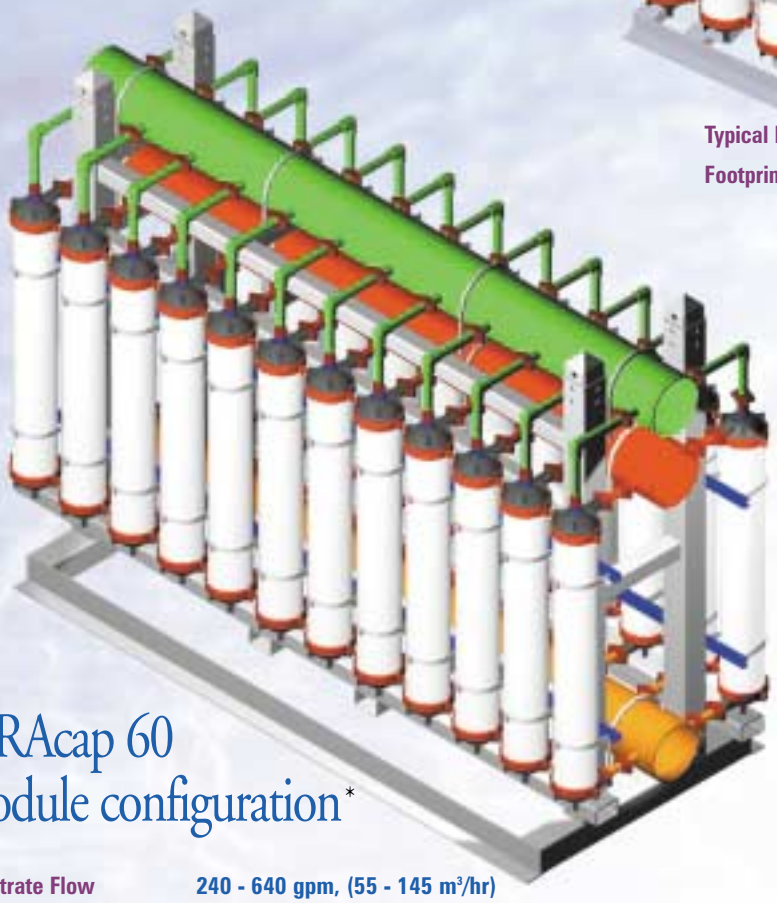
HYDRABLOC™

Modular Ultrafiltration Design

- Pre-engineered design reduces engineering cost and time
- Modular double stacked design, easily expanded
- Smaller footprint results in lower building cost
- Easy access during operation and maintenance
- Quick-release end cap design
- Larger HYDRABLOC configurations also available

HYDRAcap 40 8-module configuration

Typical Filtrate Flow	50 - 140 gpm, (11 - 32 m³/hr)
Footprint (W x L x H)	4' x 4' x 7' (1.2 x 1.2 x 2.1m)



Feed
Concentrate
Filtrate

HYDRAcap 60 24-module configuration*

Typical Filtrate Flow	240 - 640 gpm, (55 - 145 m³/hr)
Footprint (W x L x H)	5' x 14' x 9' (1.5 x 4.3 x 2.7m)

*This modular sub-bloc can be stacked to create larger HYDRABLOCs. One HYDRABLOC can accommodate up to 144 HYDRAcap 60 modules in a 3 x 2 bloc configuration.

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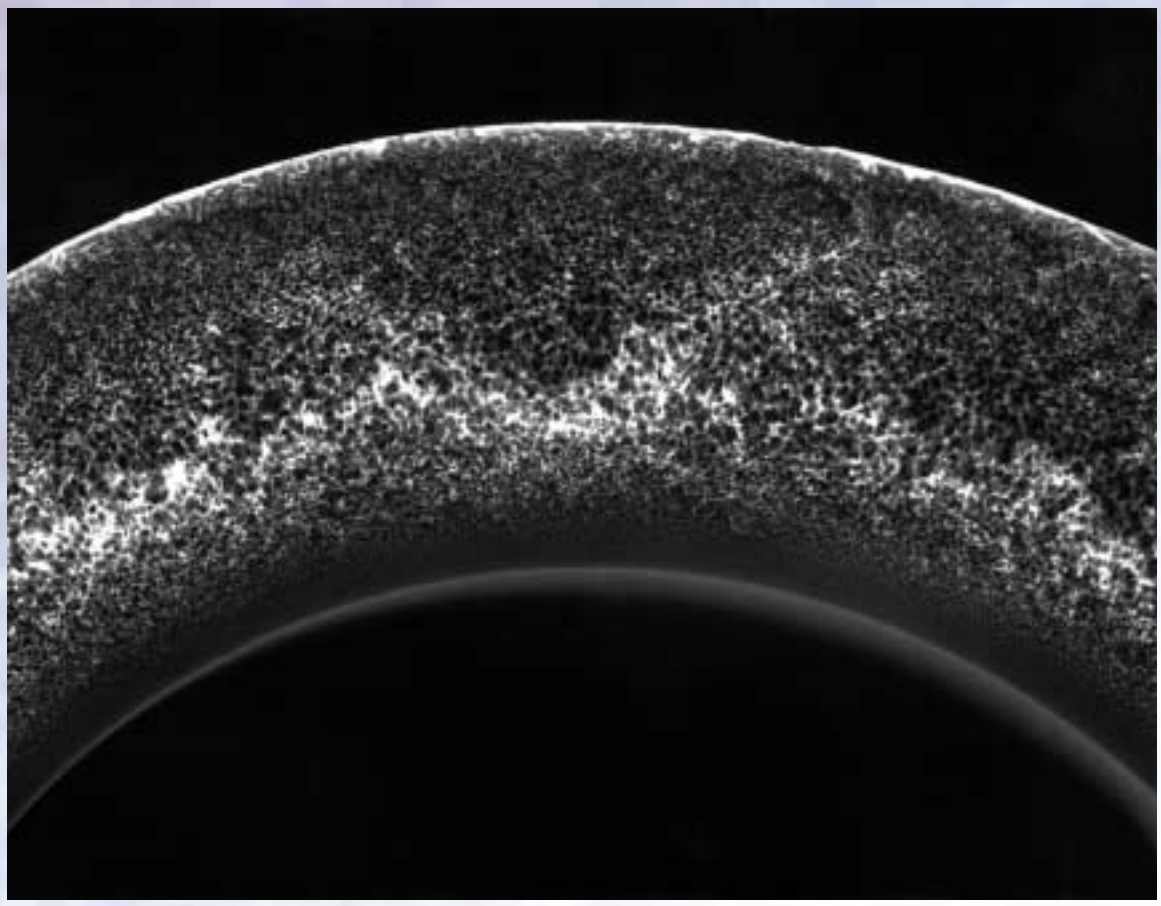

Capillary Technology from Hydranautics

Hydranautics' HYDRAcap® capillary ultrafiltration membrane is formed from pure chemicals using *in situ* polymer structure formation and a single-step patented manufacturing process. Designed for inside/out flow configuration, the inside surface of the capillary remains completely untouched during the manufacturing process, providing a defect-free, uniform fiber structure, robustness and high surface integrity throughout the fiber. These unique properties make the HYDRAcap ultrafiltration capillary membrane a perfect barrier for pathogens and colloidal material.

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