



***KRISTAL***<sup>®</sup>

Hollow Fibre Ultrafiltration Membrane

# The preferred ultrafiltration membrane with unparalleled performance in operational consistency and stability

One of the pioneer products fully designed and developed by Hyflux, Kristal® UF membranes have proven to consistently achieve optimal results in treating industrial/municipal wastewater and seawater, even in aggressive environments.



Kristal® has received the NSF mark of approval in 2010. One of seven UF membrane products in the world to receive such recognition.

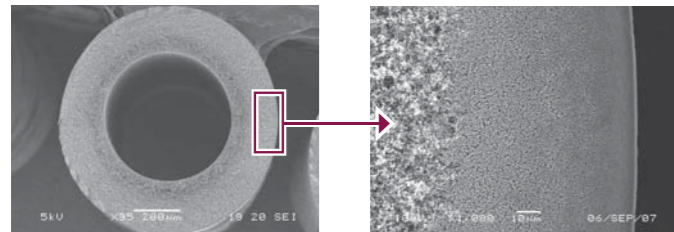
## Product Features & Benefits

- Modified polyethersulfone (PES) or polyvinylidene difluoride (PVDF) for greater hydrophilicity, less fouling
- Asymmetric structure for higher flux
- Enhanced tolerance to cleaning chemicals
- Sharp rejection profile for high permeate quality

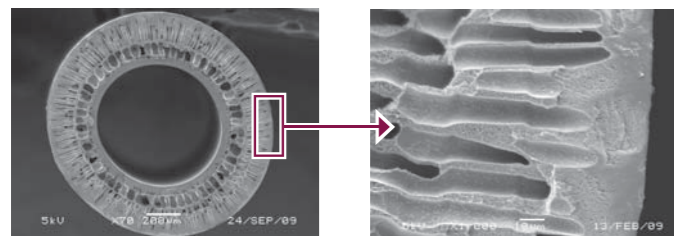
## Operation Features & Benefits

- Proven long service life
- Effective air-scouring backwash
- Small footprint

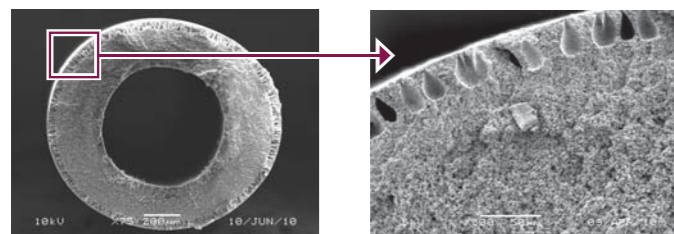
## Cross-section and magnified view of asymmetric structures



K600B



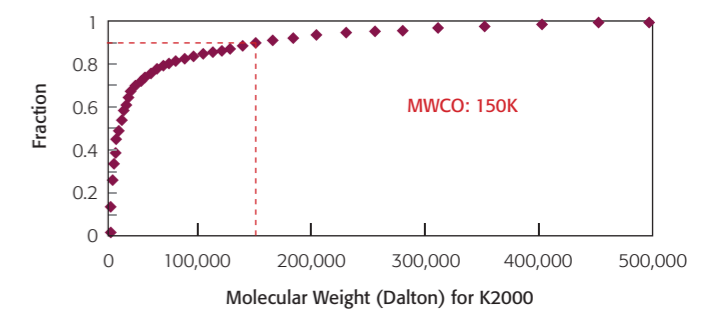
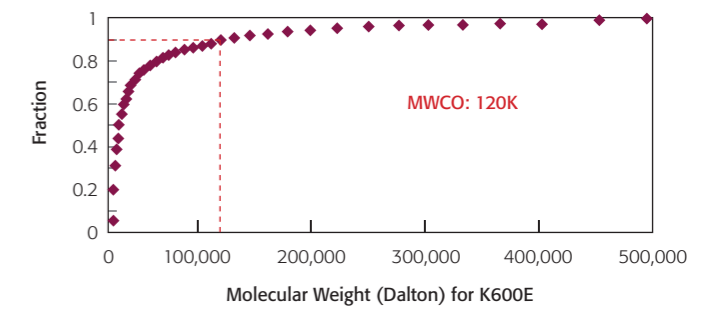
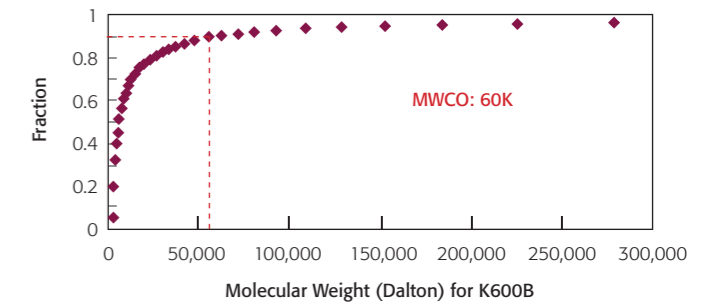
K600E



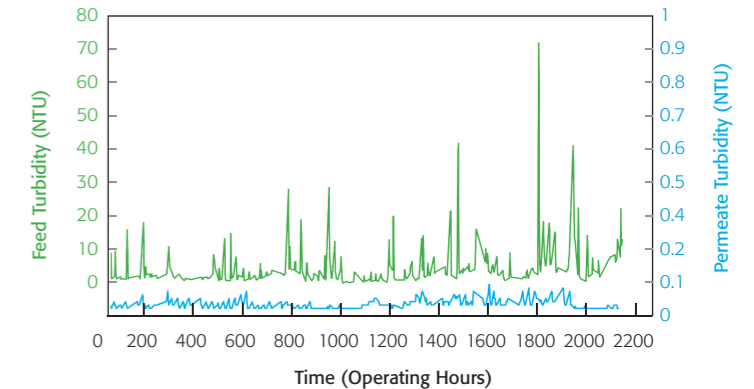
K2000



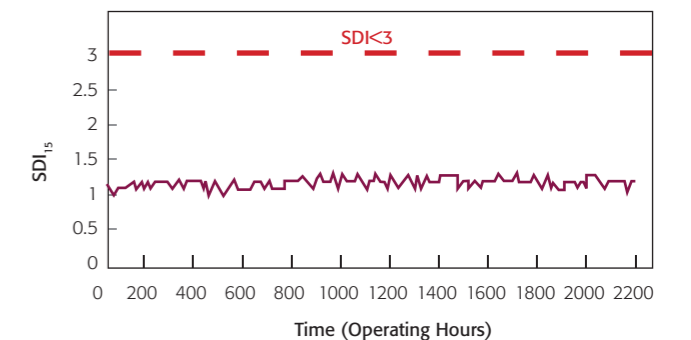
Sharp molecular weight cut-off for Kristal® fibres



Reduced and consistent permeate turbidity by Kristal®




Reduced and consistent permeate SDI by Kristal®



Membrane Specifications			
Membrane Type	600B	600E	2000
Material	Modified PES	Modified PES	Modified PVDF
O.D/I.D/Wall Thickness (mm)	1.15 / 0.6 / 0.27	1.35 / 0.7 / 0.325	1.2 / 0.6 / 0.3
Nominal Molecular Weight Cut Off (Dalton)	60K	120K	150K
Bacteria Log Reduction Value (LRV)*	≥6	≥6	≥6

\*Tested by accredited laboratory for bacteria reduction

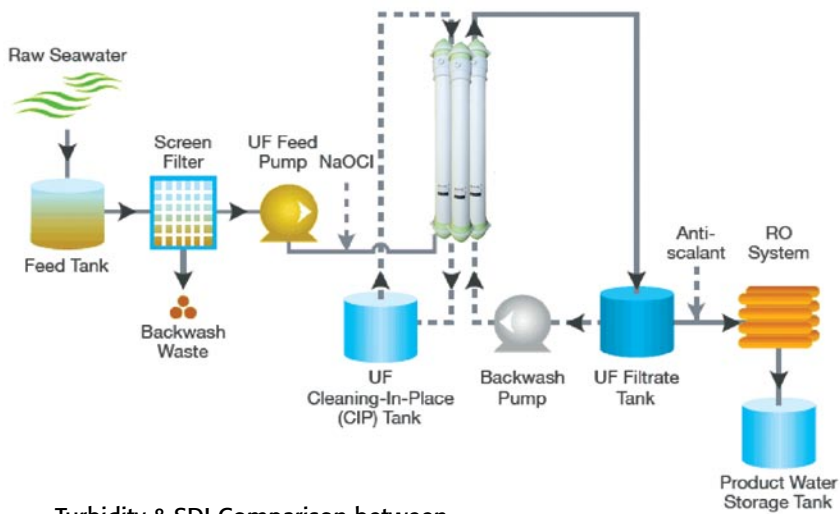
Module Specifications						
Product	Model	K-600B0820	K-600ET0820 	K-600ETN0812	K-600ER0820	K-2000T0820
	Membrane Type	600B	600E	600E	600E	2000
Overall Dimension	Diameter x Length (mm)	257.8 x 2130	344 x 2340	344 x 1190	257.8 x 2130	344 x 2340
	Membrane Area (m <sup>2</sup> )	70	60	23	60	58
Materials	End Caps	PVC				
	Sealant	Hyflux Proprietary Composite Potting Materials				
	Housing Shell	PVC				
Typical Operating Parameters*	Flow Type	Outside - In				
	Operating Temperature Range (°C)	5 - 40				
	Clean Water Flux (LMH)	135	170	200	170	140
	Operating pH Range	2 - 10				
	Cleaning pH Range	2 - 11				
	Service TMP Range (bar)	0.2 - 1.5				
	Max Feed Pressure (bar)	2.5				
	Operating Weight (Wet) (kg)	100	105	60	100	95

\* Subject to feed quality

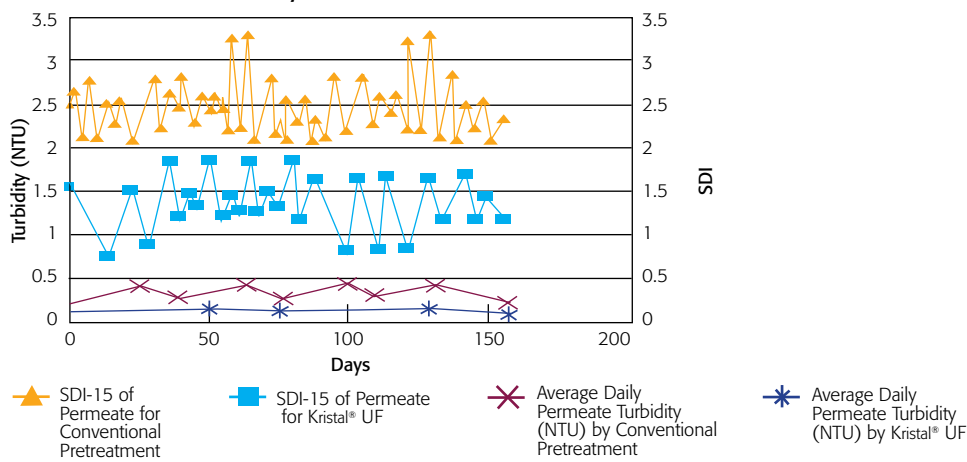
# Case Study

## Seawater Desalination Pretreatment

Replaces Conventional Treatment Method - Dissolved Air Flotation Filtration Unit (DAFF)



Turbidity & SDI Comparison between Conventional & UF Systems



# Key Applications

- RO/NF pretreatment
  - Industrial / municipal wastewater reclamation
  - Ultrapure water production
  - Seawater desalination
- Ion-exchange pretreatment
- Potable water production
- Industrial wastewater treatment for discharge
- Resource recovery from industrial waste streams such as semiconductor, pulp and paper production, textiles etc.

# About Hyflux

Hyflux is one of the world's leading technology-driven environmental companies, with operations and projects in Southeast Asia, China, India, the Middle East, North Africa and Europe.

Hyflux's spirit of innovation and entrepreneurship drives its technological advancements in membranes, project management, and operations and maintenance.

Hyflux is committed to providing cost-effective, reliable and sustainable solutions to its customers worldwide, from seawater reverse osmosis desalination, water recycling, wastewater and potable water treatment, to renewable resources management in the fields of oil recycling and beer clarification. The company is building the world's largest membrane-based seawater reverse osmosis desalination plant in Magtaa, Algeria.

Hyflux was voted the Water Company of the Year in 2006 by Global Water Intelligence. It was conferred the Forbes Best Companies under One Billion in 2005 and 2006, and won Frost and Sullivan's Technology Innovation of the Year Award 2007- Desalination Technologies (Asia Pacific) and its Technology Innovation of the Year Award 2007- Residential Water Treatment Equipment Market (Southeast Asia).

For more information on Hyflux, please visit <http://www.hyflux.com>

For more information on Hyflux membranes, please visit <http://www.hyfluxmembranes.com>

## Other Products



### MES

Compact and flexible platform for membrane evaluation



### InoCep®

Long-lasting superior ceramic hollow fibre membrane for extreme conditions



### FerroCep®

World's toughest stainless steel membrane that provides superior separation performance

## HYFLUX MEMBRANE MANUFACTURING (S) PTE LTD

202 Kallang Bahru Hyflux Building Singapore 339339 [T] 65 6214 0777 [F] 65 6214 1211 [E] [sales@hyfluxmembranes.com](mailto:sales@hyfluxmembranes.com) [W] [www.hyfluxmembranes.com](http://www.hyfluxmembranes.com)

### CHINA

99 Ju Li Road  
Zhangjiang Hi-Tech Park, Pudong Area  
Shanghai 201203 P.R.C  
Tel: +86-21-5080-5118  
Fax: +86-21-5080-5128

### INDIA

Unit 7A & 7B, Doshi Towers  
156 Poonamallee High Road Kilpauk Chennai  
600010, India  
Tel: +91-44-4542-8888  
Fax: +91-44-4542-8889

### EUROPE

Lage Dijk 29B  
5705 BX Helmond  
The Netherlands  
Tel: +31-492-565-330  
Fax: +31-492-590-010

2010©Hyflux Ltd. All rights reserved.

### DISCLAIMER

The information contained in this publication is meant for general informational purpose only. It is not to be construed as implying any warranty of any kind, whether express or implied, including, without limitation, warranties of accuracy of information, warranties of merchant indemnity, fitness for a particular purpose or warranty of performance. Hyflux Membrane Manufacturing (S) Pte Ltd hereby disclaims, to the fullest extent allowable by law, all responsibility for loss, damage, injury, claim or liability of any kind arising from or in connection with (a) any errors or omission in the manual including but not limited to technical inaccuracies and typographical errors; or (b) the reader's use of the publication.