



RO



NF



MBR

UF

TORAY

Innovation by Chemistry



Toray UF

PVDF Hollow-Fiber Ultrafiltration Membrane Module

Toray UF

60 years of Pioneering Towards Sustainable Water

Toray Industries, Inc. has been developing water treatment membranes since 1968. Today, we have been offering a full lineup of membranes backed by our sixty years of experience. Our advanced membrane technologies and global operations ensure the success of any project.

At the Toray Group, we consider sustainability to be the most important global issue of the 21st century. Toray's Sustainability Vision for water treatment aims to triple the water treated annually with our membranes by 2030 (compared to 2013). We will continue to provide advanced membrane technology such as RO membranes, further strengthen our technical services, and contribute to solving water problems worldwide.

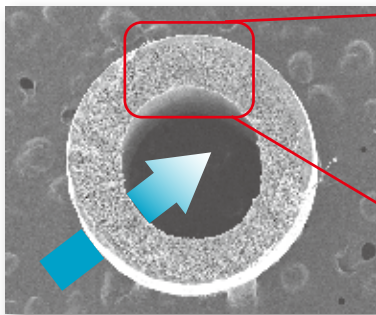
Toray UF accumulated plant capacity :
83,000,000 m³/day

(March, 2022)



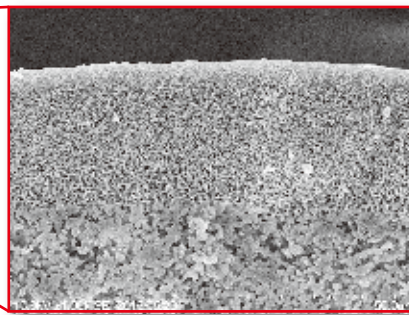
Characteristics

Outside-In Flow



Outside-In flow direction is ideal for treating water with high turbidity. Suspended solids are effectively removed during backwash and air scouring.

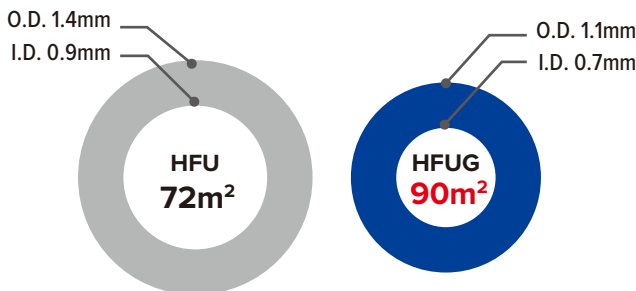
Cross-Section of the Composite Membrane



Low fouling layer

Support layer providing high permeability and durability

Membrane Area Per Module

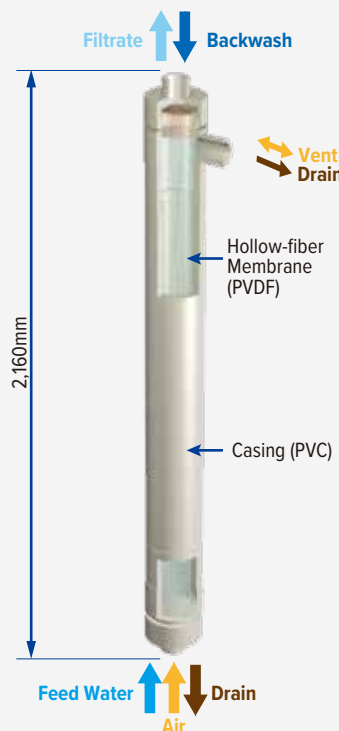


25% Increase

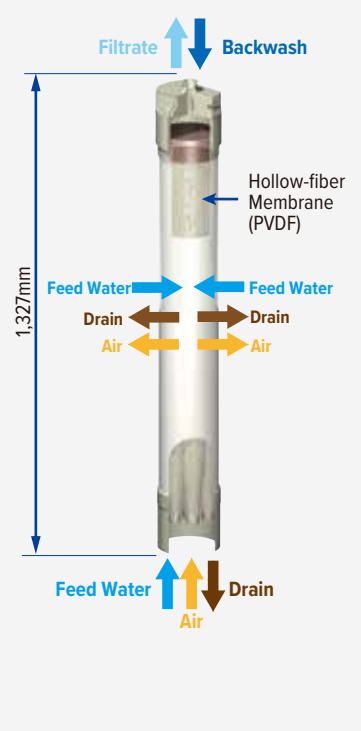
Using Toray's HFUG fiber, the surface area per module is increased by 25% without increasing the packing density. The HFUG fiber maintains the same strength and durability properties characteristic of Toray PVDF membranes.



Pressurized Series (HFUG/HFU)



Submerged Series (HSU)





Model		PRESSURIZED-series			SUBMERGED-series	
		HFUG-2020AN	HFU-2020AN	HFUG-B2315AN	HSU-1515	
Membrane Surface Area	m ² (ft ²)	90 (969)	72 (775)	75 (808)	20 (215)	
Molecular Weight Cut-off	Daltons	150,000				
Dimensions	Diameter	mm (in)	216 (8.50)	216 (8.50)	178 (7.01)	147 (5.79)
	Length	mm (ft)	2,160 (7.09)	2,160 (7.09)	2,332 (7.68)	1,327 (4.35)
Weight	Full of Water	kg (lbs)	92 (203)	92 (203)	65 (143)	14 (31)
	After Draining	kg (lbs)	49 (108)	49 (108)	35 (77)	10 (22)
Material	Membrane	PVDF (Polyvinylidene fluoride)				
	Potting	Epoxy and/or equivalent				
	Other	Casing: PVC (Polyvinylchloride) and/or equivalent			Cap: ABS; Protect Cylinder: PE	
Maximum Inlet Pressure	kPa (psi)	300 (43.5)			-	
Normal Operating Trans-Membrane Pressure	kPa (psi)	0-200 (0-29.0)			0-100 (0-14.5)	
Operating Temperature Range	°C (°F)	1-40 (33.8-104)				
pH Range	During Filtration	1-10				
	During Cleaning	0-12				

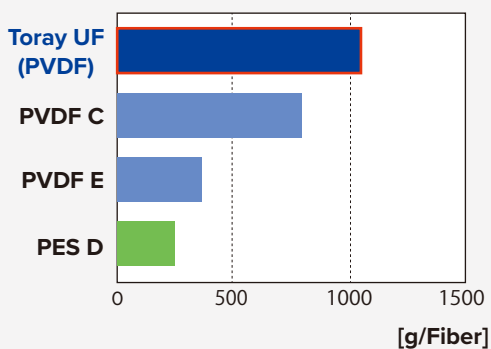
Industry Leading TIPS UF Membrane

Toray's polyvinylidene fluoride (PVDF) hollow fiber membranes are manufactured via a thermally-induced phase separation (TIPS), producing the industry's strongest fiber. Our proprietary manufacturing process carefully controls the distribution and size of the membrane pores, ensuring high filtrate quality and reducing fouling potential.

Toray's PVDF membrane is highly resistant to chlorine and strong acids, allowing for effective chemical cleaning without shortening membrane life. Toray UF Modules effectively remove suspended solids, viruses, and bacteria and are certified for drinking water applications.

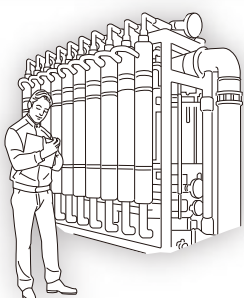


Mechanical Strength



Example of UF Module Selection Decision Matrix

	Capital Cost	Operating Cost	Experience	Financial Strength	Customer Service	Reliability	Skid Size / Flexibility	Membrane Pore Size	Membrane Strength	Design Flux	Flux correction in cold waters	Transmembrane Pressure	Cleaning Interval	Volume of Chemicals Used	Organics Removal	Overall Pilot Performance
	Important Factor															
	5	5	8	6	7	10	5	2	8	3	3	4	6	2	4	6
Brand A	10	8	6	8	8	8	10	8	8	7	8	10	8	8	9	8
Brand B	6	10	10	10	8	8	8	10	8	8	6	8	8	8	10	8
Toray UF	8	9	7	8	8	10	8	10	10	7	8	10	10	10	8	8
	Weighted Score															
Brand A	50	40	48	48	56	80	50	16	64	21	24	40	48	16	36	48
Brand B	30	50	80	60	56	80	40	20	64	24	18	32	48	16	40	48
Toray UF	40	45	56	48	56	100	40	20	80	21	24	40	60	20	32	48
	Total															
	730															



Reference Case Study



GLOBAL LOCATIONS

HEADQUARTERS Tokyo, Japan : +81-3-3245-4542

THE AMERICAS

California (TMUS) : +1-858-218-2360

EUROPE & SUB-SAHARAN AFRICA

Switzerland (TMEU) : +41-61-415-8710

Spain (TMSP) : +34-915-726-504

MIDDLE EAST

Saudi Arabia (TMME) : +966-13-568-0091

United Arab Emirates (TMME) : +971-4-392-8811

ASIA PACIFIC

China (TBMC) : +86-10-8048-5216

Singapore (TAS) : +65-6226-0525

South Korea (TAK) : +82-2-3279-1000

Toray UF Installations

Case Studies →



Wastewater Reuse: 150,000m³/d



Drinking Water: 15,000m³/d



Wastewater Treatment: 315,000m³/d



Drinking Water: 30,000m³/d



- 35 Sales Office
- 6 Production Base
- 4 R&D Laboratory



Seawater Desalination: 28,000m³/d



Wastewater Reuse: 157,500m³/d



Drinking Water: 110,000m³/d



Drinking Water : 88,000m³/d

