

kuraray

KURARAY NEW MODULE GP



Product Evolution Since 1976

Confidential

Standard designed flow rate (m³/hr/module)

PSF (polysulfone)



SF
Dead-end filtration
Pore size: 0.02-0.1 μm
7 m² (75 ft²)



GS
Dead-end filtration
Up to 2.5 m³/h (11 GPM)
60 LMH (35 GFD)
Pore size: 0.02 μm
42 m² (452 ft²)

PVDF (polyvinylidene fluoride)

FG
High flux type
Dead-end filtration
Up to 13 m³/h (57 GPM)
325 LMH (191 GFD)
Pore size: 0.02 μm
40 m² (431 ft²)



GP
FG Plastic module type
Dead-end filtration
Up to 16 m³/h (70 GPM)
325 LMH (191 GFD)
Pore size: 0.02 μm
50 m² (538 ft²)

GS
Dead-end filtration
Up to 4 m³/h (18 GPM)
95 LMH (56 GFD)
Pore size: 0.02 μm
42 m² (452 ft²)



SL
High turbidity specific type
Dead-end filtration
Up to 2 m³/h (9 GPM)
71 LMH (42 GFD)
Pore size: 0.02 μm
28 m² (301 ft²)

1976 1982 2004 2009 2016 2018

(Hydrophilic) PSF membrane manufacturing technology

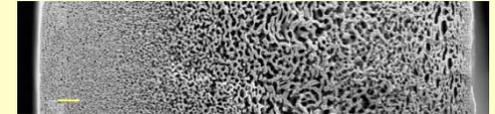
(Hydrophilic) PVDF membrane manufacturing technology

Technology coping with high turbidity

High flux technology

◆ Super High Flux

- 95 LMH (56 GFD) → **over 300 LMH (177 GFD)** : Above 3 times
- Symmetric structure → **Asymmetric structure**



◆ Enhance SS Discharge Performance

- One end free structure → Introduction of **Center Distributor** (New system)



➤ **More Competitiveness against Competitors**

- Less running cost (OPEX) by outside-in dead filtration
- Smaller foot print and Less initial cost (CAPEX) by less module quantities

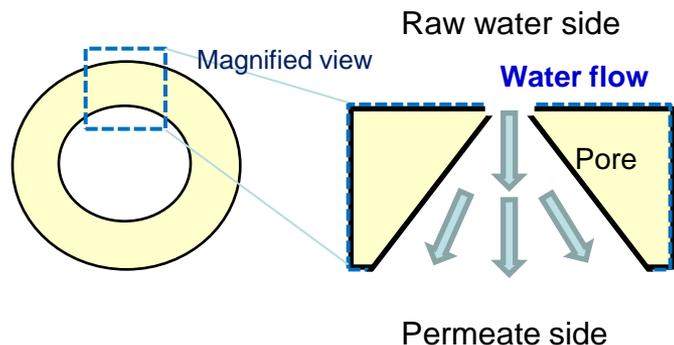
➤ **Skip Flocculation Settlement and/or Sand Filtration Systems**

- Much less initial cost (CAPEX) by cutting the existing systems
- Easier operation and less maintenance

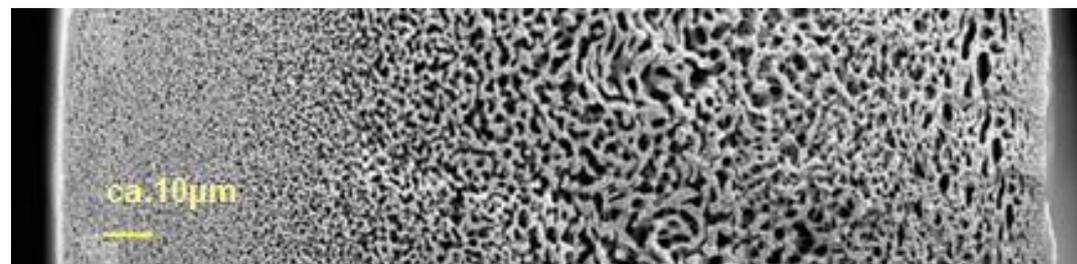
Newly Developed PVDF Membrane Structure

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New membrane

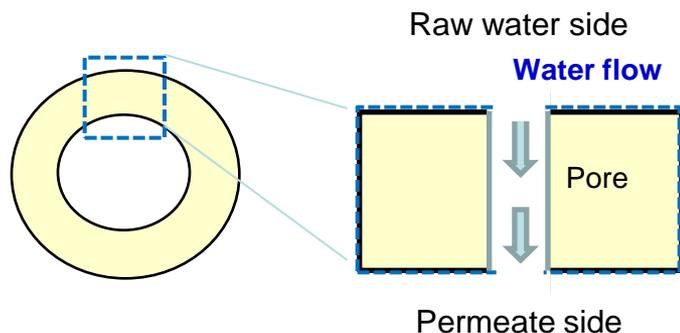


Asymmetric structure

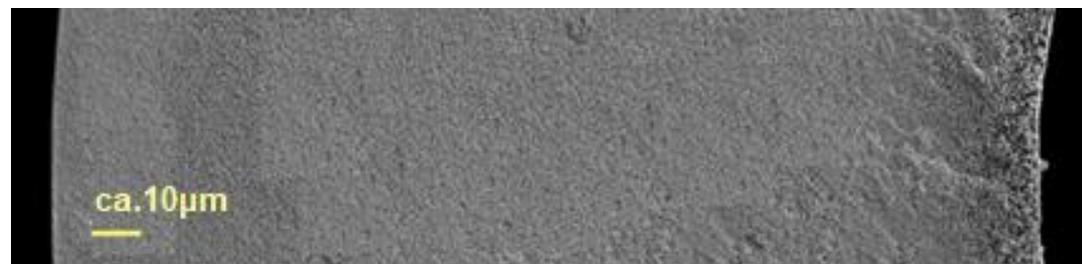


Raw water side ← ————— → Permeate side

Kuraray existing membrane

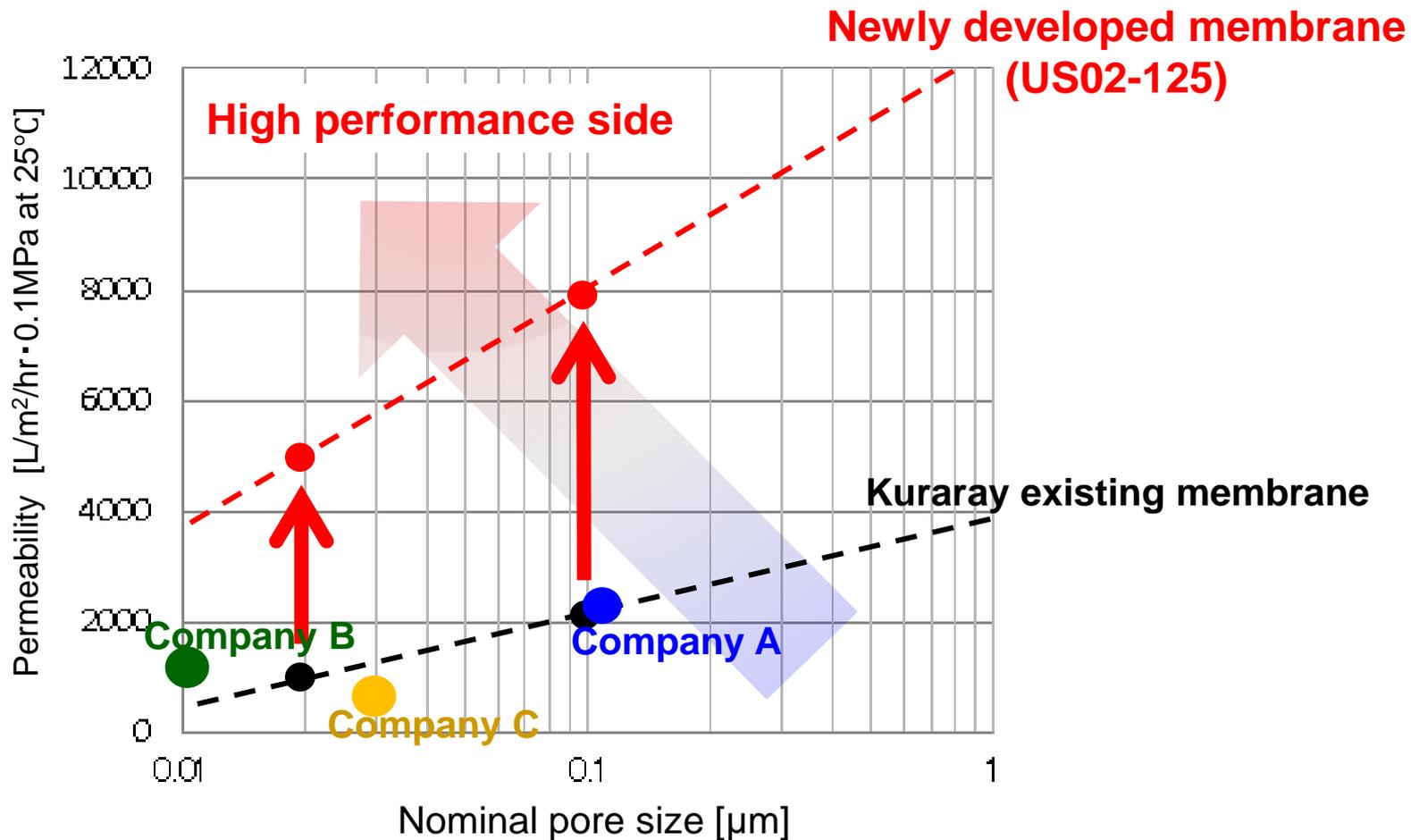


Symmetric structure



Raw water side ← ————— → Permeate side

- The newly developed membrane has an asymmetric structure, which reduces water flow resistance.
- It has dense membrane surface on the raw water side, which ensures high separation characteristics.

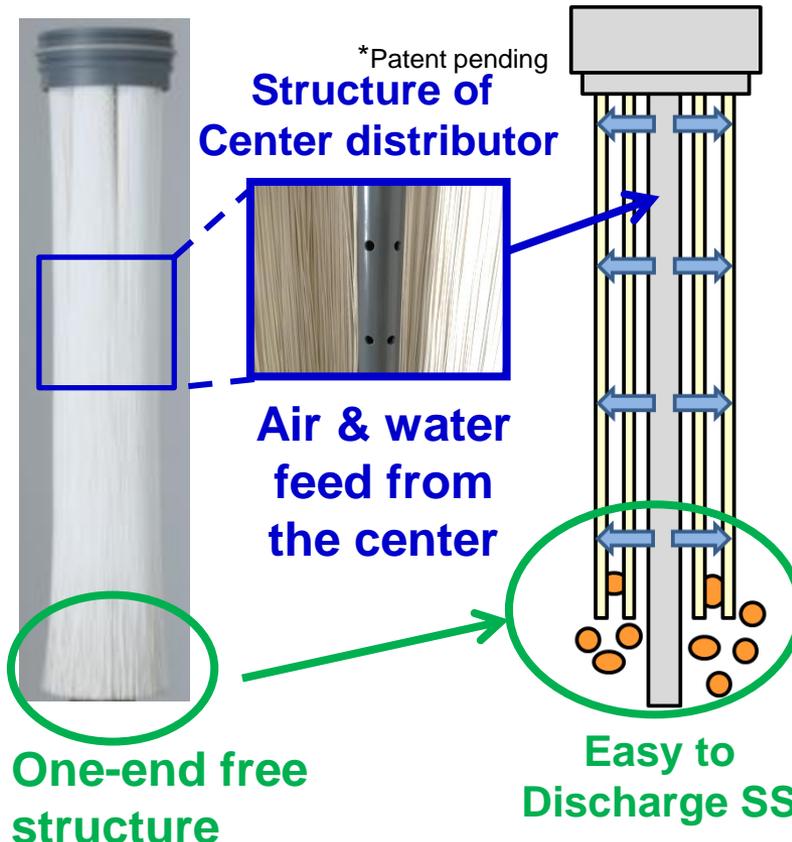


The new membrane achieves higher permeability, compared with the existing PVDF membrane.

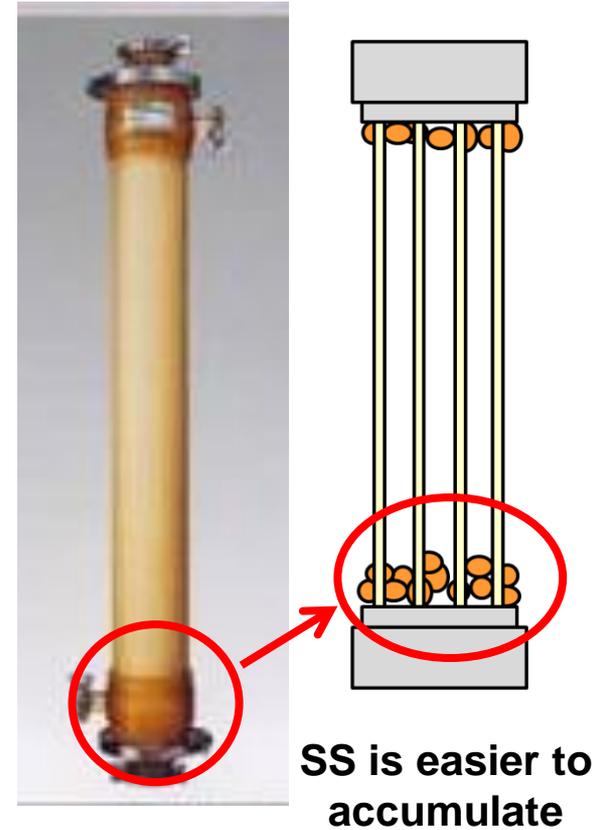
GP Module

FG Housing

FG Element



Typical both ends fixed structure



- One-end free structure makes SS discharge easy.
- Center distributor structure with the jetting mechanism enhances cleaning effect.

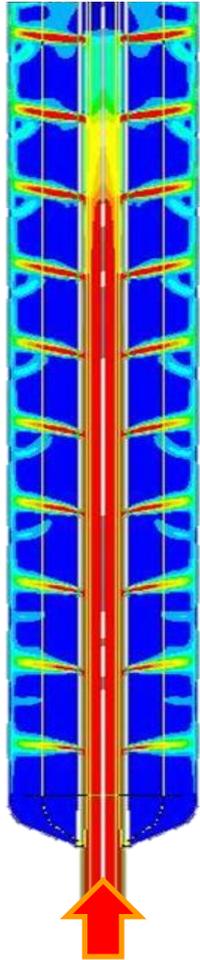


Air backwash increases water recovery rate — wasted water is only from housing holdup, no permeate is used. No need of permeate tanks or backwash pumps, thus the system is simple and compact and less expensive.

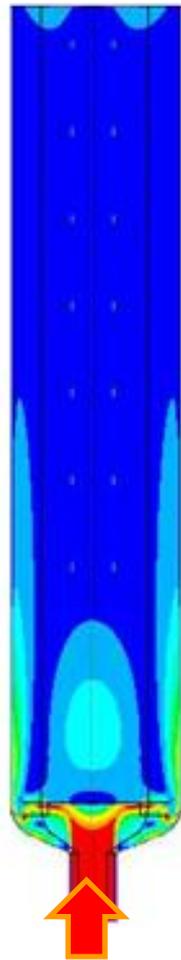
Effects of Center Distributor

Flow analysis

FG module (With center distributor) Existing module (Without center distributor)

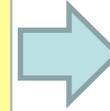


Raw water



Raw water

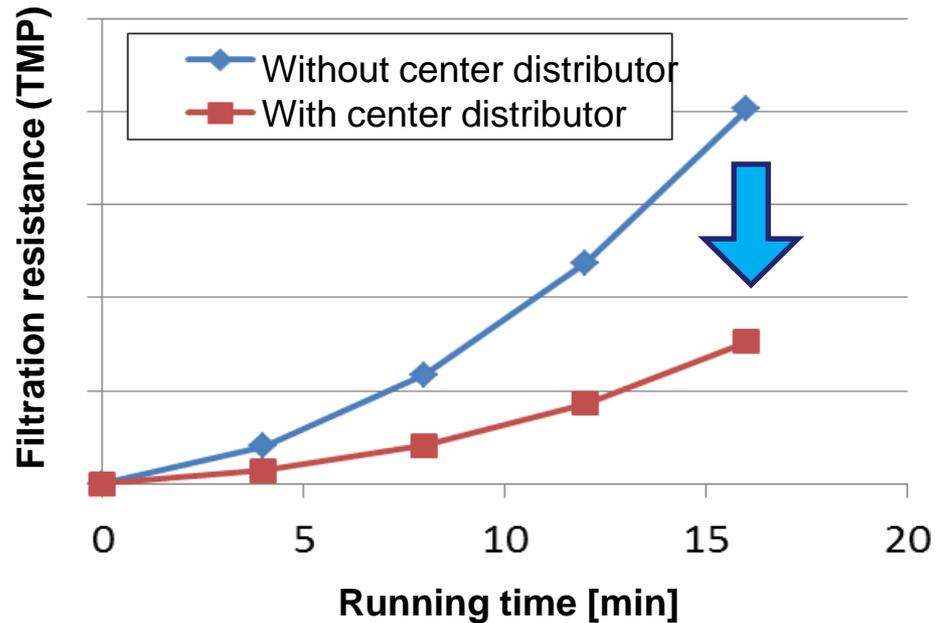
Much faster water flow suppresses SS attachment to membrane surface. (Self-cleaning function)



Filtration resistance caused by SS drops.

■ Comparison of filtration resistance (TMP) using simulated raw water

Raw water SS 250 mg/L, Flux 167 LMH (98 GFD)
Capacity 6.7 m³/h (29.5 GPM)



Water flow from center distributor cleans membrane surface during filtration.

■ Comparison of the SS discharge rates using simulated raw water

<Test conditions>

SS in raw water: 165 mg/L

Running time: 7 days

Backwash interval: 30 min

Flux: 167 LMH (98 GFD)

Capacity: FG; 6.7 m³/h (29.5 GPM)

SL: 4.7 m³/h (20.7 GPM)

FG module, 40 m² (431 ft²)

Packing density: 39.0%

With center distributor



SS discharge rate: 95% or higher

Existing module(SL), 28 m² (301 ft²)

Packing density: 28.6%

Without center distributor

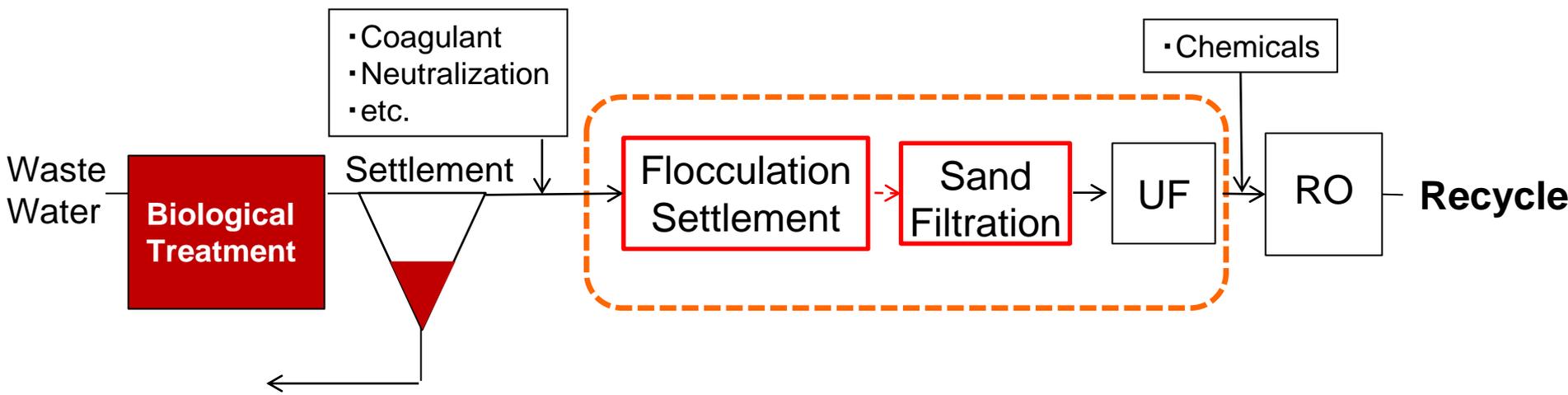


SS discharge rate: 78%

- SS discharge rate improves, compared with the existing module.
- FG module can filtrate higher turbidity water by changing filtration operation conditions depending on its SS content rate.

Benefit of GP/FG module with Using Center Distributor

◆ Conventional system



◆ New system using FG module

