

PTFE MF Membrane Module for Water Treatment System
by Sumitomo Electric Industries, Ltd.

POREFLON[®] Module



POREFLON® Module

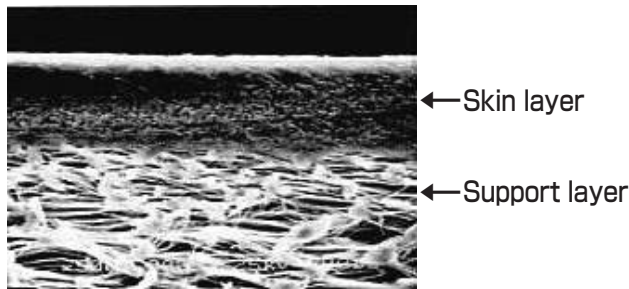
Using **PTFE** (polytetrafluoroethylene), which is high in chemical resistance, heat resistance and durability, we have developed a porous separation membrane making the best of our unique processing techniques and produced POREFLON Module as a **MF** membrane module for a water treatment system.

Features

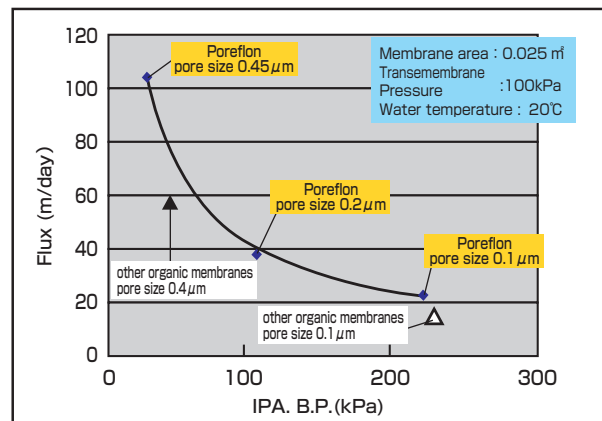
High flow rate! (Submerge / External pressure Types)

With a high porosity (percentage of void) between 75 and 85%, resistance during penetration can be reduced, demonstrating a high permeability. In addition, a double-layer PTFE structure consisting of a skin layer (filtration) and a support layer offers superior resistance to fouling.

<Cross section structure of membrane>

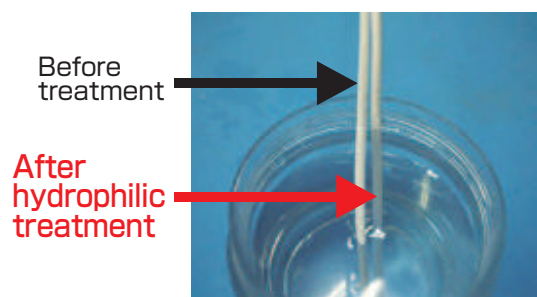


<Comparison of flow rate (pure water)>



Hydrophilic treatment allows easy transportation and installation! (Submerge / External pressure type)

As PTFE hollow fiber is subjected to hydrophilic treatment by means of hydrophilic macromolecule fixation, this product can be transported in dry condition. Moreover, hydrophilic treatment on the site is not required. Hydrophilic property will be kept throughout dry storage after use; therefore there is no problem if you let water run through this product when it is reused.



In comparison with other organic membranes, it is higher in strength, contributing to prolonged operation!

<Comparison of hollow fiber strength (nominal pore size: 0.45 μm)>

	Tensile strength (N/fiber)	Membrane thickness (mm)	Membrane external diameter (mm)	Membrane internal diameter (mm)
PTFE membrane (POREFLON®)	63	0.25	1.3	0.8
Other organic membrane	10	0.25	1.3	0.8

Membranes can be cleaned with various chemicals and exhibit high flow recovery!

PTFE's superior resistance to chemicals allows cleaning with high-concentration alkali and other chemicals.

<Change after submerge in caustic soda, which is effective in washing off oil and silica>

(Submerge conditions: NaOH 4% x 50°C x 10 days)

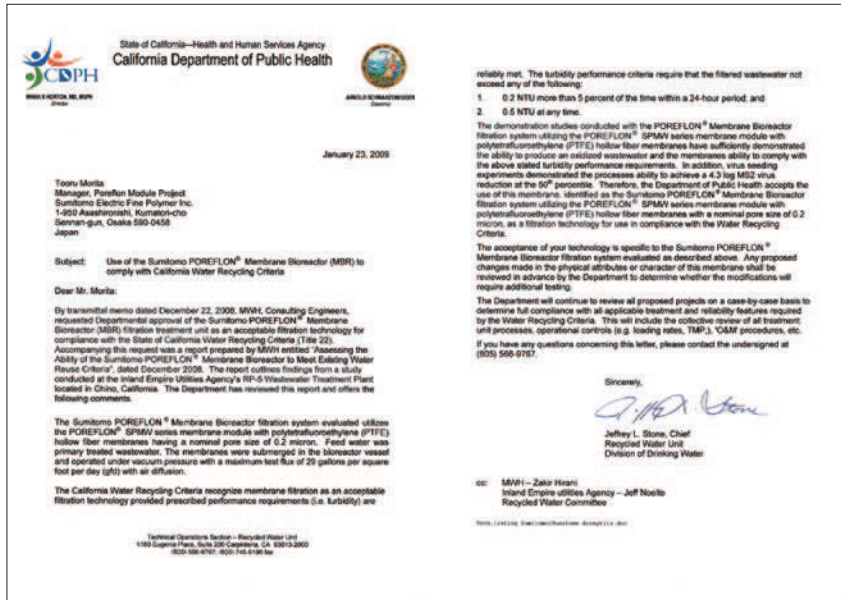
	Tensile strength (N/fiber)		Adhesive strength (N/fiber)		Remarks
	Before soaking	After soaking	Before soaking	After soaking	
PTFE membrane (POREFLON®)	63	62	>60	>60	Hydrophilic property is kept

Measurement procedure Tensile strength (hollow fiber): Measure breaking strength of a sample 100mm in length using a tensile tester. Adhesive strength (sealed area): Fix the sealed area and pull the hollow fiber upward for measurement using a tensile tester.

— Authorization of Every Kind —



Certification on Membrane Module Standards for Drinking Water Use (Japan)



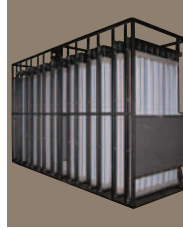
Authorization of MBR by California Department of Public Health "Title 22" (USA)

Product Line-up and Recommended Uses

Submerge Type

Recommended application

1. Membrane Bioreactor (MBR)
2. Treatment of wastewater with high turbidity
3. Treatment of wastewater with insoluble oil
4. Water purification system combined with powdered activated carbon



External Pressure Dead-end Filtration Type

Recommended application

1. Industrial wastewater treatment
2. Treatment of wastewater with insoluble oil
3. Water purification system (Water supply)



Standard Specification List (all filtration membranes are made of PTFE)

Model No.			Submerge Type				External pressure dead-end filtration type			
			SPMW				OPMW			
			-13B6	-13B12	-12B6	-12B12	-01B25	-01B50	-02B25	-02B50
			for municipal wastewater treatment		for industrial wastewater treatment		for high suspended solid water		for low suspended solid water	
Membrane	Nominal pore size	μm	0.2	0.2	0.1	0.1	0.08	0.08	0.1	0.1
	Diameter	mm	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
	Membrane area	m ²	6	12	6	12	25	50	25	50
	Hydrophilic treatment		Hydrophilic				Hydrophilic			
Material	Cap		ABS resin (Joint nut : SUS303)				ABS resin			
	Potting		Polyurethane resin		Heat- & chemical-resistant epoxy resin		Heat- & chemical-resistant epoxy resin			
	Supporting bar		SUS304				PVC resin			
	Outer casing		(Nothing)				ABS resin			
Dimensions	Length	mm	1300	2410	1300	2410	1330	2300	1330	2300
	Bottom section	mm	154×164				Diameter: 212			
Operating condition	Filtration method		Suction dead-end filtration				External pressure dead-end filtration			
	Trans membrane pressure	Filtration	>-60 kPa		>-60 kPa		<100 kPa			
		Backwash	<100 kPa		<100 kPa		<200 kPa			
	Maximum temperature limit	°C	50				50*			

* If operating temperature is over 50 degrees centigrade, please feel free to ask us.

*POREFLON® Module and related technical information may be subject to control such as the Export Trade Control Ordinance. Please note that you are responsible for taking the necessary procedure including application for an export permission in cases where this product is applicable to the products subject to control.

SUMITOMO ELECTRIC INDUSTRIES, LTD.

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Submerge Type POREFLON® Module for MBR

Features

Stable Flux

The use of PTFE membrane with high durability provided by hydrophilic treatment combined with an asymmetric (dual) structure offers superior resistance to fouling.

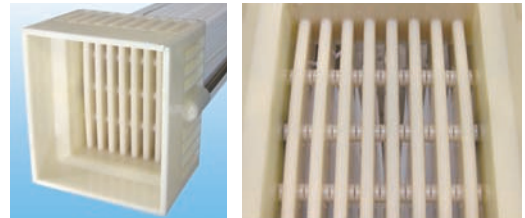
Oil and silica can be washed off.

PTFE membrane allows cleaning with strong alkali.

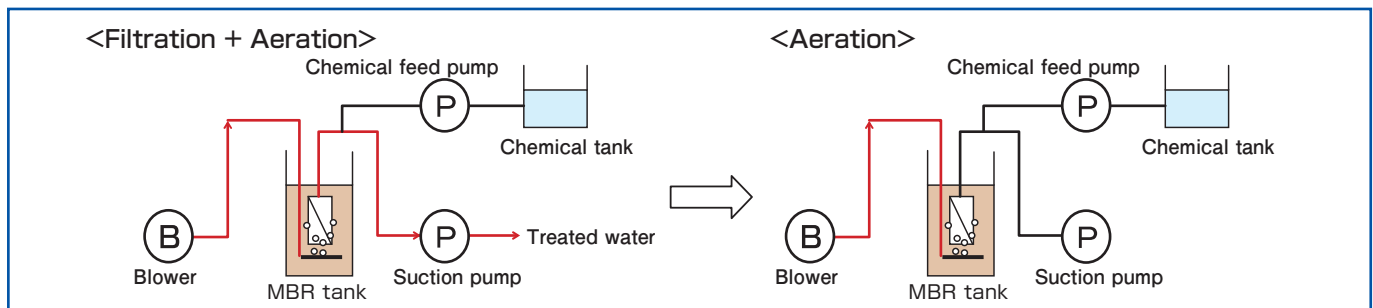
Low operational costs

Our original "U-shaped structure" employed at the end bottom prevents active sludge accumulation and allows efficient air diffusion.

<U-shaped structure>



Standard operating conditions

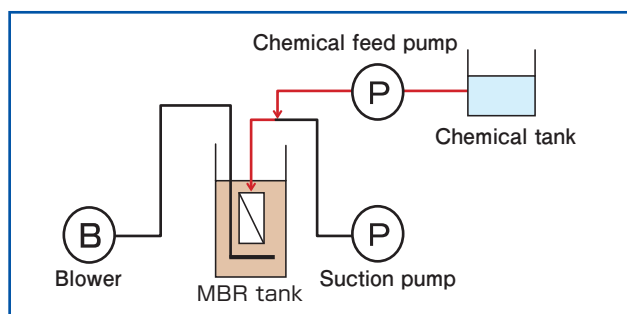


Example of filtration operating conditions

Assumed water quality: **MLSS** : 10,000 mg/L
BOD 200 – 300 mg/L **Designed Flux** : 0.5 – 0.8 m/d
COD_{Mn} 100 mg/L **Filtration time** : Filtration + Aeration : 9min → Aeration : 1min
Aeration flow rate : 30 – 60 L/min/1 module
 (Normally, no backwash is carried out.)

Standard chemical cleaning conditions

Inline cleaning (Low concentration cleaning)



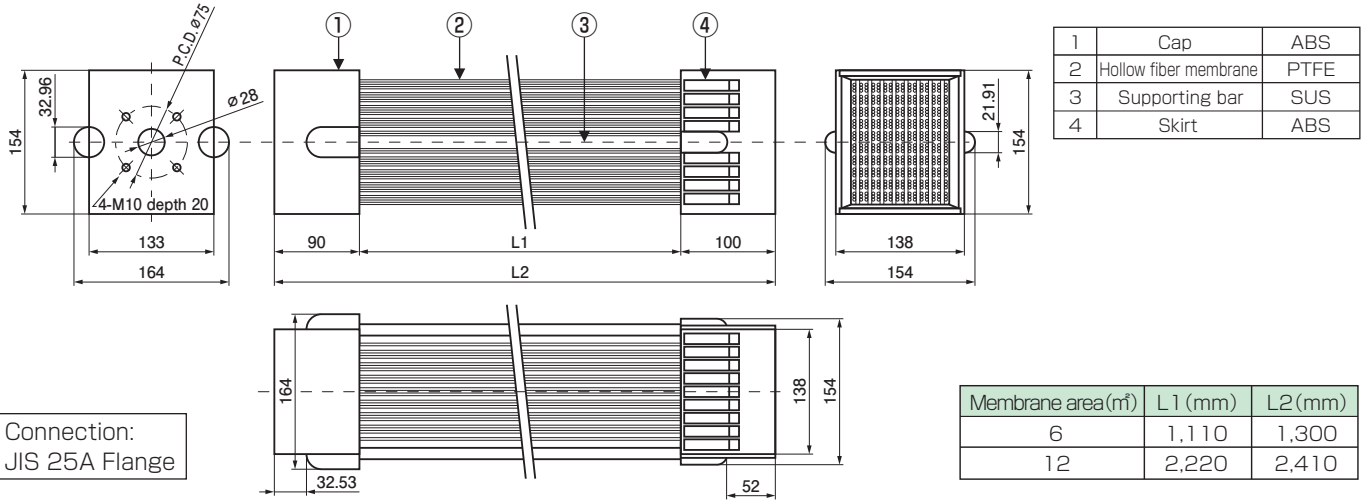
	Chemical concentration	Chemical dosage	Cleaning duration	Cleaning guideline
Target: Organic matter	100–500mg/L NaOH + 300–3,000 mg/L NaClO (mixture)	2L/m ² + All pipes	30 min – 2 hours	Every 1–2 weeks or TMP 60kPa
Target: Inorganic matter	300–3,000 mg/L HCl, H ₂ SO ₄ , Citric acid, Oxalic acid			

Out-of-tank cleaning (High concentration cleaning)

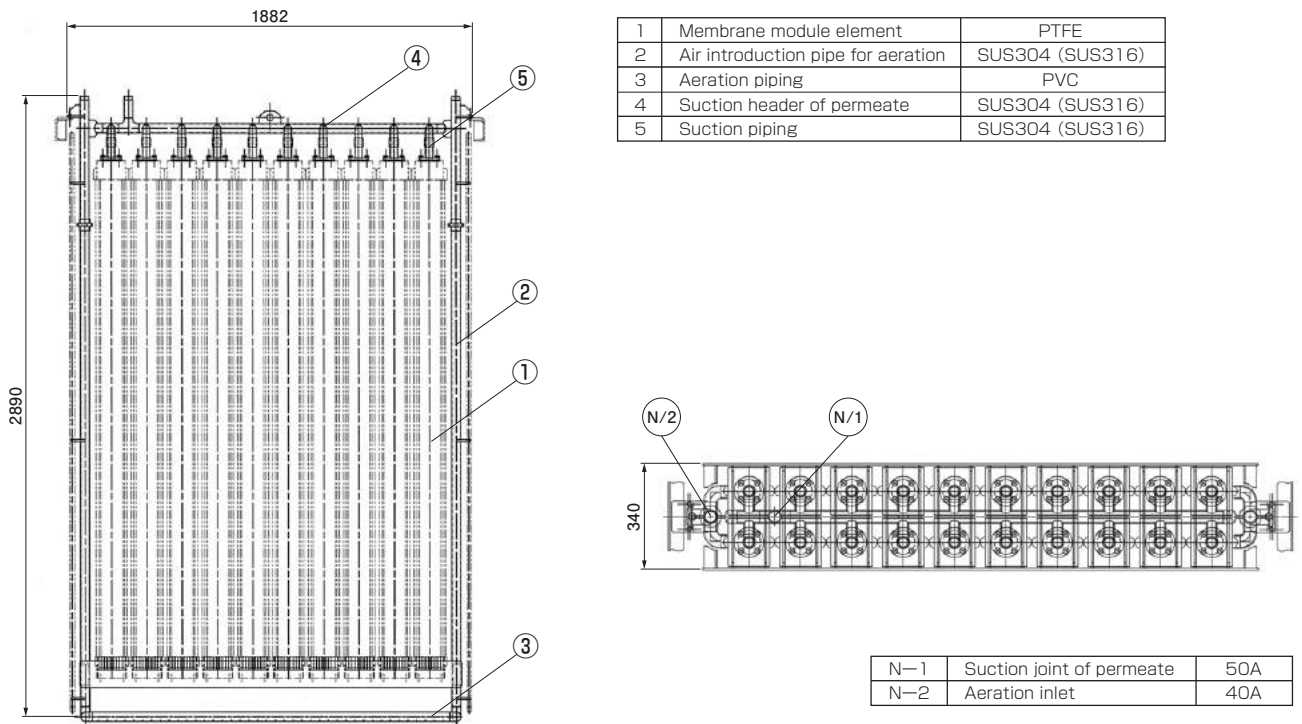
	Chemical concentration	Immersion duration	Cleaning guideline
Target: Organic matter	0.5–4wt% NaOH + 300–3,000 mg/L NaClO (mixture)	6–12 hours	Every 6 months
Target: Inorganic matter	0.3–3 wt% HCl, H ₂ SO ₄ , Citric acid, Oxalic acid		

* Cleaning conditions vary depending on raw water quality

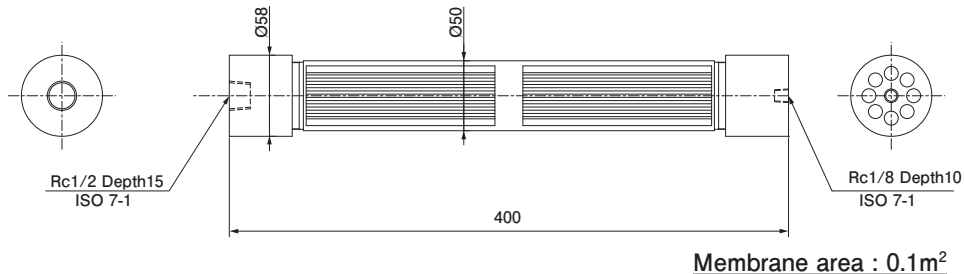
Submerge Type Standard Model Outline Drawing



Module Unit Drawing (Assembly Example on Membrane Area 240m²)



Mini module for evaluation



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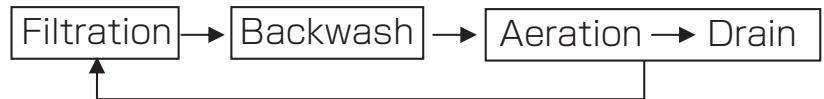
POREFLON® Module for Industrial Effluent

External Pressure Dead-end Filtration Type



Standard operating conditions

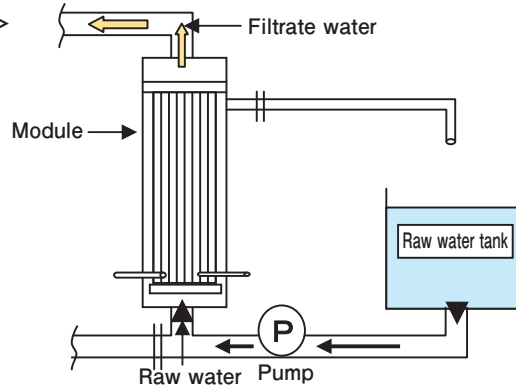
Standard operating procedure



*The following conditions are for reference use and may require changes in operational conditions depending on raw water quality.

Example of filtration operating conditions

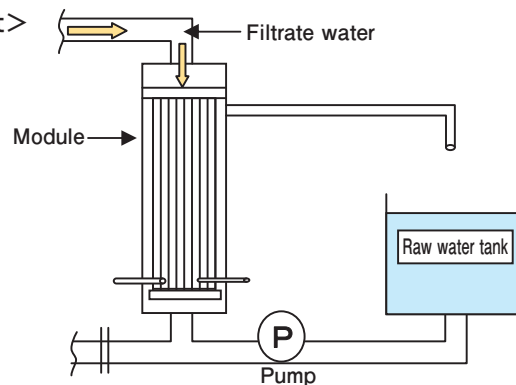
<Filtration flow chart>



Raw water type	Low turbidity water	High turbidity water
Set flow rate	100 L/ m ³ /hr	50 L/ m ³ /hr
Trans membrane pressure	<100 kPa	Same as left
Temperature	< 50°C	Same as left
Regular pH range	1 – 13	Same as left

Example of backwash operating conditions

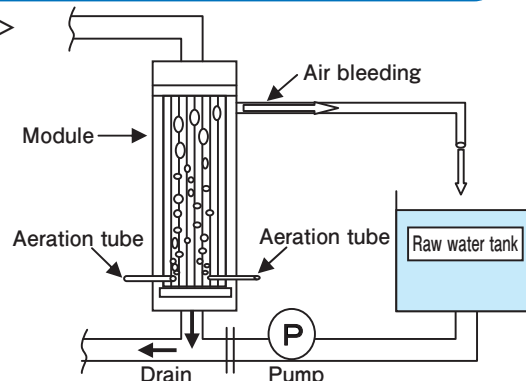
<Backwash flow chart>



Inlet pressure	< 200 kPa
Time	Standard:10sec; Max:30sec.
Frequency	Once/30 min

Example of aeration operational conditions → Drain

<Aeration flow chart>



Air flow rate	150 L/min
Time	10 – 30 sec
Frequency	After every backwash

Standard Chemical Cleaning Conditions

Low concentration cleaning

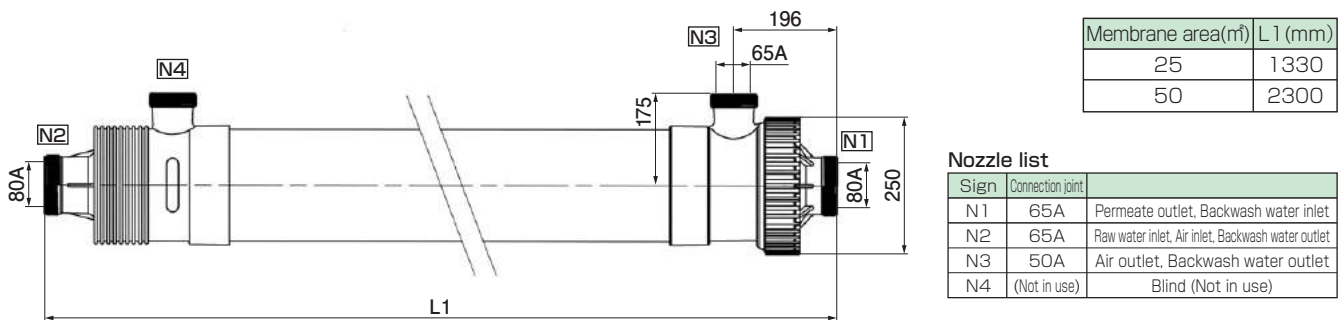
	Chemical concentration	Chemical dosage	Cleaning duration	Cleaning guideline
Target: Organic matter	100–500 mg/L NaOH + 300–3,000 mg/L NaClO (mixture)	60L + All pipes	30 min–2 hours	Initial transmembrane pressure +50 kPa
Target: Inorganic matter	300–3,000 mg/L HCl or H ₂ SO ₄ , Citric acid, Oxalic acid			

High concentration cleaning

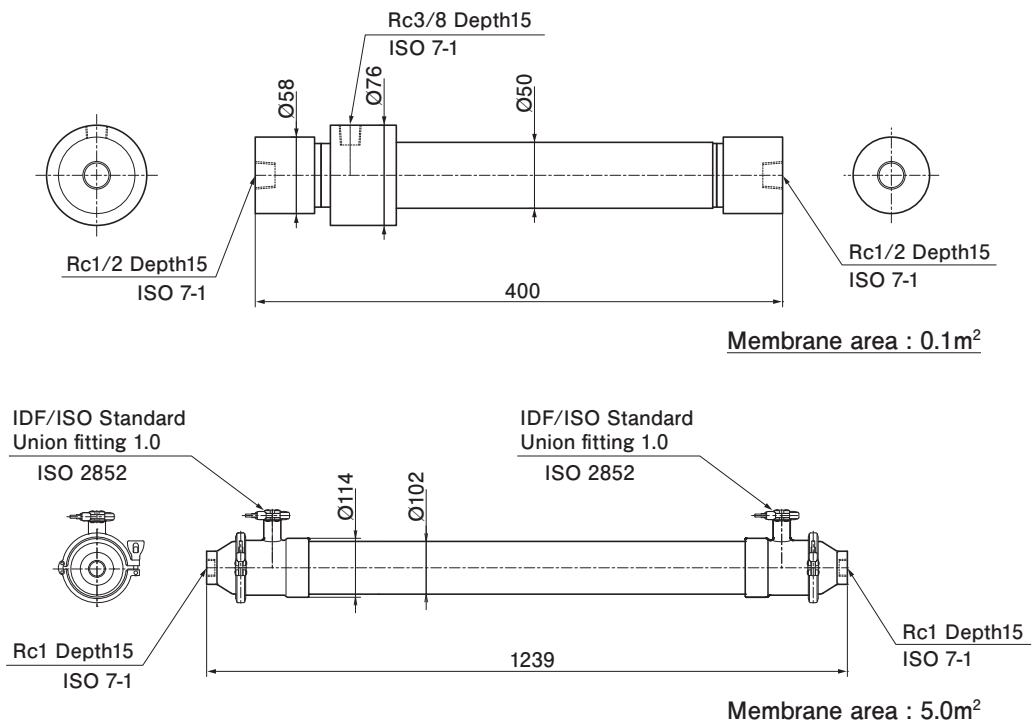
	Chemical concentration	Immersion duration
Target: Organic matter	0.5–4 wt% NaOH + 300–3,000 mg/L NaClO (mixture)	6 – 12 hours
Target: Inorganic matter	0.3–3 wt% HCl or H ₂ SO ₄ , Citric acid, Oxalic acid	

* Cleaning conditions vary depending on raw water quality

External Pressure Type Standard Model Outline Drawing



Mini Module for Evaluation



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