

## Unit Specification

The SP series has several unit types with different unit heights which can meet a **wide range of water depth requirements especially for retrofit projects.**

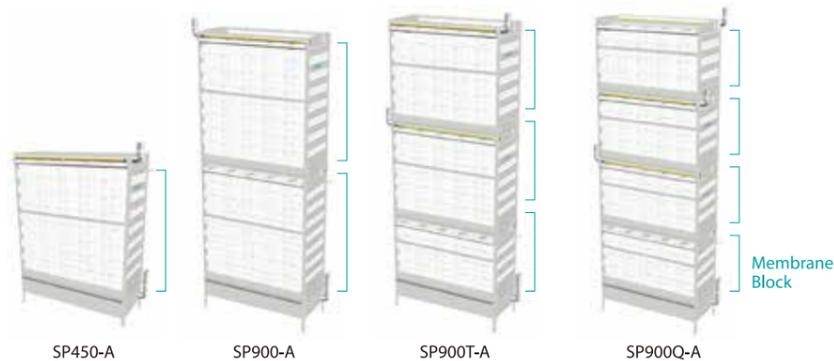
The combination of Membrane Blocks will allow you to meet ceiling height constraints and overhead crane capacity constraints.

Unit Type	Effective Membrane Surface Area	Dimensions			Mass (Dry)	Required Min. Water Depth*
		Height	Width	Length		
SP225 - A	225 m <sup>2</sup> / 2,421 ft <sup>2</sup>	1,877 mm / 6.16 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	590 kg / 1,301 lbs	2.3 m / 7.55 ft
SP337 - A	337.5 m <sup>2</sup> / 3,632 ft <sup>2</sup>	2,401 mm / 7.88 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	790 kg / 1,742 lbs	2.8 m / 9.19 ft
SP450 - A	450 m <sup>2</sup> / 4,843 ft <sup>2</sup>	2,923 mm / 9.59 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	990 kg / 2,183 lbs	3.3 m / 10.83 ft
SP450 W - A	450 m <sup>2</sup> / 4,843 ft <sup>2</sup>	3,165 mm / 10.38 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,110 kg / 2,447 lbs	3.6 m / 11.82 ft
SP562 W - A	562.5 m <sup>2</sup> / 6,054 ft <sup>2</sup>	3,689 mm / 12.10 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,310 kg / 2,888 lbs	4.1 m / 13.46 ft
SP675 - A	675 m <sup>2</sup> / 7,265 ft <sup>2</sup>	4,213 mm / 13.82 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,510 kg / 3,329 lbs	4.6 m / 15.10 ft
SP675 T - A	675 m <sup>2</sup> / 7,265 ft <sup>2</sup>	4,453 mm / 14.61 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,630 kg / 3,594 lbs	4.9 m / 16.08 ft
SP787 W - A	787.5 m <sup>2</sup> / 8,476 ft <sup>2</sup>	4,735 mm / 15.53 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,710 kg / 3,770 lbs	5.1 m / 16.74 ft
SP787 T - A	787.5 m <sup>2</sup> / 8,476 ft <sup>2</sup>	4,977 mm / 16.33 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,830 kg / 4,034 lbs	5.4 m / 17.72 ft
SP900 - A	900 m <sup>2</sup> / 9,687 ft <sup>2</sup>	5,257 mm / 17.25 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,910 kg / 4,211 lbs	5.7 m / 18.71 ft
SP900 T - A	900 m <sup>2</sup> / 9,687 ft <sup>2</sup>	5,501 mm / 18.05 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	2,030 kg / 4,475 lbs	5.9 m / 19.36 ft
SP900 Q - A	900 m <sup>2</sup> / 9,687 ft <sup>2</sup>	5,741 mm / 18.84 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	2,150 kg / 4,740 lbs	6.1 m / 20.02 ft
SP200	200 m <sup>2</sup> / 2,152 ft <sup>2</sup>	1,877 mm / 6.16 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	550 kg / 1,213 lbs	2.3 m / 7.55 ft
SP300	300 m <sup>2</sup> / 3,229 ft <sup>2</sup>	2,401 mm / 7.88 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	730 kg / 1,609 lbs	2.8 m / 9.19 ft
SP400	400 m <sup>2</sup> / 4,305 ft <sup>2</sup>	2,923 mm / 9.59 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	910 kg / 2,006 lbs	3.3 m / 10.83 ft
SP600	600 m <sup>2</sup> / 6,458 ft <sup>2</sup>	4,213 mm / 13.82 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,390 kg / 3,065 lbs	4.6 m / 15.10 ft
SP800	800 m <sup>2</sup> / 8,611 ft <sup>2</sup>	5,257 mm / 17.25 ft	944 mm / 3.10 ft	2,186 mm / 7.17 ft	1,750 kg / 3,858 lbs	5.7 m / 18.71 ft

\* Extra water depth will be needed for gravity filtration.

SP 1 2 - 3

Symbol	Definition
1	Membrane area XXX[m <sup>2</sup> ]
2	Nos of Membrane Blocks None = 1 (SMU with ≤ 450m <sup>2</sup> ) or 2 (SMU with ≥ 600m <sup>2</sup> ) W = 2 T = 3 Q = 4
3	Type of SP modules None = H025-40 (10m <sup>2</sup> ) A = H025-45 (11.25m <sup>2</sup> )



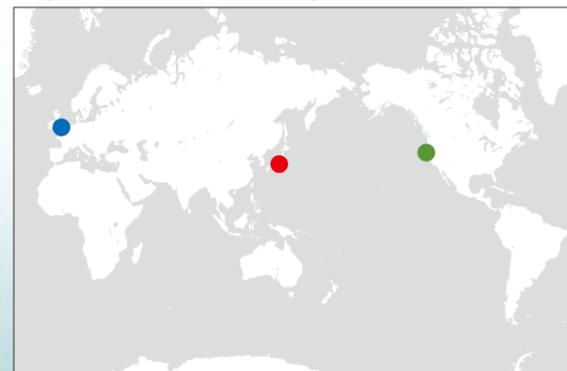
KUBOTA Submerged Membrane Unit® models in all illustrations are with pickling treatment. KUBOTA Submerged Membrane Unit® design and specifications are subject to change without notice.

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## KUBOTA Corporation

Membrane Systems Dept.

<https://www.kubota.com/products/solutions/>



### ■ KUBOTA Corporation (Tokyo Head Office)

1-3, Kyobashi 2-chome, Chuo-ku, Tokyo, 104-8307 JAPAN  
Phone: +81-3-3245-3665

### ■ Kubota Water and Environment Europe Ltd.

3rd Floor, No.1 Farriers Yard, 77-85 Fulham Palace Road, London, W6 8AH, U.K.  
Phone: +44-20-8741-5262  
<http://www.kubota-mbr.com/>

### ■ Kubota Water and Environment U.S.A. Corporation

19910 N Creek Pkwy, Suite 100, Bothell, WA 98011, USA  
Phone: +1-425-898-2858  
<http://www.kubota-membrane.com/>

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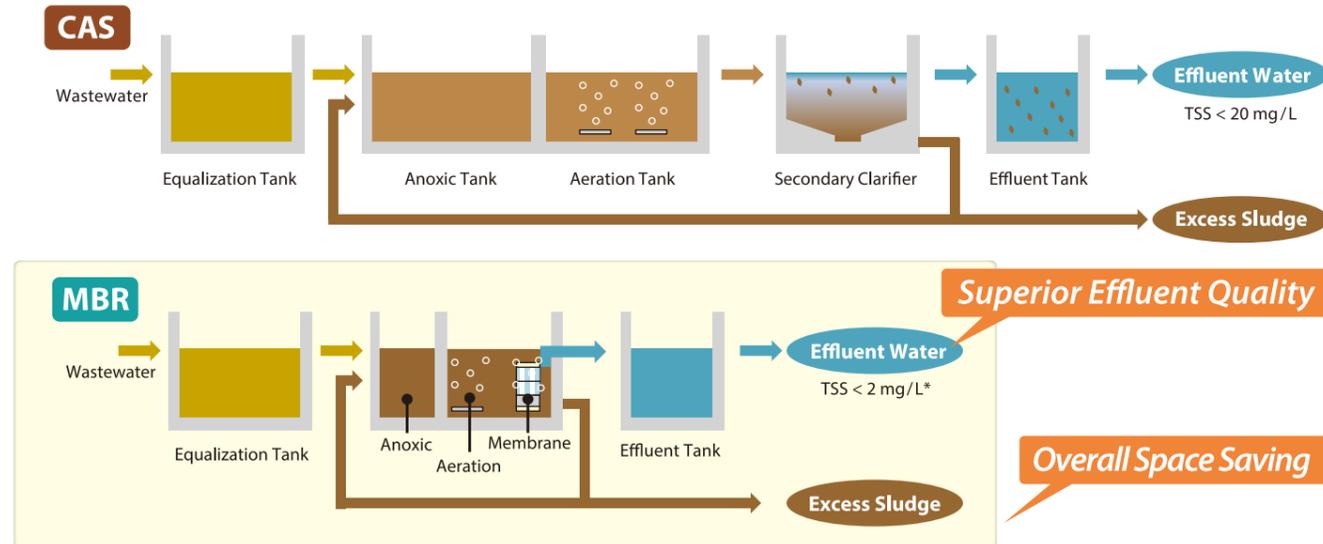
## KUBOTA Submerged Membrane Unit® SP series



## Combined Membrane Bioreactor

The Membrane Bioreactor (MBR) process is a proven wastewater treatment method which combines a biological treatment process and a membrane filtration process for final solid-liquid separation. The MBR perfectly eliminates the secondary clarifier and carry-over of the activated sludge. Therefore, the concentration of the activated sludge becomes higher and the process tank volume becomes smaller compared to the Conventional Activated Sludge (CAS) process.

KUBOTA Submerged Membrane Unit® (SMU) can supply air not only for membrane scouring, but also for the oxygen required in biological treatment. Thus, in the membrane zone, biological and filtration processes are combined and carried out at once reducing the necessary total tank volume and its land area. When SMU is installed with an additional fine bubble diffuser in the same tank, the aeration and membrane tanks can be physically combined.

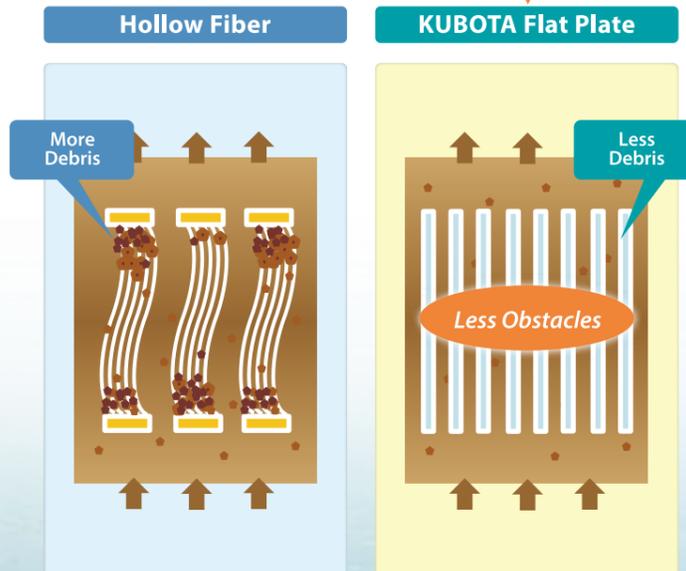


\*TSS < 2mg/L is a typical achievable value, not a guaranteed value.

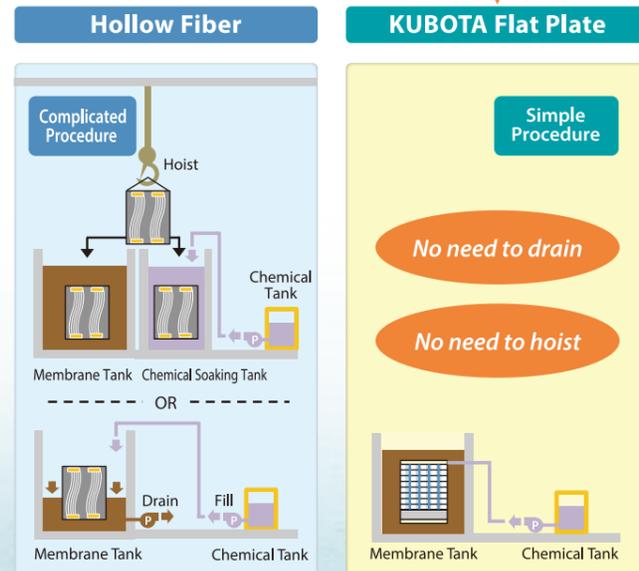
## KUBOTA Submerged Membrane Unit®

The KUBOTA Submerged Membrane Unit® (SMU) is membrane equipment dedicated for the MBR process. The SMU can be directly submerged in activated sludge and allows only clean treated water to pass through its "Flat and Rigid Plate" type membrane. The membrane sheet has 0.2 μm pores which block fine particles and most microorganisms in the activated sludge. The "Flat and Rigid Plate" configuration keeps the space between membranes clear and minimizes debris accumulation. *In-situ* chemical cleaning is the only maintenance typically required.

### Trouble Free Operation



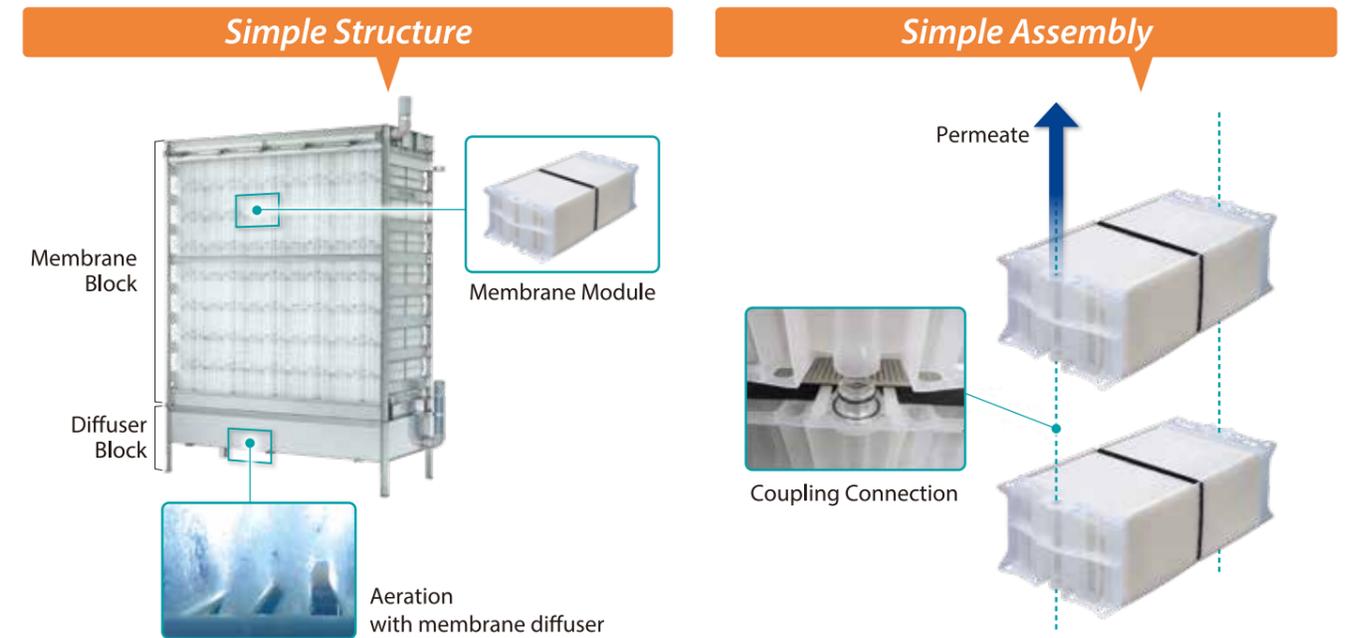
### Easy Maintenance



## Structure of KUBOTA SP Series

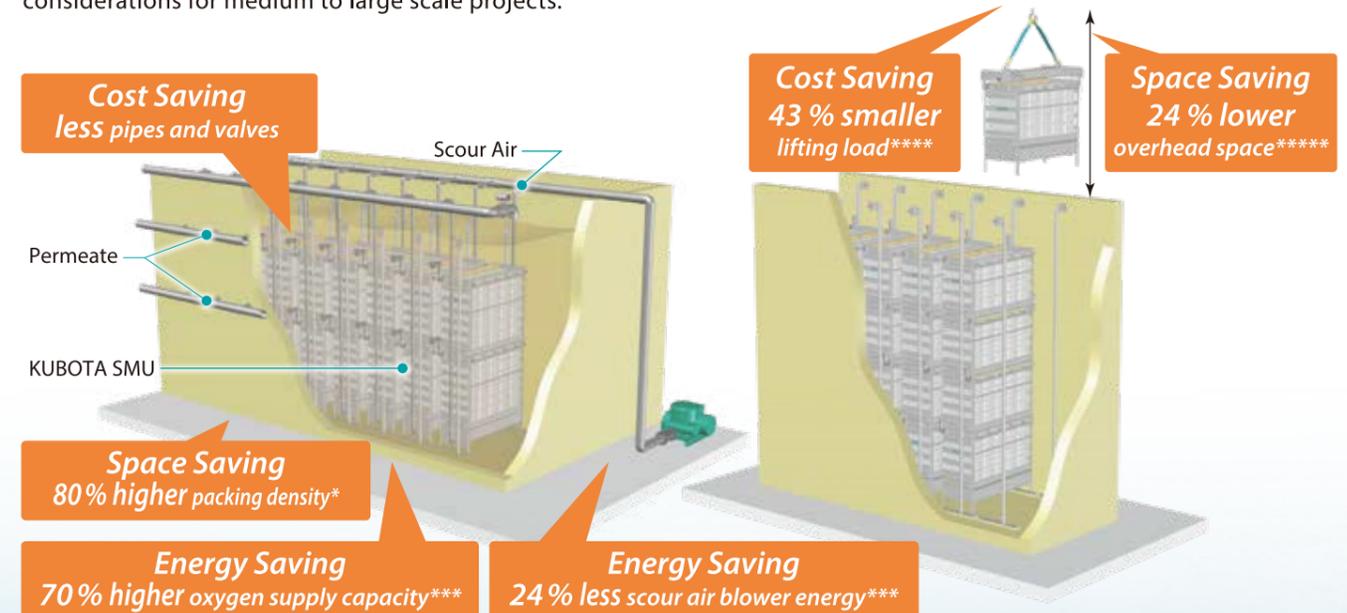
The KUBOTA SP series is made up of SMU models optimized specifically for **medium to large scale wastewater treatment applications**. A plurality of flat membrane plates and permeate collection chambers are integrated into a compact "Membrane Module". This design improves packing density and reduces scour air requirements.

Multiple Membrane Modules are assembled into a Membrane Block using simple coupling connections. The coupling connection also serves as a conduit to the permeate header. This structure simplifies the assembling procedure of the SMU during field maintenance work. Moreover, the membrane diffuser contribute to reduce the oxygen supply blowers' power consumption due to their high oxygen transfer efficiency.



## Advantages of KUBOTA SP Series

Based on its unique structure, the SP series reduces **required space** and **required scour air**; both of which are important considerations for medium to large scale projects.



\* Comparing SP900-A to RW400 in terms of membrane area per required tank space for installation [m<sup>2</sup>/m<sup>3</sup>].  
 \*\* Comparing SP900-A to RW400 in terms of required scour air blower energy consumption per membrane area [kWh/m<sup>2</sup>].  
 \*\*\* Comparing SP900-A to RW400 in terms of oxygen transfer efficiency per membrane unit [%].  
 \*\*\*\* Comparing SP900Q-A to SP900-A in terms of total max. mass of lifted lower membrane block  
 \*\*\*\*\* Comparing SP900Q-A to SP900-A in terms of required overhead space for lifting membrane unit