

# Flat Sheet membrane manufacturing systems

## About MEMS

**MEMS** is a spinoff brand from PHILOS; a prominent firm with 20+ years' expertise in membrane production and system design. It is renowned for its capabilities in delivering comprehensive solutions for various kinds of membrane applications. MEMS meanwhile, is now managed by PHILOS's sister firm Wellspring Expand.

**MEMS** focuses on adopting to customer's mind of work. We have developed our systems which are user friendly and convenient to use. With years of knowledge and experience behind us we are able to offer you the most advanced design and technology in membrane evaluation and manufacturing system. No matter the size, scale, usage or application, all of our customers will benefit from our experts' advice.

## MEMS proposal to customers

We have a long history of membrane research, manufacture, and engineering, and we know exactly what goes on in the lab. We have a greater understanding of the difficulties you face as researchers than anybody else, and we're here to help. While working with researchers, we have studied each of them attentively and attempted to comprehend the psychology of researchers. When doing research, we know that ease of use is the most important factor.

We have witnessed that, despite possessing pricey and properly functioning equipment, many researchers nonetheless employ poorly constructed equipment just because they are more comfortable to use. Most of the times, the pricier the system the more complicated it is and the more room it takes in the lab, while needing a lot of cleaning, and are not even suitable for acquiring desired results. As a result, we at MEMS have made it our duty to supply researchers and developers of membranes with the most user-friendly and convenient equipment. In order to overcome even the smallest obstacles, MEMS was established. So, at MEMS, we offer "A device that understands the researcher's mind" by adapting to the user mind of researchers via our years of expertise, observation, and realization. That's what we'd want to put forward to the community of researchers.



**MEMS**°

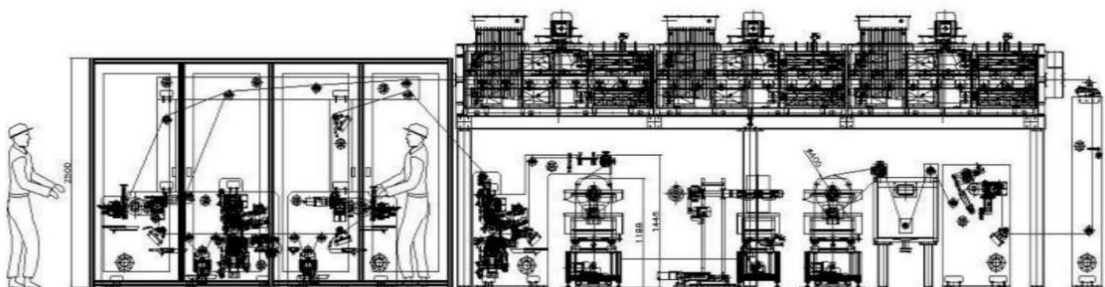
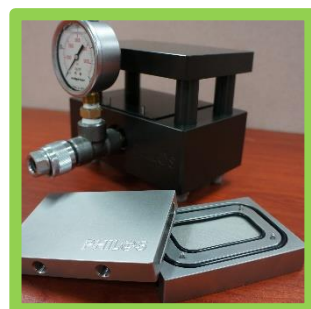
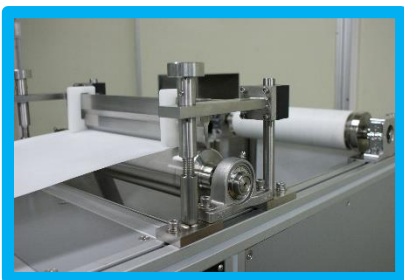
## Special feature of MEMS Flat sheet membrane manufacturing systems

Recognizing the user's mind of research, we at MEMS offer the most precise, user-friendly, time and space efficient flat sheet membrane manufacturing systems. Our flat sheet membrane manufacturing equipment, allows researchers to not only prepare a lot of samples in a short time with confidence in reproducibility and accuracy but can also permits to carry out an experiment in variety of conditions.

With MEMS researchers no more have to worry about the tedious process of membrane making such as using spacer tape on a glass plate while casting the dope with a doctor's knife or even worry about inaccurate results obtained by following such process. Researchers now can take advantage of MEMS flat sheet membrane casting machine which comes with compact and user-friendly design to make your experiment easy and fruitful whilst ensuring the accuracy and reproducibility of every result. Furthermore, with MEMS continuous type flat sheet membrane casting device, researchers can now avoid to spend a lot of time and money operating the device until the casting condition stabilizes, as you can now use our systems in much affordable price whilst producing several samples in a short time. This situation will perhaps allow you save much time and money in your research. This might even help you in publishing few more papers. Your results will be more reliable.

MEMS provides you with simple system, but the best precision casting knife, support roll, and other control systems. Coating part is also comparable to the level of production facilities due to its high precision. The thickness of the membrane is also adjustable to the object, allowing you the flexibility to develop membrane with various factors.

MEMS will give you a nice opportunity to have a whole new experience of developing membranes.



## The process of flat sheet membrane manufacturing

MEMS supplies all sorts of facilities associated with the membrane manufacturing from the materials used to the manufacturing and evaluation systems. We provide you with an overall solution to membrane R&D.

**Dope formulation ⇒ Membrane casting ⇒ TFC coating ⇒ Rinsing & drying ⇒ Spiral-wound element winding ⇒ Trimming ⇒ QC & evaluation**

### Flat sheet membrane casting system

Item	System	Specification
FCL	Lab Flat sheet membrane casting system	A4 Size casting Braid Doctor knife with thickness control by micrometer Casting speed 0.2~3 m/min Glass plate, non-temperature control 300L x 200W
FCS-330	Semi-continuous Flat sheet membrane casting system	330 mm width continuous casting Braid Doctor knife with thickness control by micrometer Casting speed 0.5~5 m/min Stainless steel 304, 88mmD casting roll, Temperature control RT~70°C with Heat exchanger 1600L x 700W x 1400H
FCS-500	Semi-continuous Flat sheet membrane casting system	500 mm width continuous casting Braid Doctor knife with thickness control by micrometer Casting speed 0.5~5 m/min Stainless steel 304, 88mmD casting roll, Temperature control RT~70°C with Heat exchanger 1600L x 900W x 1400H
FCC	Continuous Flat sheet membrane casting system	1,000 mm width continuous casting Braid Doctor knife with thickness control by micrometer Casting speed 0.5~3 m/min Stainless steel 304, 120mmD casting roll, Temp. control; RT ~ 60 ± 3°C by direct heating (Direct heating with heater installed in the bath) Washing bath and Rewinder 4,100L x 1,800W x 1,500H



## TFC (Thin Film Composite) membrane coating system

Secondary coating is generally performed to develop RO, FO and functional membrane. It is mainly formed by polyamide poly-condensation reaction on the surface of a base membrane. It is done either through gravure roll method or use a slot-die method depending upon the requirement and condition of the researcher. Generally, while making a polyamide TFC membrane, a membrane firstly has to go through dip-coating in amine solution and then react with acyl chloride solution, which usually takes much time and space to be ready. MEMS offered the best way to make TFC membrane using a very compact system. And, it usually is enough to produce a small scale spiral-wound element.

Item	System	Specification
FTD	Semi-continuous Flat sheet membrane dip-coating system	300mmW TFC coating by dipping process 1 <sup>st</sup> Coating; dipping and SUS304 rolls and rubber mangle 2 <sup>nd</sup> Coating; spray or dipping 3 <sup>rd</sup> Dry oven; drum type dryer(600mmD x 400mmW) convection type, RT~ 180 ± 5°C Coating speed 1~5 m/min 2,200L x 1,100W x 1,900H
FTG	Semi-continuous Flat sheet membrane gravure-coating system	300mmW TFC coating by dipping process 1 <sup>st</sup> Coating; gravure coating 2 <sup>nd</sup> Coating; gravure coating 3 <sup>rd</sup> Dry oven; drum type dryer(600mmD x 400mmW) convection type, RT~ 180 ± 5°C Coating speed 1~5 m/min 2,300L x 1,100W x 2,000H



## Spiral-wound element manufacturing system

Item	System	Specification
<b>SWS</b>	<b>Spiral-wound element rolling and trimming system (2521)</b>	Element 1812, 2521 available model Winding speed control Unwinder/winder tension control 2,500mmL x 1,300mmW x 800 mmH
<b>SWL</b>	<b>Spiral-wound element rolling and trimming system (4040)</b>	Tricot (support textile) welding system, Max. 30 sheets Folding system, 1022 mm width membrane sheets accurate control by servo motor Rolling system, Max. 20 leaves winding, Max 4 inch D Trimming system, 250mmD rotating knife and speed control Wrapping system, winding speed 4~40 m/min

