

Add-in Software [Pendant Drop]

Measurement of Surface / Interfacial Tension by Pendant Drop Method

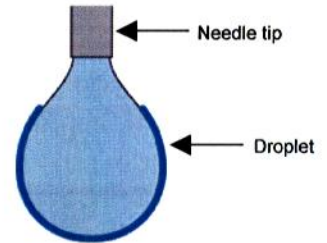
<Surface/Interfacial Tension measurement by Pendant Drop method>

"Wetting" is an interaction worked between solid and liquid surfaces when they contact, and Surface Tension of liquid will be greatly effective to the Wetting. DropMaster series enable to measure Surface/Interfacial Tension of liquid(s) by Pendant Drop method.

■ Pendant Drop Method

When liquid is dispensed from needle tip located vertically, a droplet is suspended as shown. This droplet is called "Pendant Drop". Since the shape of pendant drop changes depending on its volume, density, surface and interfacial tension, analysis of the profile can determine surface and interfacial tension

In the interfacial measurement, "Wilhelmy method" or "du Nouy method" is well-known, but pendant drop method is applicable to the interfacial tension measurement between liquid, viscous liquid, and polymer. Moreover, there is a merit that be able to measure with a bit of sample.



■ Application

- Evaluation of Emulsification / Dispensability
- Evaluation of Detergent

■ Measurement

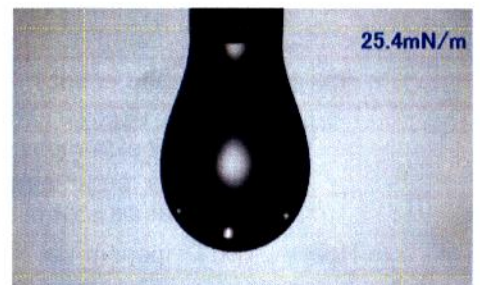
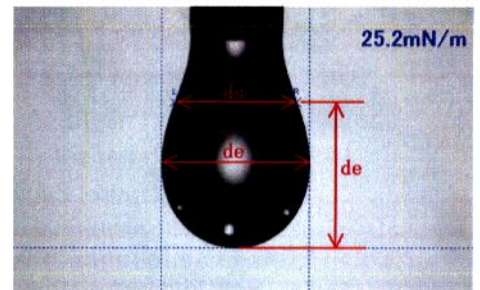
< d_s/d_e Method >

The maximum diameter of pendant drop (horizontal plane) d_e and the diameter d_s is determined as high as the length d_e from drop bottom are used for analysis.

The interfacial tension γ is determined by the following equation.

$$\gamma = \Delta\rho g d_e^2 \frac{1}{H}$$

$\Delta\rho$: Density difference g : G-forces
 $1/H$: Compensating rate derived from d_s/d_e

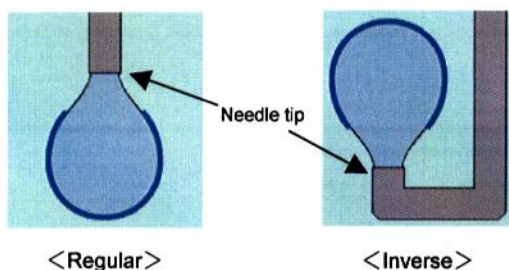


< Young-Laplace Method >

Interfacial tension is calculated by Yong-Laplace equation, by image capture system from density difference value and profile of droplet made from needle tip.

Accurate interfacial tension is calculated by fitting between the profile curve and Yong-Laplace theoretical curve.

Inversion measurement with inverted needle is possible. It is usable in the case that liquid of low density is scarce or colored in interfacial tension measurement, a measurement by discharging air bubble in liquid is preferable.



■ Pendant Drop Option corresponding list by each model

◎ : Standard equipment ○ : Applicable – : Unapplied

		DM-CE1	DM-501	DM-701
Measurement	Interfacial tension	○※1	○	○
	Interfacial tension variations over time	○※1	○	○
	Droplet volume measurement	○※1	○	○
	Automatic droplet dispensing	○※2	○	◎
	FAMAS Add-in [Pendant Drop Method]	○	○	○
Hardware	Single dispenser system	○	◎	◎
	Pendant Drop kit	○	○	○
	Standard pendant droplet sample (STANDARD VIEW) ※3	○	○	○
	Standard pendant droplet sample (WIDE1,2 VIEW) ※3	-	○	○

※1 Limited. Droplet must be smaller than the field of view 6.1 x 4.6mm.

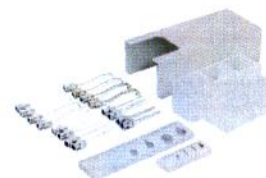
※2 Single dispenser system is required for automatic making droplet.

※3 This is included in the pendant drop kit.

■ Option Information

< Pendant Drop kit >

- Glass Cell 5 ea.
- Glass Cell Cover for Light shielding 1 ea.
- PD Needle set (28G、22G、18G、15G) 2 ea.
- PD Inverted Needle set (28G、22G、18G、15G) 2 ea.
- Standard Pendant Drop Sample (STANDARD VIEW) 1 ea.
- Standard Pendant Drop Sample (WIDE1、2 VIEW) 1 ea.



< Temperature Control System >

Since surface tension relies on the liquid temperature,

[Circulating Water System]

- Jacket Type Chamber set

For use to control circum-temperature of pendant drop as interfacial tension measurement.

Temperature range: about +10~70℃
(Hot/Cold water circulator is required.)

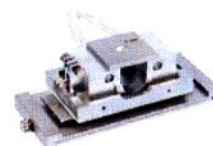


[Electric Heater System]

- Heater Type Chamber set

For use to control circum-temperature of pendant drop as interfacial tension measurement

Temperature range: ambient ~ 380℃
(Temperature controller is required.)



- Heater Type Dispenser set

For use to control temperature of liquid sample, molten polymer.

Temperature range: ambient ~ 380℃
(Temperature controller is required.)



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