

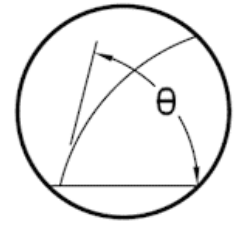
ramé-hart 400 Series

ramé-hart instrument co.

World Leader in Surface Science Instruments

Since 1961

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ramé-hart Model 400
Goniometer / Tensiometer



Model 400 Goniometer / Tensiometer with Wafer Support

ramé-hart Model 400 Goniometer / Tensiometer

The ramé-hart Model 400 has a unique position in the lineup of instruments offered by ramé-hart instrument co.: it's the only one that has specifically been built and optimized for a particular industry – the semiconductor makers.

Today's chipmakers are involved in the most technical and challenging manufacturing tasks. Processing methods demand increasingly complex and sophisticated methods and monitoring systems to detect contaminants and reduce outgassing (molecular contamination, or MC) which can reduce yields and lower profits.

ramé-hart has been a leader in helping chipmakers detect excess levels of MC through contact angle. Pure deionized water droplets are deposited on a silicon wafer that has oxidized under normal cleanroom manufacturing conditions. If the contact angle is higher than a specific setpoint, then excess organic condensation has occurred.

After specific and highly controlled cleaning processes occur, the wafers are again

inspected via contact angle to ensure that they are free of contaminants.

Our Model 400 was used in the first 10k cleanroom in the Philippines for this very purpose.

While Model 400 is optimized for the chipmakers, it's also suitable for other applications that require a large rotating circular specimen stage.

The included DROPimage Pro software measures, in addition to contact angle, surface energy (using seven different methods), and surface and interfacial tension.

Model 400 can easily be customized. The Automated Dispensing System is a popular option and recommended in QC environments where many tests are made daily and where repeatability is important.

The rotating wafer support can also be upgraded to a larger 10, 12 or even 13.625-inch support, or downgraded to a 6 or 4-inch support.

Vacuum chucks are available in 6 inch and 8-inch sizes as well.

DROPimage Pro Software

Model 400 ships with our powerful DROPimage Pro software package and is capable of contact angle, surface energy, surface tension, and interfacial tension.

There are (8) surface energy tools. The van Oss Acid-Base Tool uses three liquids – two polar and one apolar. The Owens-Wendt Geometric-Mean Method uses two pure liquids denoting their dispersive and non-dispersive components and is accessed through the Two-Liquid Surface Energy Tool. The Wu Harmonic-Mean Method is ideal for polymer surfaces and also requires two liquids also. The Work of Adhesion Tool quantifies an index of wettability for a solid/liquid combination. Zisman's Plot Tool summarizes wetting behavior and permits interpolative predictions using a homologous series of liquids. This tool is named after William Zisman, the inventor of the original ramé-hart NRL Contact Angle Goniometer (circa 1960). The Schultz Solid-Liquid-Liquid Tool evaluates surface energy on a solid submerged in a variety of different liquids. This method is ideal for high-energy solids which are difficult to measure using other methods. The Rabel Multi-liquid Tool uses two or more liquids. The Kwok One-liquid Surface Energy Tool evaluates surface energy using a single liquid.

The Surface Tension Tool permits the measurement of both surface tension as well as interfacial tension on pendant and sessile drops. A database of liquids is included and can be added to using the phase editor. Critical drop dimensions and volume are also reported. All results are logged and can be exported to other programs.

DROPimage Pro coupled with Model 400 provides a powerful tool for capturing a wide variety of contact angle, surface energy, surface tension, and interfacial tension measurements. For even more demanding requirements, DROPimage Pro can be upgrade to methods-based DROPimage Advanced which provides an even more powerful platform for experiment design and dynamic and time-dependent studies.

Hardware Specifications

Specification	Model 400
Camera	German-Made U1 Series
Camera Interface	SuperSpeed USB 3.0
Backlight	Fiber Optic Illuminator
Manual Dispensing via Microsyringe Assembly	Yes
Software-controlled Automated Dispensing System	Optional
Included Rotating Wafer Support	8 inches
Stage	Standard 3-Axis Stage
Power Requirement	110-240 VAC
Power Frequency	50-60 Hz
Instrument Dimensions	635 x 267 x 603 mm
Instrument Weight	8.25 kg
Windows 10 PC and Monitor	Included

Software Specifications

Specification	Model 400
Software Included with system	DROPImage Pro
Static Contact Angle Measurement Range	0-180°
Contact Angle Accuracy	+/-0.1°
Contact Angle Resolution	+/-0.1°
Continuous Contact Angle Reporting	Yes
Number of Surface Energy Tools	8 (Note 1)
Surface Tension and Interfacial Tension	Yes
Surface Tension Measurement Range	0.01-2500 mN/m
Surface Tension Accuracy	+/-0.01 mN/m
Methods-Base Experiment Design Tool	Optional (Note 2)
Supports Automated Dispensing System	Yes
Data exchange (textual and graphic) with other Windows programs	Yes
Number of video windows	One
Supported version of Microsoft Windows	7, 8, or 10 (64-bit recommended)

Note 1: Surface Energy Tools include: van Oss Acid-Base Method, Owens-Wendt Geometric-Mean Method, Wu Harmonic-Mean Method, Work of Adhesion, Zisman's Plot, Schultz Solid-Liquid-Liquid Tool, Rabel Multi-liquid Tool, Kwok One-liquid Surface Energy Tool

Note 2: DROPImage Pro can be upgraded to DROPImage Advanced

Accessories

Accessory	Model 210
Automated Dispensing System 100-22	Supported
Tilting Base 100-25-M	Supported
Environmental Fixture 100-14	Supported
Hot Plate 100-33-HP	Supported
Heated Environmental Cell 100-33	Supported
Overhead Optical Imaging Kit 100-31	Note 1
Peltier Environmental Chamber 100-30	Supported
Oscillator 100-28	Note 1
U2 Series 750 fps Upgrade Kit 100-12-U2	Note 1
Film Clamps 100-15	Supported
Rotating Wafer Support 100-21-x	Supports the following sizes: 4-inch, 6-inch, 8-inch (included), 10-inch, 12-inch, 13.625-inch

Note 1: requires upgrade to DROPimage Advanced