

Surface Analysis by Contact Angle Measurement



VCA Optima

APPLICATIONS

Determine surface cleanliness, evaluate cleaning methods and study adhesion, wetting behavior, bonding quality, surface treatments and coatings on fiber, fabric, polymer, semiconductor wafer, hard disk, flat panel displays and biomaterials.

SURFACE ANALYSIS BY CONTACT ANGLE MEASUREMENT

When a liquid drop is placed on the surface of a solid, the shape of the droplet is determined by balance from the three forces of solid, liquid and vapor. The line tangent drawn at the curve of the droplet to the point it intersects the solid surface forms the contact angle. A droplet with high surface tension resting on a low energy solid forms a spherical shape or high contact angle. Conversely, when the solid surface energy exceeds the liquid surface tension, the droplet forms a flatter, lower profile shape or low contact angle. The correlation of contact angle data with surface tension provides fundamental information for critical surface analysis.

MEASURING TECHNIQUE

The VCA Optima utilizes a precision camera and advanced PC technology to capture static or movie (dynamic) images of the droplet and determine tangent lines for the basis of contact angle measurement. Manual or automatic syringe provides easy dispensing of test liquid. Computerized operation eliminates human error in line drawing and captures dynamic images for time sensitive analysis. Data and images are stored in the computer for later analysis or easy transfer to other software applications.

CAPABILITIES

Static and dynamic (time-based) contact angle.
Advanced and receding contact angle.
Surface energy analysis.
Statistical analysis.
Advanced numerical Pendant Drop surface tension analysis.

ACCURACY

Precision hardware and advanced calculation models ensure measurement accuracy of contact angle to less than 0.1 degree and that of surface tension measurement to less than 0.5 dyne/cm.

HARDWARE FEATURES

- 1 High-resolution video camera with powerful lens system for fine image focus
- 1 Solid state lighting for sharper and brighter images
- 1 High-end PC standard with high-performance video board for advanced image capture and fast results
- 1 Three-dimension adjustable stage for accurate sample position
- 1 Standard motorized syringe for XE model
- 1 Single control box for easy setup
- 1 Small footprint requires less counter space

SOFTWARE FEATURES

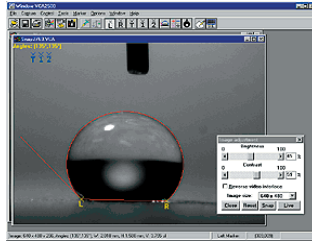
- 1 Complete surface analysis software package
- 1 Windows XP or NT based with enhanced tool bar control
- 1 Wizard assisted *dynamic image capture*, *Pendant Drop analysis and calibration procedures*
- 1 Graphical data charting, easy data storage and exporting

ACCESSORIES

- 1 Film sample clamp
- 1 Environmental chamber
- 1 Heated environmental chamber
- 1 Tilted stage
- 1 Heated syringe
- 1 Motorized syringe system (standard for XE)

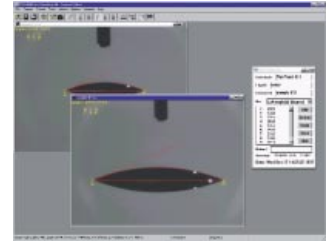
AutoFAST Imaging Software

Automatically captures the droplet image and calculates the contact angle measurement by Sessile Drop method. Both the contact angle tangent line and computer generated drop shape curve fit are displayed on the video image. Graphical or numerical results can be printed, documented or exported to other programs.



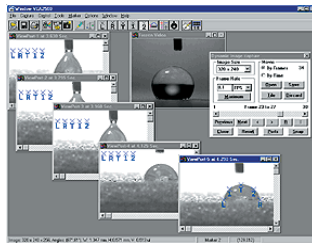
SPC (Statistical Process Control) Software

Automatically records contact angle, droplet height, width, volume, and area in an easy to use chart. Instantly displays statistical values of average and standard deviation as the data is entered. All data can be printed, saved and/or exported for further analysis or graphing in other software programs.



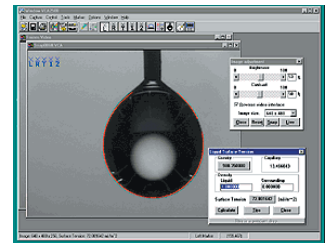
Dynamic-2500 Software

Performs high-speed image capture up to 60 frames/second for dynamic and time-based contact angle analysis. Provides movie viewing of timed interval image capture. Controls motorized syringe and tilting base assembly for advancing and receding contact angle analysis.



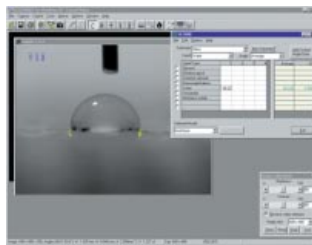
PDAST (Pendant Drop Analysis for Surface Tension) Software

Determines the surface tension (or interfacial tension) by pendant drop image analysis through video-imaging digitization and numerical curve-fitting using the Laplace equation of capillarity.



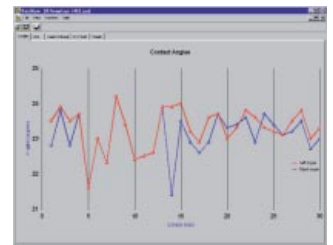
SE-2500 Surface Energy (dyne/cm) Software

Calculates the surface energy of an unknown solid substrate in dynes/cm based on the contact angle of multiple known liquids. Tabulates contact angles from a number of liquids on the same substrate and automatically calculates the surface energy using one of the four user selectable methods: Zisman, Geometric Mean, Harmonic Mean, and Acid-Base.



DataView Software

Views color charts of contact angle, width and height, wetted area and volume. Data and charts can be stored, printed, and edited.



Wizard guided functions

Provides step-by-step, easy-to-follow instructions for complicated procedures of dynamic image capture, Pendant Drop tension analysis and instrument calibration.

