

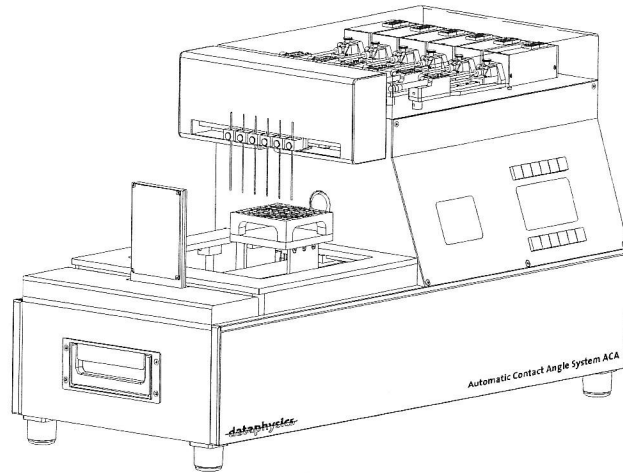
ACA 50

Fully automatic video based contact angle measuring system

Contact angle measuring device for the fully automatic measurement of the wetting behavior of solids (e.g. wafers or glass substrates for flat panel displays) under clean-room conditions, as well as for series tests and systematic analysis. The ACA 50 enables the reduction of subjective factors and time involved for contact angle measurements in research, quality- and production inspection.

For the software-controlled measurement and analysis of

- the static and dynamic contact angle according to the Sessile and Captive Drop method as well as the analysis of the drop shape according to the Pendant Drop method
- the wetting behavior on solid surfaces
- the surface free energy of solids and their components
- the surface and interfacial tension out of the analysis of the drop shape



The ACA 50 consists of the basic instrument with the following technical equipment:

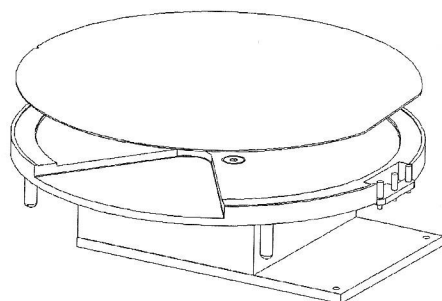
- Single needle support or optional a multiple needle support (max. 6 dosing needles and electronic syringe units) with fully automatic needle selection and vertical and horizontal positioning
- Measuring stage, fully automatic adjustable in three axis for accurate sample positioning
- Lens mount with motorized adjustable tilt ($\pm 5^\circ$)
- Motorized powerful 7-fold zoom lens with software controlled magnification, aperture and focus
- Video measuring system with high-resolution CCD-camera
- High-performance video digitizing board (frame grabber) for the PC
- Illumination with continuously adjustable intensity for a homogeneous back lighting
- Control and measuring electronics for the teach-in procedure, graphic display with keyboard and video display
- Power supply with automatic voltage adjustment

The 32-bit software SCA 50 developed for Windows NT/95 offers by various expansion steps:

- Control of the sample position in X-, Y- and Z-direction, the needle selection and position in Y- and Z-direction, the measuring lens with adjustment of zoom, focus and aperture, the electronic syringe modules, the tilting base assemblies, wafer stages and temperature control units
- Development, administration and up- and download of control programs
- Static and dynamic contact angle measurement according to the Sessile and Captive Drop method
- Calculation of the surface and interfacial tension from the contours of pendant and sessile drops as well as of liquid lamellas on plates, rods and threads
- Calculation of the surface free energy of solids and their components (e.g. dispersion, polar and hydrogen bond force contribution, acid and base portions respectively) according to the theories of Wu, Zisman, Owens-Wendt, Extended Fowkes, Schultz 1 + 2, Fowkes and van Oss & Good
- Statistics and measurement error analysis

Technical data

Maximum sample size (L x W x H)	320 x ∞ x 70 mm; 12"-wafer on WT 300 M/E with 0.5x front lens
Maximum sample weight	3 kg
Size of sample stage	100 x 100 mm
Position accuracy	± 0.1 mm in the sample level; 5 µm vertical to the sample level
Range of contact angle measurement	0 ... 180°; ± 0.1° measuring accuracy of the video system
Range of surface and interfacial tension	1·10 ⁻² ... 2·10 ³ mN/m; resolution: min. ± 0.05 mN/m
Optics	Motorized powerful 7-fold zoom lens (0.75 ... 5.25-fold magnification) with integrated software controlled magnification, aperture and focus CCD-camera with a resolution of max. 752 x 582 pixels Field of view (FOV): 1.2 x 0.9 ... 8.5 x 6.4 mm Optical distortion: < 0.05 %
Video system	High-performance image processing system with 132 MBytes/s data transfer rate (compatible to European standard CCIR and US standard RS-170) Up to 50 images/s digitizing speed
Measuring methods	Sessile and Captive Drop method Tilting Plate method Pendant Drop method Optical Wilhelmy Plate and Rod/Thread method
Size of device (L x W x H)	830 x 330 x 450 mm
Weight	35 kg
Power supply	100 ... 240 VAC; 50 ... 60 Hz; 55 VA
Clean-room classification	100
Alternative/Supplementary units and accessories	Single dosing unit; multiple dosing unit; manual and electronic wafer stages and tilting base assemblies; liquid, peltier and electrical temperature control units (-10° ... 350°C); suction plate; film sample holder; optical contact angle and surface tension standards; dosing needles; syringes; PTFE-tubes; temperature inert glass cells; complete PC systems



Wafer stage WT 300

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