

||||| **Contact Angle Instruments –**  
For the measurement of surface properties



## More than 50 year of measuring instruments to meet the highest demands

Precision, flexibility, and reliability – LAUDA Scientific offers proven solutions for various areas like viscosity measurements, surface science and tensiometry.

Modularity is our passion and we implemented it by offering a wide range of accessories which allow you to configure measuring systems that can be used for a variety of applications in compliance with international standards. User and application specific solutions result in the highest level of safety and reproducibility.



Take advantage of more than 50 years of experience in viscometry and surface science. Our expert consulting services assisting you with your application, at our corporate headquarters in Germany or at one of our subsidiaries or agencies worldwide. Our specialists and distribution partners will work with you to put together a system which meets your individual requirements – no matter whether it is for research & development or quality control.

Our support goes far beyond that: With our service and maintenance plans we make sure that you can rely on consistent results, day after day, year after year.

## Precise software for all measuring tasks

The accuracy of contact angle and surface tension measurement based on optical systems is depending to a large extent on the software algorithms. LAUDA Scientific offers you a package for every application, adaptable to different tasks and accessories. Features such as high-speed video recording, predefinable methods, an extensive fluid library and comprehensive adaptability are convincing in practice.

In addition, there are also special methods for very small contact angles and for automatic baseline determination even for difficult surfaces. Various data export formats, focus assistant, evaluation modules for surface energy and control options for sample axes and rotating tables as well as various dosing systems supports you and your application.





# Custom configurations for all applications and standards

LAUDA Scientific contact angle instruments and optical tensiometers help you to cover a wide range of applications:

## Applications for contact angle measurement

### Wettability and liquid-solid interactions

- || You can determine the surface free energy and its polar and disperse properties of your surfaces via contact angle measurements and use it for predictions of surface-liquid interactions

### Cleaning and coating

- || Advancing and receding contact angles and their hysteresis characterize the complete wetting and de-wetting for cleaning and coating processes.

### Self-cleaning and spraying

- || To optimize spraying and wetting processes you can simulate the wetting and de-wetting processes with unique accessories to test it with different forces.

### Work of adhesion

- || For coatings, printing, painting, etc., the strength of wetting and adhesion to the surface is decisive for processing and a successful application.

### Printing and absorption

- || With high-speed cameras you can determine how quickly printer inks are absorbed by micro-porous photo papers and optimize contour sharpness and inter-colour bleeding.



## Applications for optical tensiometry

### Measuring surface and interfacial tension

- || Universal measuring method for almost any liquid. Optical tensiometers offer a wide dynamic range from approx. 50 ms to several hours, with less than 0.1 ml sample volume, easy handling and high accuracy.

### Characterization of surfactants

- || Monitoring of surface and interfacial tension and surfactant content in real time.

### Interfacial tension of transformer oils

- || Determination of the time-dependent interfacial tension of transformer oils and esters.

### Determination of critical micelle concentration

- || With LAUDA Scientific's optical tensiometers the CMC of surfactants can be reliably and fully automatically (depending on the type of added accessories) determined in a wide range of concentrations.

### Dynamic surface tension of polymer melts

- || Even complex liquids such as polymer melts can be measured with LAUDA Scientific instruments using high temperature chambers.

### Measurements under extreme conditions

- || For measurements under high temperatures or pressures, in inert atmospheres, for highly viscous liquids and polymer melts as well as for aggressive chemical substances.

### Flexible adaptation to all applications

- || With the right accessories every LAUDA Scientific optical tensiometer can be converted into a fully functional contact angle instrument.



# LAUDA Scientific Optical Surface Analyzer system



## Modules

With LAUDA Scientific you will find the perfect solution for all applications, from quality inspection or a high-end research. All LAUDA Scientific devices offer precision and reliability for their field of application and can be modified by a wide range of accessories according to customer requirements.



### LAUDA Surface Analyzer LSA60

- || Robust and precise measurement of contact angle
- || Versatile automatic dosing systems available
- || Large sample stage with precise z-axis for easy handling
- || Extremely accurate surface tension measurements using the pendant drop method
- || Budget-friendly entry-level device with high-end accuracy



### LAUDA Surface Analyzer LSA100

- || Ideal for both research & development and quality inspection
- || Accurate pendant drop method with full support for determination of the critical micelle concentration (CMC)
- || Extremely versatile software package Surface.Meter included
- || Expandable and customizable with a wide range of dosing systems, sample stages and accessories



### LAUDA Surface Analyzer LSA200

- || Flexible automation with automatic x/y/z axes for the sample stage
- || Different lenses and cameras for every possible application
- || Optional revolutionary features such as the double view module for simultaneous top and side view and measurements on a single drop
- || Extremely versatile software package Surface.Meter included



### LSA.MOB-M LAUDA Mobile Surface Analyzer

- || Mobile measuring instrument with innovative top view technology. Suitable for measurements on surfaces with complex topography and onsite inspections
- || Highest precision for any contact angle range due to Young-Laplace fit of the drop. Suitable for all drop sizes and liquids
- || No limits for sample size
- || Surface mapping of the wetting properties with high spatial resolution down to 5mm
- || Optional robot systems and automatic sample stages
- || Optional automatic dosing system for measurements both on horizontal and vertical surfaces

# LAUDA Scientific accessories



## Dosing systems, temperature chambers and sample stages

With the right accessories, LAUDA Scientific surface analyzer can be adapted to virtually any application. Our competence in measuring instrument design and temperature control ensures precise results in all cases.



### Liquid dosing systems

- || Manual dosing systems MDU-S1 and S2 for one resp. two liquids
- || Automatic dosing systems with up to three liquids with the ADDU-30 and/or ADUV-30: support for disposable syringes and disposable tips with air cushion principle to avoid carry-over
- || Innovative contact-free direct dosing with the ADDN-30 for the fastest measurements without needle influence with all functionalities of a bidirectional automatic dosing system



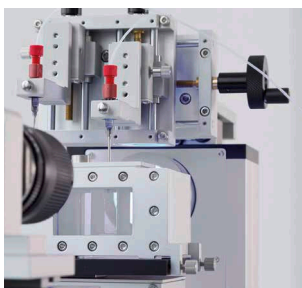
### Temperature chambers

- || EC 10 for standard applications at constant temperature. Ideal with the LAUDA LOOP or other LAUDA thermostats (-10 to 120 °C depending on the LAUDA thermostat)
- || HTC350 for high temperature measurements and polymer melts up to 350°C



### Sample stages

- || Various manual and automatic z-axes for different samples
- || Manual and automatic x/y axes, available in different lengths for both large and small samples
- || Tilting table accessory for advancing/receding angle tests
- || Innovative rotating stage to simulate larger gravitation for exact determination of wetting/de-wetting properties



### Needles and cuvettes

- || Disposable needles in a wide range of diameters
- || Syringes with different volumes
- || Optical glass cuvettes for surface and interfacial tension measurements
- || Inverse needle set for transformer oil tests



### Innovative solutions

- || New measurement methods which make non-measurable effects measurable
- || For example the RFB20, which characterizes Easy-Clean surfaces with virtually any liquid.
- || Or the optical determination of the critical micelle concentration
- || Or the possibility of keeping the drop surface area constant over a long period of time when analyzing surface tension via pendant drop
- || And many more

# Comprehensive solutions

For the analysis of surfaces and liquid-surface interactions

Easy to operate, compact and economical: The LSA60 is the perfect start for surface analytics



For quality control and routine measurements of small to medium sized surfaces and for surfactant solutions

- || Compact size which requires only small bench space
- || Very easy handling with exchangeable manual dosing system
- || Two axis sample platform for exact positioning
- || Optionally available with surface and interface tension measurement
- || Powerful algorithms enable precise drop analysis
- || Expandable with automated dosing systems and tilting table modules

The modular solution: LSA LAUDA Scientific Surface Analyzer System – flexible and upgradable



#### LAUDA Surface Analyzer LSA100

- || Wide range of drop calculation methods for the contact angle, also including the unique TrueDrop method
- || Powerful surface tension measurement
- || Full support of automatic interfacial tension and CMC measurements
- || Depending on model up to two different dosing systems integrated  
Optional non-contact dosing systems and numerous other modules and accessories



#### LAUDA Surface Analyzer LSA200

- || Optional with up to three dosing units and therefore ideal for surface energy determination
- || Wide range of drop calculation methods for the contact angle, supplemented by the unique TrueDrop method
- || Powerful surface tension measurement makes mechanical tensiometers obsolete



#### LAUDA Surface Analyzer LSA200 Expert Series

- || Equipped with automatic z-axis and 2-fold dosing for automatic drop placement and measurement
- || As E2 model with integrated zoom lens, non-contact dosing and automatic x/y/z-axis for automatic surface mapping

#### LAUDA Surface Analyzer LSA200 Tilting

- || Due to integrated tilting table ideal for automatic measurement of advancing, receding and roll-of angles for complete characterization of surface properties
- || Equipped either with the direct dosing system or automatic refill dosing system
- || All methods for sessile and pendant drop also included

# Advanced Solutions

For advanced surface science

## Fully automatic measurement of critical micelle concentration (CMC)

- || Automatic concentration variation and measurement
- || Significantly larger concentration range than mechanical tensiometers due to variable sample container
- || Determination of CMC depending on surface age (dynamic CMC)
- || First instrument which offers concentration-dependent interfacial tension measurements
- || Integrated drop volume method
- || Upgradable to contact angle instrument by software modules



## Precise contact angle measurements for micro drop analysis on extremely small samples

- || Precise determination of wetting properties of fibres, hair, or COB electronic contact pads
- || Automatic analysis of fast wetting process in microscopic dimensions due to high-speed camera
- || Sophisticated optics and illumination for best image quality
- || Precise positioning of the sample and the dosing system



## Simultaneous measurement of contact angle using projection and top-view technique

- || Combining the LSA100 and the LSA MOB-D allows a simultaneous analysis of drop shapes with complementary techniques give you the full picture of wetting properties
- || Ideal tool for precise determination of small contact angles
- || Fast setup for measurement in cavities and concave surfaces
- || Our innovative Top-View technology employing the full Laplace evaluation gives correct results with any liquid and volume



## Innovative measurement of wetting and dewetting Retention Force Balance RFB 360

- || Our innovative tool makes traditional tilting tables obsolete
- || Determination of Easy-Clean properties independently of drop size
- || Significantly wider measurement range than any tilting table
- || Total integration into our Surface.Meter Software and the LSA100 or LSA200
- || Automatic calculation of adhesion forces for precise surface analysis



## Optical drop volume tensiometry with extension module TVT10

- || Combination of pendant drop analysis and the drop volume method for most precise results even with dynamic measurements
- || Accurate and fast measurements due to sophisticated algorithms
- || Fully automatic measurement with automatic dosing system



## Contact Information

LAUDA Scientific GmbH  
Laudaplatz 1  
97922 Lauda-Königshofen  
Germany

Phone: +49 (0)9343 503-340  
Fax: +49 (0)9343 503-222  
E-mail: [info@lauda-scientific.de](mailto:info@lauda-scientific.de)

further information: [www.lauda-scientific.de](http://www.lauda-scientific.de)