Capturing the Dynamics
2026

Drop Shape | Tensiometry | Foam Analysis

Science is not a static body of knowledge, but a dynamic process.

Sir Peter Brian Medawar (1915-1987)
Zoologist, immunologist and Nobel loreate

Capturing the Dynamics

Science is not really about recording facts about the world as it is. Much more often, it takes snapshots of fleeting, dynamic events and generates insights by recreating and repeating these events under precisely controlled conditions. This especially applies to interfacial science, which is based on thermodynamics, and it is particularly true for the analysis of liquid foams, which are practically a symbol of the fleeting and transient.

Our foam analyzers capture the dynamics with exact timing, produce foam under precisely reproducible conditions, and deliver solid numbers that help you optimize your foam-producing product – or, where necessary, prevent foam formation. Get to know our DFA100 for analyzing all kinds of liquid foam and explore our HPFA for high-pressure foam measurements!

Stop the clock and take a look at our other measuring instruments, which describe the dynamic events at the interfaces with reliable, scientific parameters and thus support you in your R&D and QC wherever surface interactions play a role.

Capturing the Dynamics 2026

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The software that brings your instrument to life

ADVANCE is our solution-focused software which maximizes the performance and versatility of our instruments. It is designed to go the shortest way from planning measurements to obtaining reliable data and analyzing them. As a user of ADVANCE, you especially benefit from its outstanding and growing functionality as well as new standards in intuitive operability.

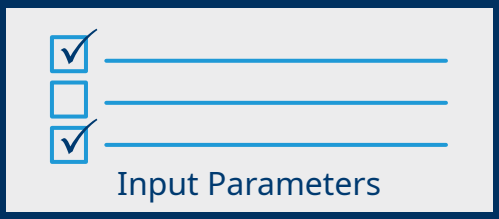
By clearly organizing the context-relevant functions in tiles and avoiding menus and pop-ups, ADVANCE eliminates unnecessary clicks and time-consuming searches for hidden elements. Easy-to-create automation programs make analyses repeatable and results user-independent. To make the measurement even more relevant for your task, results can be automatically evaluated using your preset limits. All modules can also be used in the ADVANCE touch mode with its specially optimized user interface.

ADVANCE

The ADVANCE principle

The operating concept of ADVANCE follows a universal workflow from preparation to evaluation on which every scientific measurement is based in principle. The software mirrors this workflow organically, thus making operation intuitive.

ADVANCE is designed to follow the idea that, however complex a scientific task may be, the tools to solve them should be as easy to use as possible. To master complexity, automation programs can be created using a versatile step-by-step logic with diverse possibilities to group or cycle the steps. To keep ease of use, this logic stays close to the instruments' functionalities without any abstract programming level.

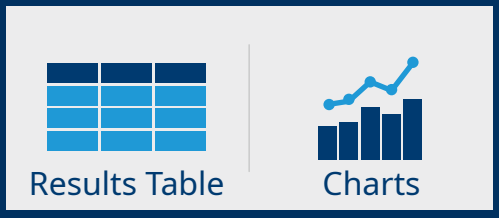


Step 1: Preparing the measurement

The process starts with editing information on the sample as well as setting parameters. Automated procedures make it possible to create measurements for even the most complex tasks in order to carry out analyses without user interference.

Step 2: Performing the measurement

Now the instrument enters the stage. Depending on the degree of automation, ADVANCE takes complete control. During the measurement, displayed raw data and video images, if appropriate, make it easy to monitor the measurement in life view.



Step 3: Reviewing results

The measurement is finished. ADVANCE shows all measuring data in clearly arranged tables and charts. Moreover, the software offers features to re-analyze raw data with new settings to make measurements more flexible and independent from initial decisions.

Step 4: Evaluating and exporting results

Finally, ADVANCE uses scientific models to calculate conclusive results from raw data. With a few clicks, comprehensive reports or export files are created for further processing or archiving. To gain a maximum of information from your results, measurements can be compared at will with just a few clicks.

Driving automation further: ADVANCE WebApp and API

In quality control, even the most radically simplified workflow of a scientific measurement may still be too complex. This is why we have created the ADVANCE WebApp that reduces operation to setting a sample name and clicking a button. From the browser of any computer, ADVANCE carries out the measurement remotely using a prepared template and responds with a clear passed or failed message for the quality check.

With the highly flexible module for custom data field, you can make ADVANCE compatible to your established QC routine. Combined with the WebApp, the operator can – or is obliged to – enter the required information before starting the measurement.

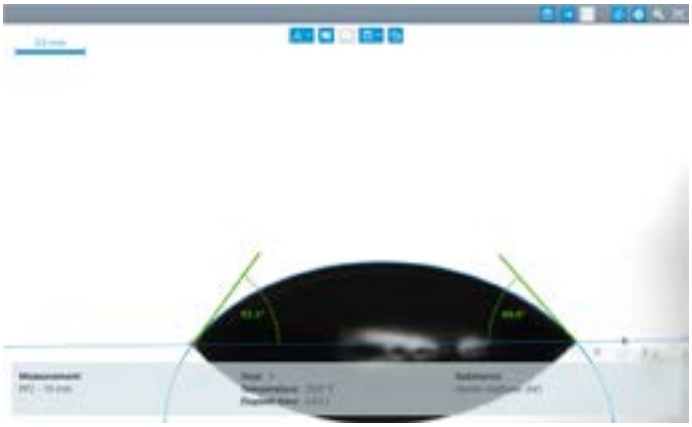
While the WebApp still requires an operator, the ADVANCE API makes interfacial analysis ready for Industry 4.0, enabling communication with other software in order to carry out extensive measurement series fully automatically. With this feature and flexible data output customization, ADVANCE can be seamlessly integrated in a Laboratory Information Management System (LIMS).

Ready for Industry 4.0: Inline cleanliness control with our MSA and ADVANCE at Fraunhofer CSP

ADVANCE

An insight for different instruments

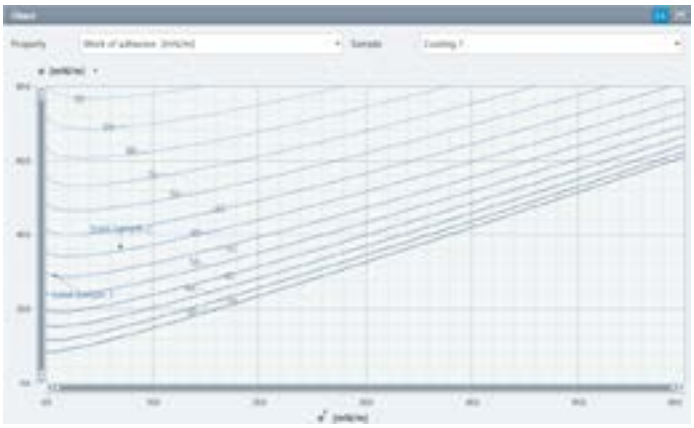
The solutions ADVANCE offers are as diverse as the challenges of our customers. ADVANCE works perfectly with a wide range of our instruments to ensure the best user experience, whatever the application. See for yourself.

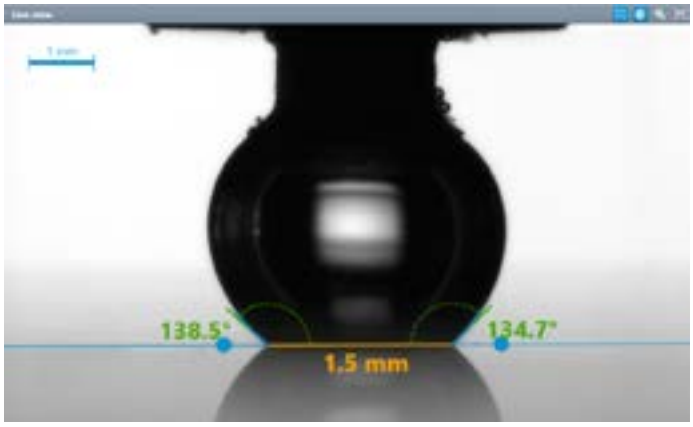


Measure surface free energy (SFE) with just one click: With our Liquid Needle dosing unit, ADVANCE displays and analyzes two dispensed drops in parallel.

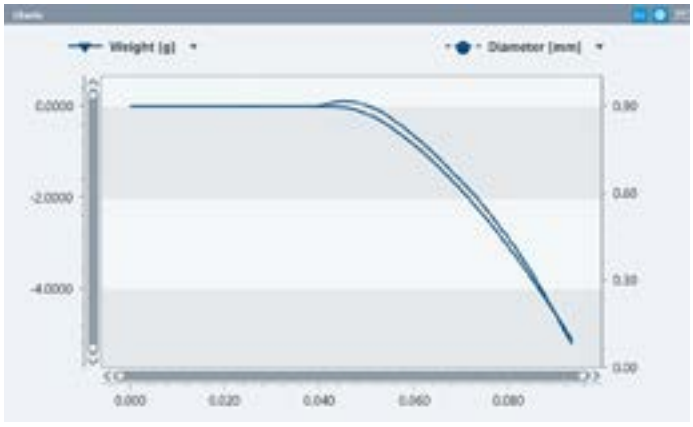
When controlling a fully automated measurement an SFE determination is carried out within a second.

ADVANCE goes beyond collecting raw data and presenting results. Powerful evaluation tools turn information about your samples into know-how for your application. For our contact angle instruments, the Adhesion Analysis module uses measurements or entered data to calculate adhesion-related parameters. This already helped customers in optimizing primer or lacquer formulations to make them match with the surface properties of specific materials.



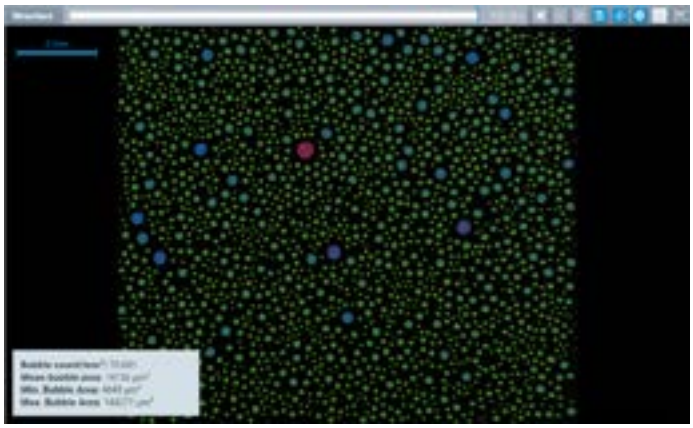


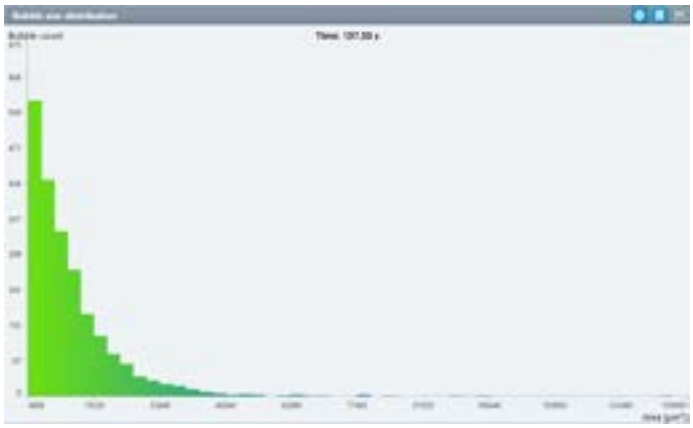
Measuring adhesion with the Drop Pull-off method: Our Tensíío uses an integrated camera to combine force measurement and drop shape analysis including contact angle results.



The data in the force/distance measurement curve is synchronized with the video image to make the course of the measurement absolutely transparent.

Analyze several aspects of foam behavior in one measurement: With our Dynamic Foam Analyzer – DFA100, ADVANCE makes it possible to simultaneously measure the amount of foam, its liquid content, and its bubble structure with respect to time. Here, the foam structure is analyzed in a video and the resulting bubble size distribution is shown in parallel.





Drop Shape

Method Overview | Drop Shape

An astonishing fact about surface science is how many problems can be solved with a drop of liquid. Lying on a coated or pretreated sample, it tells you everything about its wettability. A drop at a tip of a needle can give you an exact result of the surface or interfacial tension. If it rolls off at slight inclination, the surface has good self-cleaning properties.

To make drops hand over all this information, our instruments for drop shape analysis provide you with a wide range of methods for dispensing drops, capturing them in video images, and evaluating their shapes with powerful analysis algorithms.

Sessile drop
Contact angle of a drop on a solid surface

Double sessile drop
Contact angles of two drops dosed in parallel

Surface free energy
Surface free energy of a solid using contact angle data

Sessile drop mapping
Automated position-dependent contact angle measurement and evaluation

Stood-up Drop
Measuring the recently receded contact angle to characterize dewetting behavior

Captive bubble
Contact angle using a gas bubble beneath a solid surface in a liquid

Meniscus
Contact angle at an immersed, cylindrical sample, usually a fiber

Pendant drop
Surface or interfacial tension using the curvature of a drop or bubble at the tip of a needle

Constrained Sessile Drop
Surface tension using the curvature of a perfectly symmetrical drop on a circular sample pedestal

Roll-off measurement
Roll-off behavior and advancing/receding contact angle of a drop on a tilted surface

3D Contact Angle
Evaluation of an exact virtual replica of a dosed drop reconstructed on the basis of reflection patterns

Sessile drop top view analysis
Contact angle of a drop viewed from the top

Oscillating pendant drop
Interfacial rheological behavior of a pendant drop or a bubble with periodically alternating volume

Adhesion analysis
Calculating adhesion-related scientific parameters for the interfacial contact

Liquid polarity
Calculating the polar and disperse part of the surface tension from contact angle and surface tension data

Cycle
Carrying out a measurement up to 20 consecutive times and displaying the results together

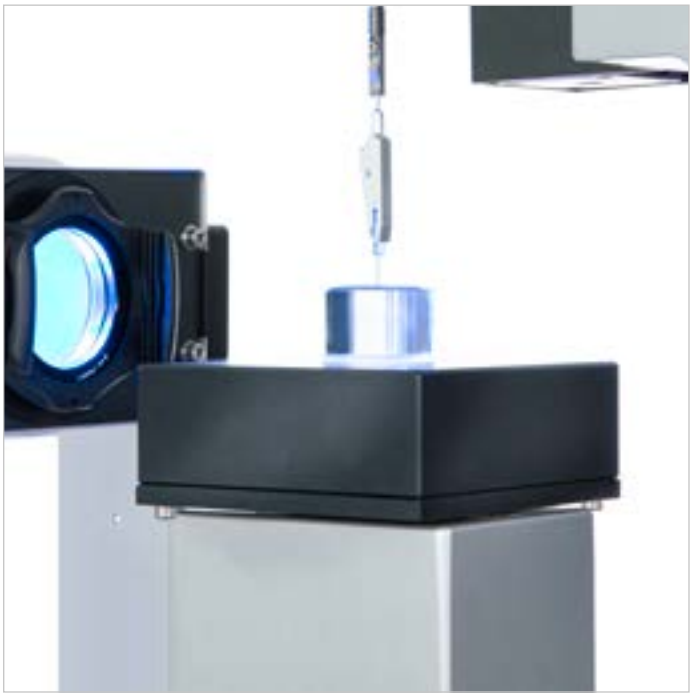
ADVANCE API
Interface for remote control of ADVANCE by other software for integration in custom-designed, complex automations

Run by ADVANCE
On the following pages, instruments with this icon are supported by our ADVANCE software

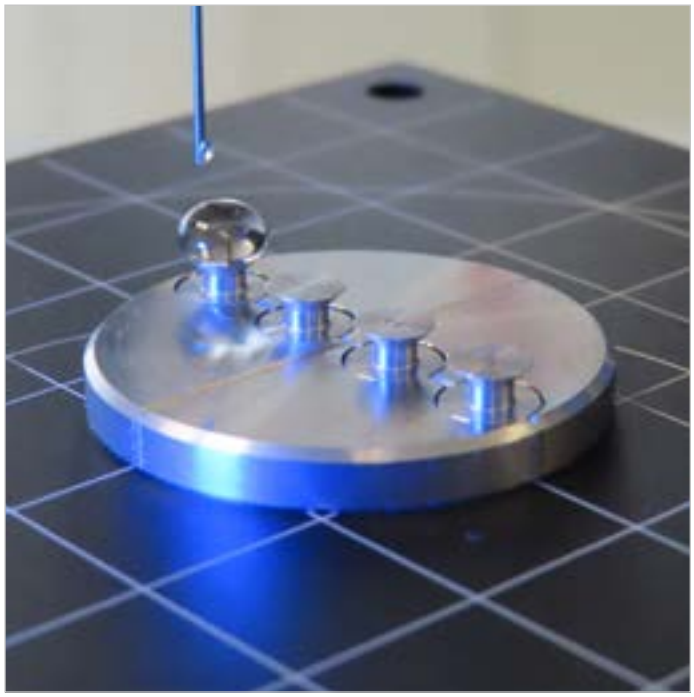
Method Focus:
Meniscus & Constrained Sessile Drop

Expand the possibilities of drop shape analysis and measure contact angles on individual fibers and surface tension (SFT) on a single, sessile drop using accessories and ADVANCE modules for the meniscus and Constrained Sessile Drop methods.

Meniscus



Constrained Sessile Drop



Optically measuring the contact angle on a single fiber – the meniscus method makes it possible. With the SH3220 accessory, the fiber sample is quickly prepared and immersed vertically in the liquid, where it forms a characteristic meniscus at the point of contact. This contact angle is determined using the high-resolution camera of the Drop Shape Analyzer used and the precise evaluation algorithm of ADVANCE.

The Constrained Sessile Drop is a highly accurate method for measuring surface tension and is available for many of our mobile and stationary measuring instruments. A single drop is dispensed onto a sharp-edged sample platform and takes on a highly curved shape, from whose contour ADVANCE calculates the SFT. Use this method to collect important measurement data or check the purity of your test liquids using the SFT.

Instrument	Accessory
Mobile Surface Analyzer – MSA	SH3900
Drop Shape Analyzers with syringe dosing	SH3201
Drop Shape Analyzers with Liquid Needle dosing	SH3202

3D Contact Angle – Ayríís®

Tasks and applications

- Quality assurance of cleaning steps as well as pretreatment and coating processes
- Determination of the wettability of solid materials before coating or bonding
- Testing the effectiveness of hydrophobic coatings
- Mobile measurement on large workpieces and finished products such as automobile parts

Measuring methods and options

- 3D Contact Angle of water within seconds
- Clear result validation using custom-defined quality limits
- Easy definition and selection of sample types

Surface QC has never been so easy and reliable

Getting rid of any user intervention and result interpretation whatsoever, our Ayríís uses groundbreaking technology for perfectly reliable QC checks of wettability. With just one click and in seconds, the 3D Contact Angle of water is measured and auto-validated with a simple passed/failed message using preset quality limits. The highly advanced 3D drop projection technique of Ayríís provides for automatic self-checking of consistency and plausibility of each result. As a mobile, stand-alone instrument with easy-to-exchange rechargeable batteries and prefilled cartridges, Ayríís is prepared to operate 24/7 on your production site.

The dosing outlet inside the measuring head produces a water drop with an accurately adjusted volume.

Hitech in a tight space: 90 LEDs generate reflection patterns for the three-dimensional reconstruction of the drop.

Specifications

Camera system	
Performance	2 cameras, 50 fps at 1024 × 1024 px each
Illumination	
Type	90 high power LEDs + 2 lasers
Dosing system	
Dosing	water single pressure dosing
Resolution	0.1 µL

Contact angle	
Resolution	0.1°
Instrument dimensions	
Footprint	58 mm × 51 mm (W × D)
Height	290 mm
Weight (including accessories)	1.36 kg

Mobile Surface Analyzer – MSA One-Click SFE

Tasks and applications

- Measurement on large workpieces and finished products such as automobile parts
- Determination of the wettability of solid materials before coating or bonding
- Quality assurance of cleaning steps as well as pretreatment and coating processes
- Testing the effectiveness of hydrophobic coatings

Measuring methods and options

- Measurement of contact angle
- Calculation of surface free energy according to Owens-Wendt-Rabel-Kaelble, Wu, Zisman, and Fowkes
- Checking the cleanliness of test liquids based on surface tension

Measuring surface free energy in a second with only one click

Designed according to the requirements of quality control, our Mobile Surface Analyzer – MSA measures surface free energy with two liquids and fully automatically using the “One-Click SFE” method. Using a Liquid Needle dosing unit, the MSA doses two parallel drops with one click, followed by the direct analysis of the contact angles and the derived results of the surface free energy. All steps are automated and happen within a second. The results enable well-founded statements about wettability by aqueous or organic liquids. The MSA supports you in your quality assurance in the pretreatment and coating of solid materials in an ideal way.

Non-destructive quality control

Also works on curved samples and even vertically or overhead

Specifications

Camera system	
Connection	USB 3.0
Performance	25 fps at 1000 × 700 px
Illumination	
Type	high power LED, adjustable
Dosing system	
Dosing	double pressure dosing
Resolution	0.1 µL

Contact angle	
Range	0 to 180°
Resolution	0.01°
Instrument dimensions	
Footprint	84 mm × 32 mm (W × D)
Height	112 mm
Weight	0.85 kg

Embedding the MSA in a robotic system

To make automated sample analysis complete, the MSA can be equipped with an adapter for using it in portal systems where a robotic arm does the job of positioning the instrument on the sample.

Communication with robotic control systems is easy to set up thanks to a remote control interface (API) of the ADVANCE software. Beyond the mere triggering of a measurement, its results and raw data as well as video images of analyzed droplets can be transferred automatically.

Mobile Surface Analyzer – MSA Flexible Liquid

Tasks and applications

- Analyzing the wetting behavior of formulations such as paints, coatings, or adhesives on solid materials
- Checking wettability of plastics, glass, ceramics, wood, paper, or metal
- Quality assurance of activation processes such as plasma treatment, flame treatment, or corona treatment
- Measurement on large workpieces and finished products such as car bodies, aircraft parts, or walls

Measuring methods and options

- Contact angle of a drop on a solid surface
- Surface free energy of a solid using contact angle data

Fast, automatic, and non-destructive wetting analysis with your liquids of choice

In the Flexible Liquid configuration, the Mobile Surface Analyzer - MSA carries out automated contact angle measurements between freely selectable liquids on solid samples. The focus lies on non-destructive analysis with formulations such as inks, coatings, or adhesives, to evaluate their wetting behavior in real processes.

Wetting analysis with almost any liquid

The MSA Flexible Liquid is ideal when you want to know the wetting behavior of a formulation with unknown surface tension rather than that of a standard test liquid. The measurement reveals how your actual liquid behaves on your solid. This helps to optimize paints, adhesives, and other liquids as well as the surface properties of solid materials. Since disposable cartridges are used, contaminating or hardening liquids are no problem at all.

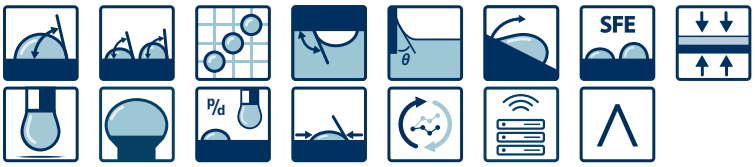
Specifications

Camera system	
Connection	USB 3.0
Performance	25 fps at 1000 × 700 px
Illumination	
Type	high power LED, adjustable
Dosing system	
Dosing	single direct dosing
Resolution	0.25 µL

Contact angle	
Range	0 to 180°
Resolution	0.01°
Instrument dimensions	
Footprint	84 mm × 32 mm (W × D)
Height	112 mm
Weight	0.85 kg

Drop Shape Analyzer – DSA100

Drop Shape Analyzer – DSA100E
(Expert configuration)



Tasks and applications

- Characterization of surface pretreatment processes
- Investigation of the adhesion and stability of bonding and coating processes
- Investigation of coating substances in accordance with DIN 55660
- Checking the wettability of plastic, glass, ceramic, wood or metal
- Validating surface cleanliness

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of several test liquids using all common models
- Static contact angle, advancing angle, and receding angle
- Fiber contact angle using the Meniscus method
- Roll-off behavior on hydrophobic and superhydrophobic surfaces
- Measurement of surface tension and liquid-liquid interfacial tension using the pendant drop method
- Temperature-controlled measurements from -30 to 400 °C
- Measurements at controlled humidity
- Measurements on inclined surfaces

The universal, high-quality instrument for analyzing wetting and coating processes

The Drop Shape Analyzer – DSA100 is our high-quality system solution for almost all tasks in the analysis of wetting, dewetting, and adhesion on solid surfaces. From the basic unit for precise measurement of the contact angle to the fully automatic expert instrument for series measurement of surface free energy (SFE), we have the suitable DSA100 for your special requirements. With our modular product philosophy, we are able to exactly match our instruments and accessories to your needs based on your specific surfaces and processes.

Drop Shape Analyzer – DSA100S
(Standard configuration)

Drop Shape Analyzer – DSA100B
(Basic configuration)

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Max. dosing units	2 syringe dosing units + Liquid Needle, 4 liquids, software-controlled
Multi-dosing system (optional)	
Syringes/liquids	up to 8, software-controlled

Internal and external tilting	
Range	0 to 90°
Resolution	internal tilting: 0.01° | external tilting: 0.1°
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m

Drop Shape Analyzer – DSA100L

Tasks and applications

- Characterization of large, pretreated surfaces
- Investigation of the cleanliness of windows and frames
- Surface analysis for monitors and touch panels
- Characterization of automobile parts before coating or bonding
- Hydrophobicity analysis of ceramic tiles

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of several test liquids using all common models
- Static contact angle, advancing angle, and receding angle
- Measurement of surface tension and liquid-liquid interfacial tension using the pendant drop method
- Position-dependent surface free energy and contact angle measurement (mapping)

Automated wetting analysis of large samples

With the special version DSA100L of our Drop Shape Analyzer – DSA100, the instrument is fitted in a particularly wide frame and equipped with a large, rotating sample table plus an extra-long movement axis. Thanks to an adapted arrangement of the optics, which is above the sample, almost the whole frame width is available for samples with an area of up to 500 × 500 mm.

Fast, automated sample mapping of the surface free energy with an optional Liquid Needle dosing unit

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Dosing	software-controlled syringe
Liquid Needle dosing (optional)	
Resolution	0.1 µL

Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m
Sample dimensions	
Max. sample space	700 × ∞ × 275 mm (W × D × H)
Max. measuring surface	500 × 500 mm (W × D)
Instrument dimensions	
Footprint	1000 × 375 mm (W × D)
Height	490 mm

Drop Shape Analyzer – DSA100W

Tasks and applications

- Characterization of the cleaning and coating homogeneity of wafers
- Adhesion evaluation between wafer and coating
- Wetting investigation of exposed and unexposed photo varnish
- Ideal for analyzing other round samples, e.g. hard drives or brake disks

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of several test liquids using all common models
- Static contact angle, advancing angle, and receding angle
- Measurement of surface tension and liquid-liquid interfacial tension using the pendant drop method
- Position-dependent surface free energy and contact angle measurement (mapping)

Fully automatic quality testing of wafer surfaces

We have specially geared the DSA100W instrument configuration of the universal Drop Shape Analyzer – DSA100 towards the automatic, standardized quality control of wafer surfaces. The DSA100W precisely determines the homogeneity of the cleaning of a wafer surface based on the contact angle. It also enables coatings to be characterized, for example by differences in wetting of exposed and unexposed photo varnish.

Fully automated drop positioning on a wafer

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Dosing	software-controlled syringe
Liquid Needle dosing (optional)	
Resolution	0.1 µL

Rotation axis	
Control	software-controlled
Resolution	0.1°
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m

Drop Shape Analyzer – DSA100M

SFE

Tasks and applications

- Wettability measurement on small electronic parts
- Contact angle on hair and synthetic single fibers
- Investigating biocompatibility of dental implants
- Wetting of nozzles of an inkjet print head

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of two test liquids using all common models
- Static contact angle, advancing angle

The precision contact angle measuring instrument for microscopically small samples

Using precise microscope optics and a high-resolution, high-speed camera, the special micro configuration of our versatile DSA100 system solution is well-prepared for analyzing wetting for the smallest samples. The instrument enables drops in the picoliter range to be accurately dosed, which is additionally supported by separate observation optics for accurate positioning. The shape of the droplets is analyzed in order to measure the contact angle precisely. The DSA100M helps you to optimize wetting and coating processes on very small surfaces such as hair or on microchip contacts.

Dosing and analyzing picoliter drops with DSA100M

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Optics	
Zoom	6.5× microscope zoom, manual
Illumination	
Type	high power monochromatic LED

Dosing system	
Dosing	software-controlled
Resolution	fixed
Contact angle	
Range	0 to 180°
Resolution	0.01°

Drop Shape Analyzer – DSA100HP

Tasks and applications

- Optimized chemical flooding with surfactants, brines, polymers, and mixtures
- Choosing the right chemicals for each reservoir
- Minimum miscible pressure between liquids and liquefied gases
- Wettability alternation during oil extraction, carbon capture and storage
- Capillary pressure, e.g. in heat exchangers; material research
- Fundamental research in thermodynamics, phase diagrams
- Optimization of hydrogen storage

Methods and options under high pressure and temperature

- Contact angle measurement using a sessile drop
- Surface tension of a liquid in gas or interfacial tension between two liquids using a pendant drop
- Upside-down pendant drop measurement of an oil drop in water
- Measurements at pressures up to 1750 bar and temperatures between -10 and 250 °C

Wetting and surface tension under extreme pressures and temperatures

The Drop Shape Analyzer – DSA100HP is our high-quality solution for the precise measurement of contact angle as well as surface and interfacial tension under high pressures and temperatures, primarily for tertiary oil recovery. The DSA100HP combines the Drop Shape Analyzer – DSA100 for optical drop shape analysis with a measuring cell for high-pressure applications up to 1750 bar. It determines the surface tension and analyzes the wetting of oil-bearing rock by surfactant solutions under the extreme pressure and temperature conditions found in reservoirs. The results help in the extraction of oil from layers of rock in the most effective manner using enhanced oil recovery (EOR) methods such as steam or surfactant flooding and thereby increase the yield. The instrument also reliably measures the wettability of gases which liquidize under pressure, for example for the optimization of extraction processes with carbon dioxide.

Sample positioning with closed pressure chamber

Either a gas or a liquid can be added as surrounding phase

Specifications

Camera system	
Connection	USB 3.0
Performance	CF04: 2.3 Mpix, up to 2300 fps
Optics	
Zoom	7× zoom, manual
Pressure control	
Maximum pressure	40 to 1750 bar (580 to 25 000 psi)
Temperature control	
Range	up to 250 °C

Material of pressure chamber	
Type	stainless steel, Hastelloy©, titanium, Inconel©
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m

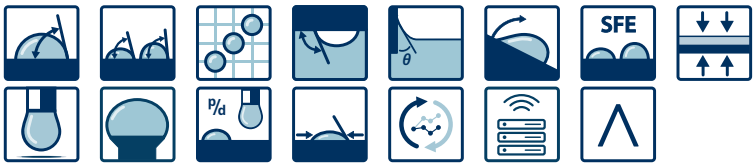
Measuring the minimum miscible pressure (MMP)

In EOR, oil extraction using CO_2 is becoming increasingly common. The MMP is a critical pressure above which the displacement of oil becomes efficient as oil and gas mix. Of the various methods that can be used to measure MMP, the simplest is to measure the interfacial tension (IFT). The MMP is the pressure value at which the IFT reaches 0.

Use one of our DSAHP instrument configurations with automatic pressure dosing to accurately measure the MMP and maximize the sweep while preventing excessive pressure that would make extraction too energy-intensive.

Drop Shape Analyzer – DSA30

Drop Shape Analyzer – DSA30E
(Expert configuration)



Tasks and applications

- Characterization of surface pretreatment processes
- Investigation of the adhesion and stability of bonding and coating processes
- Checking the wettability of plastic, glass, ceramic, wood, or metal
- Validating surface cleanliness

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of several test liquids using all common models
- Static contact angle, advancing angle, and receding angle
- Fiber contact angle using the Meniscus method
- Measurement of surface tension and liquid-liquid interfacial tension using the pendant drop method
- Measurements on inclined surfaces
- Temperature-controlled measurements from -30 to 400 °C
- Measurements at controlled humidity

Contact angle measurement in quality control

The Drop Shape Analyzer – DSA30 is a robust instrument which can be used flexibly for the precise measurement of contact angle and surface free energy (SFE). With high-quality components and various automation options, the DSA30 analyzes wetting and adhesion on solid surfaces. Fast measurements and simple operation make the instrument a valuable part of your routine quality control.

Drop Shape Analyzer – DSA30S
(Standard configuration)

Drop Shape Analyzer – DSA30B
(Basic configuration)

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Max. dosing units	2 syringe dosing units + Liquid Needle, 4 liquids, software-controlled
Multi-dosing system (optional)	
Syringes/liquids	up to 4 software-controlled + 1 manual

Internal tilting	
Range	0 to 90°
Resolution	0.01°
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m

Drop Shape Analyzer – DSA30R

Tasks and applications

- Emulsions and foams for food or personal care
- Flooding mixtures and foam in enhanced oil recovery
- Demulsifiers
- Defoamers and antifoamers
- Surfactant research

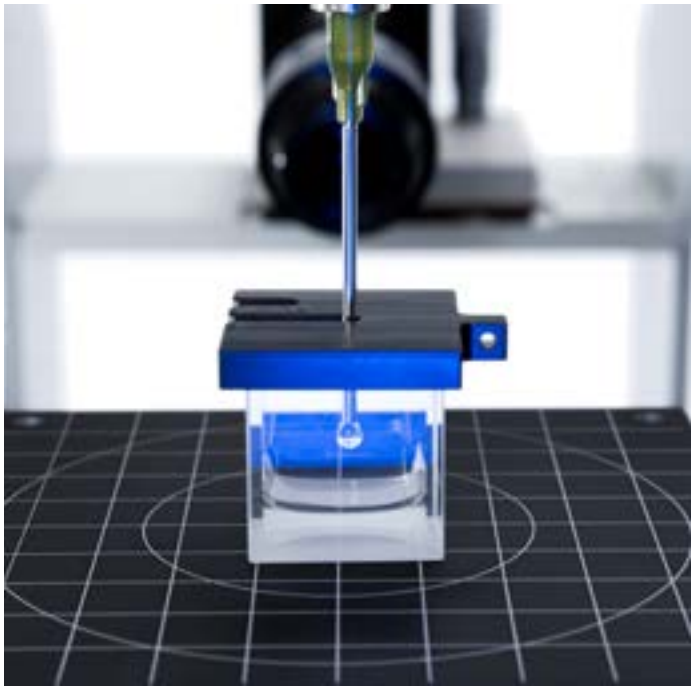
Measuring methods and options

- Measurement of interfacial rheological parameters such as the elastic modulus E' and viscous modulus E''
- Analysis of oscillating pendant or rising drops in a gaseous and liquid surrounding phase
- Measurements on oscillating rising gas bubbles
- Static surface and interfacial tension
- Measurement at temperatures ranging from -10 to 70 °C

Analyses in interfacial rheology – time-saving and reproducible

Emulsions and foams are constantly in motion during production or transport. The interfaces of droplets or bubbles are stretched during these processes. How such deformations impact on the stability of food and personal care products or influence the yield in tertiary crude oil production depends on how the surface tension or interfacial tension (SFT/IFT) responds to the stretching. Interfacial rheology measurements with the Drop Shape Analyzer – DSA30R provide the key to answering this question.

Oscillating Drop Module – ODM of the DSA30R, also separately available as DS3270/DS4270 for DSA100/DSA30



Analysis of oscillating pendant drop in a solvent-saturated atmosphere

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Dosing	software-controlled
Maximum volume variation	2.5 µL
Viscosity range	max. 5000 mPas with needle NE45 max. 10 mPas with needle NE44
Frequency	0.001 to 30 Hz

Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m
Oscillating drop	
Results	E, E', E'', phase shift
Programmable waveform	sine
Model	Lucassen

Drop Shape Analyzer – DSA30M

SFE

Tasks and applications

- Investigation of synthetic and natural fibers for composites
- Wettability of contact points in microelectronics
- Optimization and development of hair care products
- Wettability of biochips
- Micromechanical components, e.g. in watches
- Microfluidics

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of up to three test liquids using all common models
- Static contact angle, advancing angle
- Pinpoint dosing accuracy thanks to additional observation optics

Precise wettability analysis on extremely small surfaces

The Micro configuration of our DSA30 was specially designed to investigate the contact angle on surfaces which require very small drops of standard test liquids for analyzing them. The DSA30M solves this task with a picoliter dosing system and powerful microscope optics. The result is a versatile instrument that provides precise contact angle and surface free energy results for samples such as hairs or the screw windings of dental implants.

Dosing and analyzing picoliter drops with DSA30M

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Optics	
Zoom	6.5× microscope zoom, manual 20× zoom micro optics
Illumination	
Type	high power monochromatic LED

Dosing system	
Dosing	software-controlled
Resolution	fixed
Min. drop volume	20 pL
Contact angle	
Range	0 to 180°
Resolution	0.01°

Drop Shape Analyzer – DSA30M Flexible Liquid

Tasks and applications

- Investigation of synthetic and natural fibers for composites
- Wettability of contact points in microelectronics
- Optimization and development of hair care products
- Wettability of biochips
- Micromechanical components, e.g. in watches
- Microfluidics
- Wetting of nozzles of an inkjet print head

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of up to three test liquids using all common models
- Static contact angle, advancing angle
- Pinpoint dosing accuracy thanks to additional observation optics

Wettability of microscopically small surfaces by almost any liquid

Determine the wettability of very small surfaces using standard test liquids – or find out how microdroplets of your individual formulation, for example an inkjet printing ink, wet the sample. The Drop Shape Analyzer – DSA30M Flexible Liquid dispenses picoliter drops of the liquids and determines the contact angle as a relevant measured variable when wetting and coating processes on tiny surfaces are to be optimized.

Versatile and precise dosing system allowing quick liquid changeover

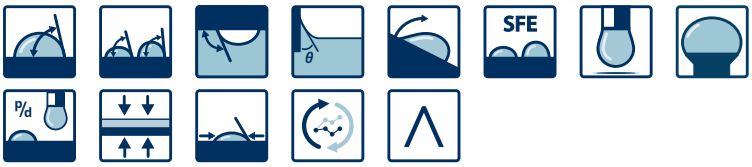
Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Optics	
Zoom	6.5× microscope zoom, manual 20× zoom micro optics
Illumination	
Type	high power monochromatic LED

Dosing system	
Dosing	software-controlled
Resolution	fixed
Min. drop volume	10 pL
Contact angle	
Range	0 to 180°
Resolution	0.01°

Drop Shape Analyzer – DSA25

Drop Shape Analyzer – DSA25E
(Expert configuration)



Tasks and applications

- Characterization of surface pre-treatment processes
- Checking the wettability of plastic, glass, ceramic, wood, or metal
- Validating surface cleanliness

Measuring methods and options

- Contact angle between a liquid and a solid
- Surface free energy from contact angles of several test liquids using all common models
- Static contact angle, advancing angle, and receding angle
- Fiber contact angle using the Meniscus method
- Measurement of surface tension and liquid-liquid interfacial tension using the pendant drop method
- Temperature-controlled measurements from -30 to 400 °C
- Measurements at controlled humidity
- Measurements on inclined surfaces

The basic instrument for wetting investigations

Our Drop Shape Analyzer – DSA25 is an easy-to-use, reliable instrument for measuring contact angle. From a simple wetting test to the accurate measurement of surface free energy (SFE), the robust instrument provides flexible options for analyzing wetting and adhesion on solid surfaces. Its rapid, manual operation makes the DSA25 outstandingly suitable for occasional wetting measurements with changing tasks and sample types.

Drop Shape Analyzer – DSA25S (Standard configuration)

Drop Shape Analyzer – DSA25B (Basic configuration)

SFE measurement with two drops using the Liquid Needle

View on a pendant drop for measuring surface tension

Specifications

Camera system	
Performance	CF04: 2.3 Mpix, up to 2300 fps CF10: 5.3 Mpix, up to 3450 fps
Illumination	
Type	high power monochromatic LED
Dosing system	
Dosing	1x software-controlled 1 x Double pressure dosing system
Liquid Needle dosing (optional)	
Resolution	0.1 µL

External tilting	
Range	0 to 90°
Resolution	0.01°
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 2000 mN/m
Resolution	0.01 mN/m

Top View Analyzer – TVA100B

Tasks and applications

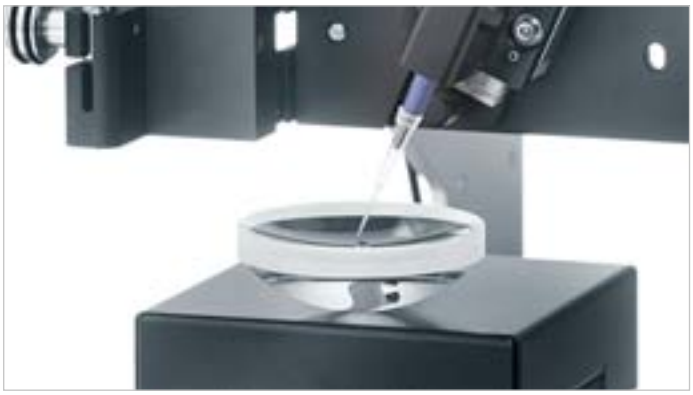
- Measurements in depressions of well plates
- Measurement between electronic components on populated boards
- Measurement on concave optical lenses
- Surface investigations for the interior of tubes and hoses

Measuring methods and options

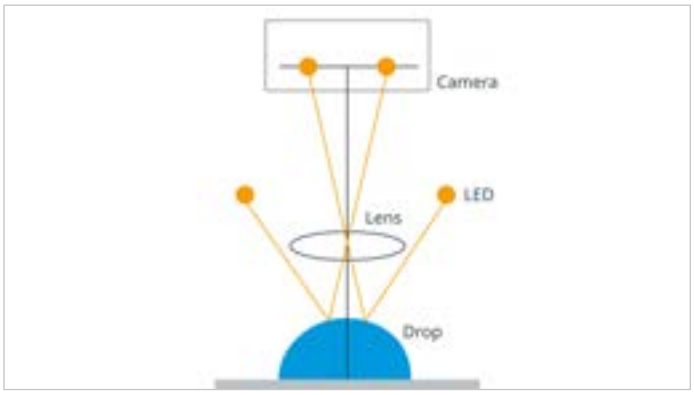
- Measuring the contact angle using our top view distance method
- Special contact angle method for measuring in recesses
- Surface free energy from contact angles of several test liquids using all common models
- Particularly good resolution in the range of small contact angles
- Available as stand-alone instrument or as a measuring head module for DSA100, DSA30, or DSA25
- Easy measurements in patterns such as well plates

Instrument for measurements in depressions and on concave surfaces

The Top View Analyzer – TVA100B is the only instrument in the world to use the top view distance method for measuring the contact angle of a liquid on a solid from above. The innovative measuring method is particularly suitable for measurements in depressions and on concave surfaces where drops cannot be analyzed using the conventional side view.



Measuring on a concave surface



Principle of a top view contact angle measurement

Our exclusive top view distance method: how it works

With the top view distance method, the curvature of the surface of a drop, which correlates with the contact angle, is determined from the distance of reflected light spots in a video image. These light spots originate from LEDs, which are arranged above the drop.

Calculating the contact angle only requires variables which are determined by the setup: the working distance, the distance of the LEDs from one another, the optical enlargement, and the dosed drop volume.

Specifications

Camera system	
Connection	USB 3.0
Performance	CF04: 2.3 Mpix, up to 2300 fps
Optics	
Zoom	6.5× zoom, manual
Illumination	
Type	LED, adjustable

Dosing system	
Dosing	electronic pipette for precise drop generation
Resolution	0.01 µL
Minimum drop volume	0.2 µL
Capacity	10 µL
Contact angle	
Range	3.5° to 75 °
Accuracy	±0.1° (3.5° to 23°) ±1° (23° to 75°)

Tilting Tables

External tilting tables

DSA100 with External Tilting Table PA3220

DSA25 with External Tilting Table PA4020

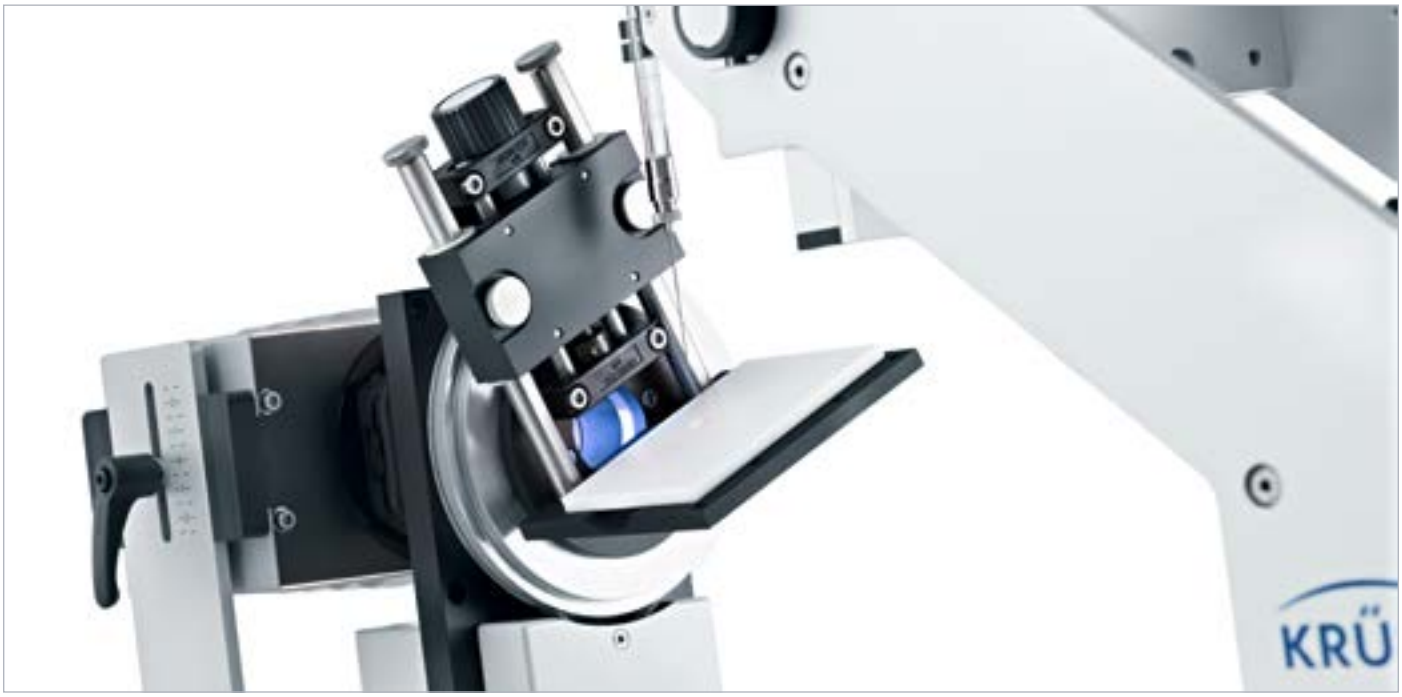
Our external tilting devices are special units for the flexible analysis of inclined surfaces. Measuring the resulting drop deformation and the tilt which leads to the drop running off enables conclusions to be drawn relating to roughness and adhesion. The roll-off angle is informative for superhydrophobic samples and is accurately measured with slow tilt movements.

As the whole instrument is tilted, the surface is always in the same position relative to the lens. This makes the video evaluation very easy and changes in the drop can also be tracked visually. Almost all other measuring methods and options provided by your instrument can be used without changing the setup.

- Angle of inclination up to 90° with a resolution of 0.1° for DSA100 and 0.01° for DSA25
- Accuracy of 1.0° for DSA100 and 0.5° for DSA25
- Tilt speed from 0.1°/s to 4.5°/s
- Video recording starts automatically when tilting begins

	DSA100	DSA25
Model name	PA3220	PA4020

Internal tilting table



DSA30 with Internal Tilting Table PA4240

We have developed the internal tilting table for software-controlled wetting analyses on inclined surfaces with high dosing flexibility. With this tilting solution the dosing unit remains vertical, thus enabling drops to be deposited or dropped onto the already inclined surface in a defined way. This is a common method for measuring the roll-off angle. Furthermore, the system also reliably analyzes drop deformation.

The low weight enables angular resolution, precision, and possible tilt speed to be maximized. The internal table is also ideal when little space is available for the frame of an external tilting device.

- Angle of inclination up to 90° with a resolution of 0.01°
- Accuracy of 0.3° ± 0.1°
- Tilt speed from 0.5°/s to 50°/s
- Video recording starts automatically when tilting begins
- Optional tilting table support ST13 can be fitted for finely adjusting the dosing position

	DSA100	DSA30
Model name	PA3240	PA4240

Measurement Modules

Micro-drop analysis

DSA30 with Flexible Liquid Micro Module (left) and with Micro Drop Analysis module (right), both supported by optional observation optics for accurate dosing

Convert your Drop Shape Analyzer DSA30 or DSA100 for dosing and analyzing microscopically small droplets on tiny surfaces without the need for a second instrument frame. The micro module is available with a dosing unit for standard test liquids, e.g. for measuring the water contact angles or the surface free energy, or with a more versatile component for dosing almost any liquid.

The high-quality microscope lens and the particularly powerful special lighting ensure a clear, sharp image of the drop. The different dosing units of the modules produce drops from 10 pL, 20 pL, or 60 pL, respectively, which are placed with pinpoint accuracy with the help of a micro-positioning unit and optional observation optics. A micro-sample table supplied with each unit enables the sample to be finely positioned with great accuracy. Both modules also include practical accessories for cleaning and liquid degassing.

Liquids	Drop volume	DSA30	DSA100
Water, diiodomethane, glycerin	≥ 20 pL	CK4232	CK3232
Water, diiodomethane, glycerin	≥ 60 pL	CK4234	CK3234
Almost any liquid	≥ 10 pL	CK4238	-

Alternatively, we have put the necessary accessories for micro-drop analyses together in the instrument configurations DSA100M, DSA30M, and DSA30M Flexible Liquid.

Interfacial rheology

DSA30 with Oscillating Drop Module

The Oscillating Drop Module for the DSA100 and DSA30 is used for analyzing drops to measure interfacial rheological properties of liquids. In doing so, the change in the surface or interfacial tension is measured as a drop specifically changes in size. The magnitude of the change is mathematically divided into an elastic and viscous component (elasticity and viscosity modulus). The results provide information on the mechanical and time-dependent stability of foams, films, and emulsions.

During the measurement, a pendant drop is produced, the size of which is changed periodically with accurately controlled amplitude and frequency. The piezo unit of the module produces an exactly sinusoidal oscillation which guarantees a reliable evaluation. The camera of the instrument then records a video of the oscillating drop with very high image quality. This video is automatically evaluated, frame by frame, to precisely calculate the elasticity and viscosity modulus.

The module includes the following components:

- Piezo unit for dosing drops and specifically changing their size with associated electronics board
- ADVANCE software module for calculating interfacial rheological parameters from the raw data

The module is already included in the instrument configuration DSA30R, which we have specially put together for interfacial rheology.

	DSA100	DSA30
Model name	DS3270	DS4270

Dosing Solutions

Dosing Hub

DSA100E with Dosing Hub and three dosing units

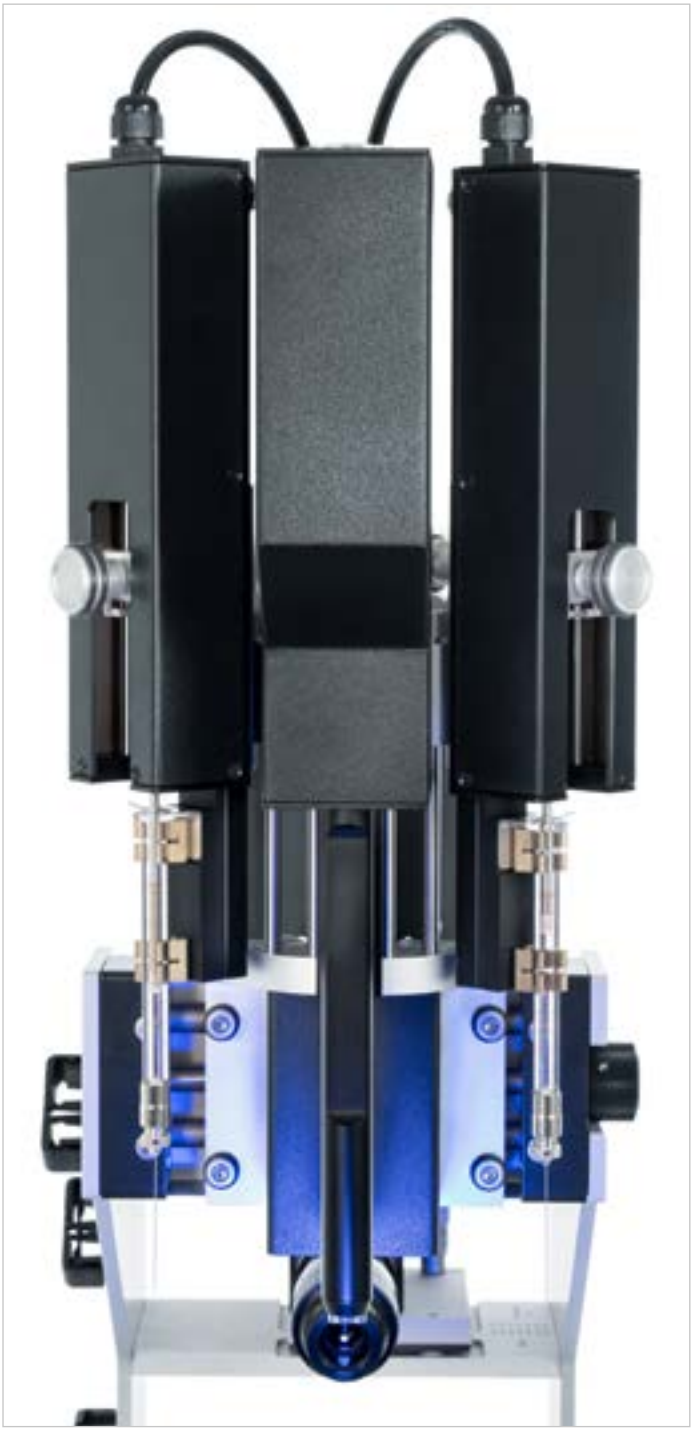
Ultra-fast changing and positioning of three dosing units

Many dosing options, one flexible solution: The Dosing Hub is our changing and positioning system which integrates up to three dosing units simultaneously in automated sample analyses. With high speed and precise positioning, the system enables reliable contact angle and surface free energy measurements with up to four liquids and masters challenging measurement tasks with special dosing units.

The Dosing Hub saves time by changing the dosing liquid particularly quickly and transporting it swiftly to the programmed dosing height. In addition, the system works together with the exclusive Liquid Needle double-dosing unit, which enables measurements of the SFE with two liquids in a matter of seconds. By combining this system with up to two syringe dosing units, even fully automatic SFE determinations with four liquids can be carried out in very short time.

Special problems require special solutions for dosing – for example, temperature control of the liquid to simulate conditions close to the process. The Dosing Hub is designed to position such massive dosing solutions with pinpoint accuracy. A great deal of flexibility is provided when combining it with a syringe dosing unit or the liquid needle. This means that routine measurements and special measuring tasks can be carried out alternately without having to change the instrument setup. Thanks to its robust layout, the Dosing Hub can also be used together with heavy dosing solutions such as the Oscillating Drop Module for interfacial rheology. Drop Shape Analyzers DSA30E and DSA100E are already equipped with the Dosing Hub.

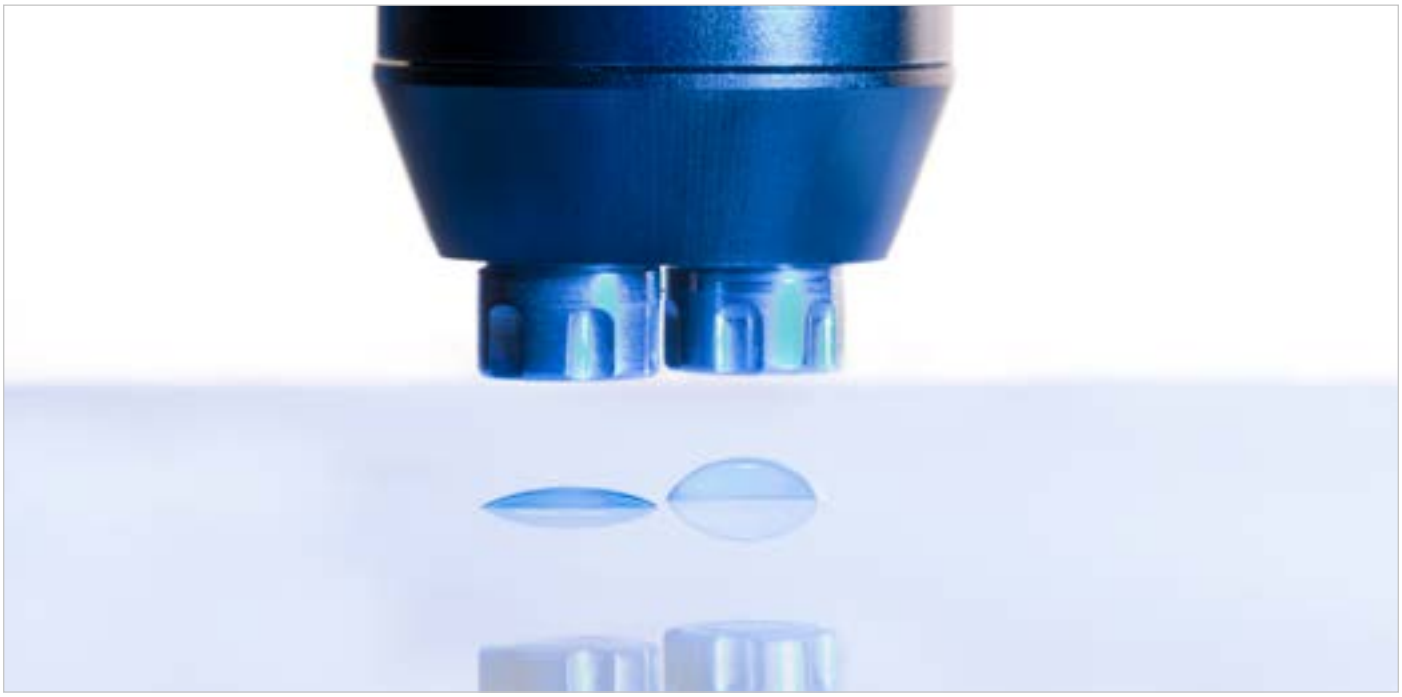
Also compatible with the DSA30: the Dosing Hub



Enabling automated analysis with combinable dosing techniques

	DSA30	DSA100
Model name	NM4220	NM3220

Twofold Liquid Needle dosing unit



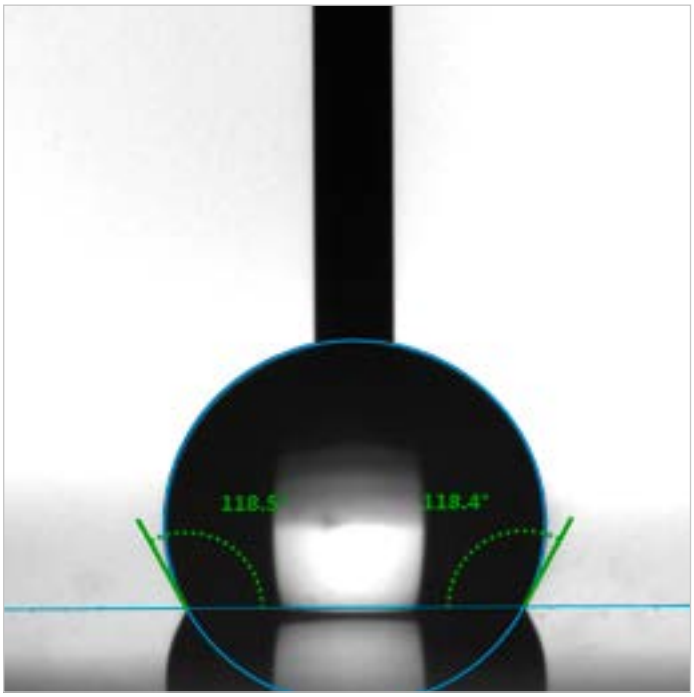
Twofold Liquid Needle dosing unit for extremely fast SFE measurements

Our automatic twofold dosing module performs fully automated surface free energy (SFE) determinations, using our Liquid Needle technology. The dosing unit dispenses and analyzes two drops of different test liquids in parallel. The entire process from dosing start to SFE calculation is fully automatic and complete within a second. Each dosing valve can be also used separately for single sessile drop analyses.

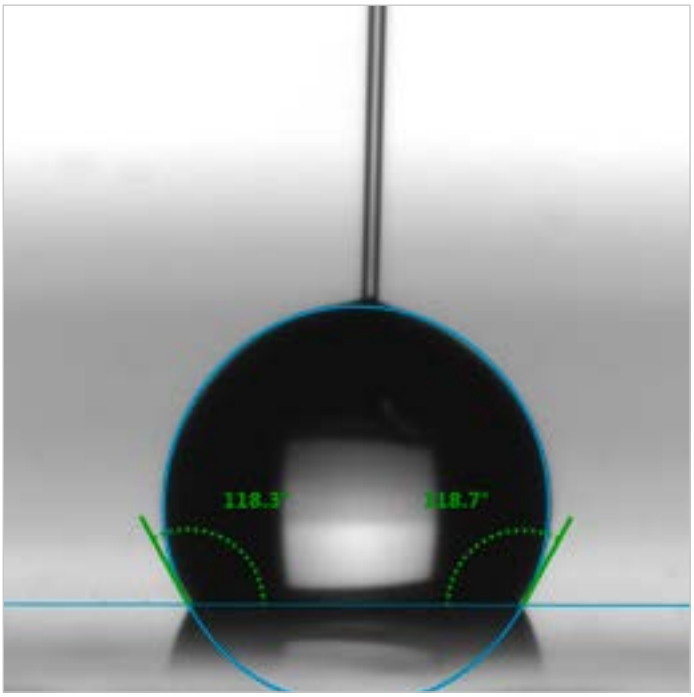
The cartridges of the easy-to-handle unit can be removed quickly and filled directly with test liquids. One filling is enough for approximately 1000 SFE determinations.

- Dosing of two drops in less than 0.1 seconds
- Measuring surface free energy (SFE) in less than 1 second
- Keeps dynamics low to measure contact angles reliably
- 1000 SFE determination with one cartridge filling

	DSA100	DSA30	DSA25
Model name	DS3252	DS3252	DO3252



Dosing with solid needle



Dosing with Liquid Needle

The Liquid Needle: Revolutionary dosing technology with proven validity

The patented Liquid Needle is an extremely thin jet of liquid which is created through a dosing nozzle using pressure. The dynamics are just sufficient to form a continuous stream of liquid while dosing, but small enough to avoid influencing the contact angle.

Dosing can be carried out much faster with the Liquid Needle compared to a solid needle, with the extra benefit of a user-independent dosing process. Furthermore, dosing drops on very hydrophobic samples is easier because the drop does not have to detach from a solid needle.

The validity of the Liquid Needle method was proven in a thorough scientific study in which contact angles were measured on a broad range of samples.

Find out more: **https://www.kruss-scientific.com/en/know-how/glossary/liquid-needle**

Stood-up Drop dosing unit

Despite the high information value for technical dewetting processes, dewetting has rarely been investigated to date, especially in quality control, due to the increased time required. This is now changing with the Stood-up Drop® of the DS3251 dosing unit, which combines speed and ease of use.

The defined dosing distance and the constant, non-influenceable dynamics ensure user-independent results. The disposable cartridges used for measuring with pure water can be filled quickly and easily and last for up to 2,000 contact angle measurements.

- Dewetting measurement within seconds
- Powerful QC parameter using pure water
- Available for DSA100, DSA30, and DSA25
- Compatible with the Dosing Hub

The Stood-up Drop can be combined with other dosing units

In the Stood-up Drop method, the liquid is dispensed at high speed onto the solid surface in a thin jet using pressure. Due to the high dynamics, the liquid initially spreads out flat on the solid (wetting) and then contracts into a drop (dewetting).

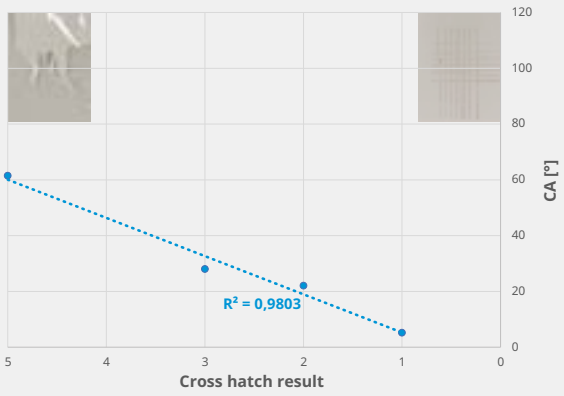
Dosing of a Stood-up Drop in slow motion

An abundance of applications

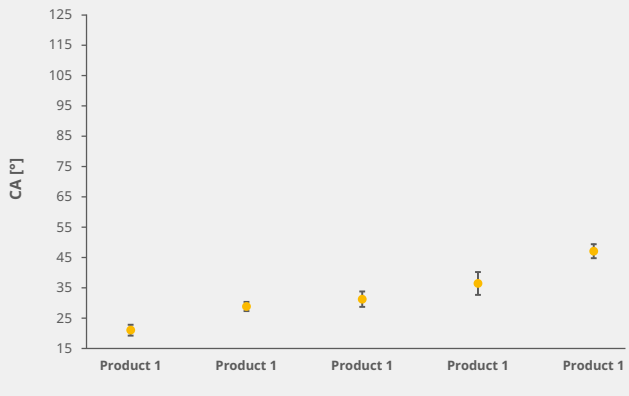
The recently receded contact angle (RRCA) measured on this Stood-up Drop in a matter of seconds accurately reflects dewetting and correlates with many process and QC parameters, such as surface activation settings or crosshatch ratings for coating adhesion.

This opens up new fields of use for contact angle measurement in material quality control, which has already been show in great number of use cases.

Real-life use cases of the Stood-up Drop



Strong correlations between the Stood-up Drop and crosshatch test ratings demonstrated in a comprehensive study together with BYK



The SUD could clearly differentiate between pressure sensitive adhesives of different types and brands.

Manual single syringe dosing unit

DSA30 with manual single syringe dosing unit

With the dosing unit, drops of a single liquid can be manually dosed in a simple way. The slowly advancing forward feed ensures gentle dosing so that the shape of the drop is not affected. The high-quality glass syringe SY20 is suitable for almost all substances and also enables low-viscosity liquids to be dosed in a controlled manner. Tubeless direct dosing and the option of using disposable syringes make the dosing unit suitable for hazardous substances and contaminating liquids.

	DSA100	DSA30	DSA25
Model name	DS3205	DS3205	DO3205

Software-controlled single syringe dosing system

DSA100 with software-controlled dosing system for one liquid

The software-controlled dosing system produces drops with accurately reproducible volume for measuring contact angle and surface tension. The uniform dosing feed can be set to a very slow speed in order to accurately measure the advancing angle and the receding angle. Tubeless direct dosing and the option of using disposable syringes make the dosing unit suitable for hazardous substances and contaminating liquids.

	DSA100	DSA30	DSA25
Model name	DS3210	DS4210	DO4011

Software-controlled multi syringe dosing system

DSA100 with software-controlled multi-dosing system

Our multi-dosing system equips the instrument for the fully automatic dosing of 4 or 8 liquids (DSA100), respectively 4 liquids (DSA30). The motorized lift automatically actuates the dosing height or places the drop carefully on the sample. The software organizes even highly complex dosing and measuring sequences and, especially when combined with motorized axes. For example, the surface free energy of a solid can be determined using several liquids in a single measuring sequence.

Thanks to the large dynamic range of 10 to 1400 µL/min, the dosing feed can be set to a very slow speed to accurately measure the advancing and receding angle. On the other hand, service functions such as filling a syringe are carried out very quickly. An additional manual syringe can be used for measuring surface tension or analyzing contaminating liquids, for example.

Number of liquids	DSA100	DSA30
4	DS3224	DS4224
8	DS3228	-

Temperature Control Equipment

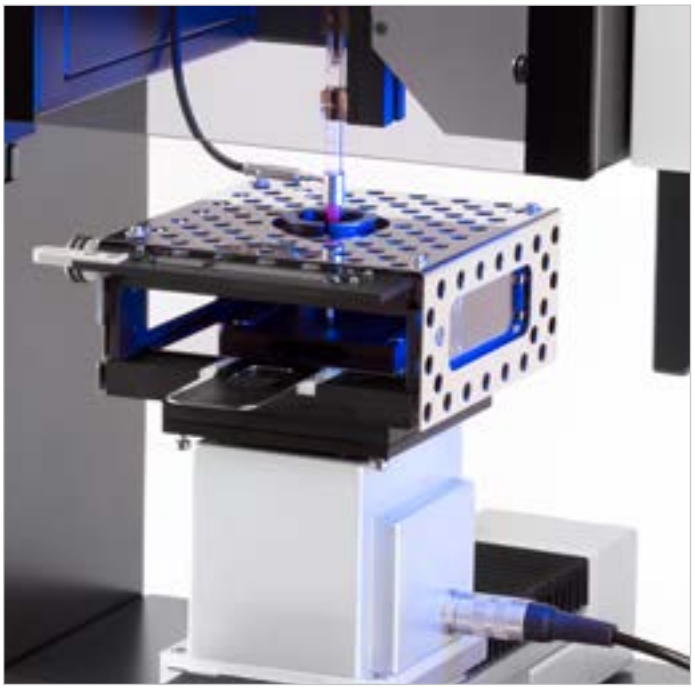
TC21
Temperature-controlled chamber for high temperatures

- Electrically controlled temperature between 50 and 400 °C
- Precision temperature sensor included
- Ideal in combination with the high-temperature dosing unit DS3241/DS4241

The temperature-controlled chamber TC21 enables liquid and solid surfaces to be analyzed at temperatures up to 400 °C. The target temperature is easy to specify and is reliably achieved at defined heating rates. The chamber's excellent insulation ensures stable equilibrium during the measurement. With the help of the accurate temperature sensor, the current value is recorded by the software together with the contact angle or the surface tension.

	DSA25	DSA30	DSA100
TC21	✓	✓	✓

TC11
Temperature-controlled chamber for large samples

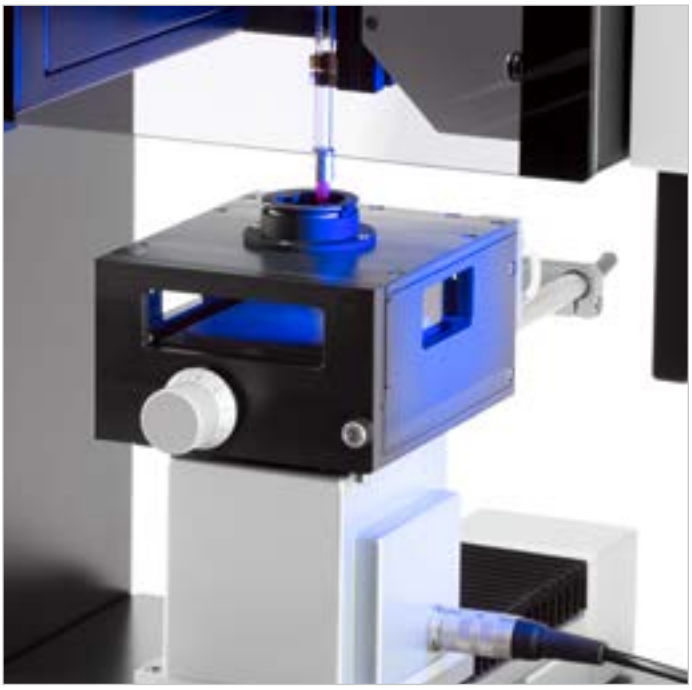


- For sample sizes up to 132 × 132 × 27 mm (W × D × H)
- Temperature range between -10 and 130 °C (suitable thermostats are available)
- Precision temperature sensor included
- Inert gas connector provided

The temperature-controlled chamber TC11 has been specially developed for measuring the contact angle on large samples at temperatures up to 130 °C. The slide-in sample tray is conveniently loaded outside the chamber and can be moved from the outside when the chamber is closed and at the required temperature. Small samples are prevented from shifting by means of removable holding clamps. The front viewing window simplifies dosing in the required sample position.

	DSA25	DSA30	DSA100
TC11	✓	✓	✓

TC30
Temperature-controlled chamber up to 90 °C

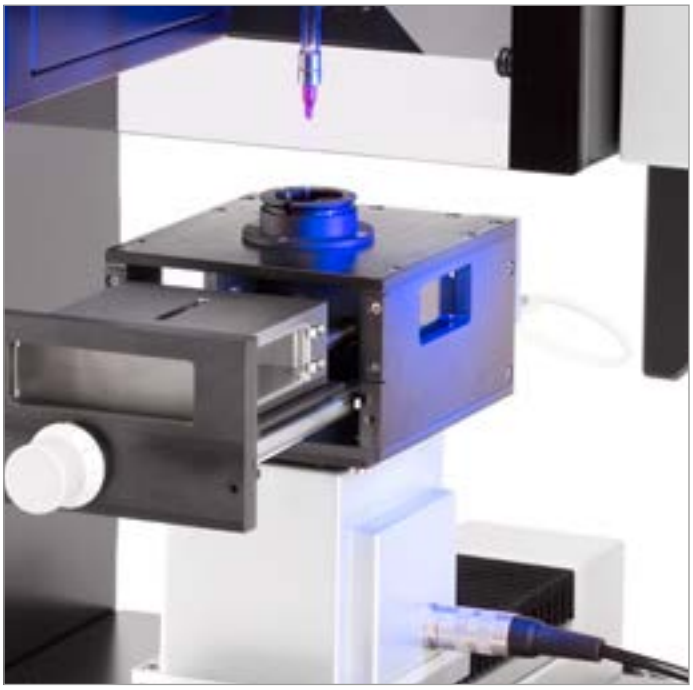


- Temperature range between 5 and 90 °C (suitable thermostats are available)
- Precision temperature sensor included
- Inert gas connector provided
- Can be ideally combined with the humidity chamber HC10

The wettability of solid samples can be reliably analyzed at temperatures up to 90 °C with the help of the temperature-controlled chamber TC30. The well-sealed and insulated plastic housing and a copper heat-conducting hood ensure stable thermodynamic equilibrium. Gas purging of the viewing windows is effective against condensation. The dosing position can be conveniently adjusted from the outside when the chamber is closed and at the required temperature.

	DSA25	DSA30	DSA100
TC30	✓	✓	✓

TC40
Temperature-controlled chamber for rapid changes



- Fast electrical temperature control between -30 and 160 °C
- Precision temperature sensor included
- Inert gas connector provided
- Can be combined with the humidity chamber HC10 between 5 and 90 °C

With rapid temperature changes between -30 and 160 °C, the temperature-controlled chamber TC40 is our versatile solution for wettability analyses under different thermal conditions. The insulating plastic housing and a heat-conducting copper hood ensure a uniform, stable internal temperature. A gas flow can be connected in order to avoid condensation and icing of the viewing windows. The dosing position can be conveniently adjusted from the outside when the chamber is closed and at the required temperature.

	DSA25	DSA30	DSA100
TC40	✓	✓	✓

TC3213
Temperature-controlled unit for liquids

- Temperature range -10 to 130 °C (suitable thermostats are available)
- Precision temperature sensor included
- Also suitable in combination with temperature-controlled chambers TC11, TC30, and TC40

The unit TC3213 brings liquids for measuring contact angle or surface tension to the required temperature of up to 130 °C. Embedded in a heat-conducting metal sleeve, the filled syringe (additionally available) quickly reaches the desired temperature. With the help of a sensor, the temperature is measured directly at the syringe and assigned to the measurement in the software. The unit is easy to fit and ideally complements your software-controlled or manual single dosing unit.

	DSA25	DSA30	DSA100
TC3213	✓	✓	✓

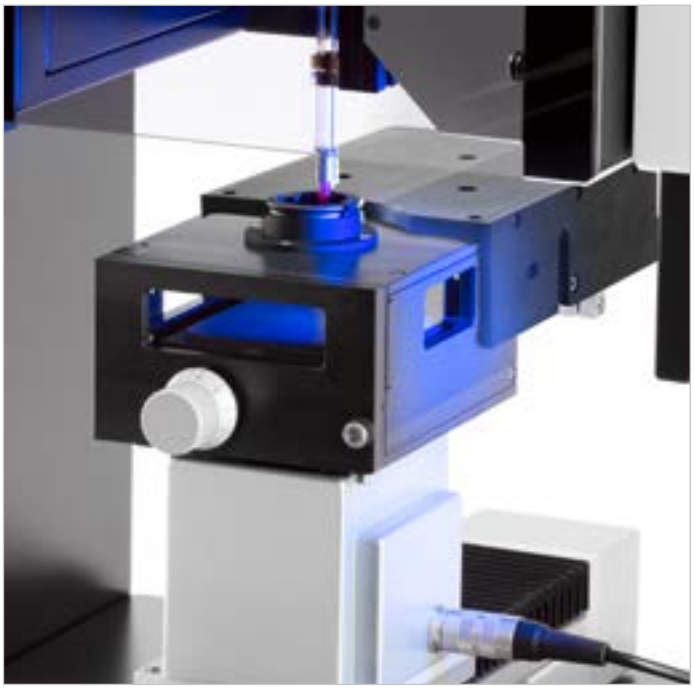
DS3241/DS4241
High-temperature dosing units

- Large temperature range of 50 to 400 °C
- For polymers, hotmelts or any other melts
- Exchangeable melting chamber for easy cleaning

We have designed the dosing units DS3241 for DSA100 and DS4241 for DSA30 specially for analyzing the wetting and surface tension of melts at temperatures between 50 and 400 °C. The melting cylinder is conveniently filled in the cold state and then heated rapidly in a controlled way. Dosing is carried out precisely with the help of a micrometer screw, thus easily producing a drop of the desired size. The DS3241 or DS4241 are ideal when used in combination with the temperature-controlled chamber TC21 for temperature control of samples to measure the contact angle.

	DSA25	DSA30	DSA100
DS3241	-	-	✓
DS4241	-	✓	-

HC3210/HC4210
Humidity chamber



- Relative humidity (without insulating hood): 15 to 85 % at 22 °C, up to 89 % at 10 to 15 °C, up to 5 % at 70 to 90 °C
- Time to achieve target value: 20 to 300 s
- External compressed air supply required (3 to 6 bar, very dry air), a suitable compressor is available
- Temperature range between 5 and 90 °C (suitable thermostats are available)

The wettability of a surface is affected by the climatic ambient conditions. Using the humidity chamber HC10 in combination with the temperature-controlled chamber HC3210/HC4210 enables you to measure contact angles at precisely controlled humidity and temperature. At temperatures above 50 °C and humidities above 65 %, we recommend using the insulating hood TC3200. Inserted into the temperature- controlled chamber, this enables the target humidity to be reached even more quickly and maintained with increased stability.

	DSA25	DSA30	DSA100
HC3210	-	-	✓
HC4210	✓	✓	-

Tensiometry

Method Overview | Tensiometry

Wetting agent, detergent, dispersant, emulsifier: Surfactants have many names. Each name stands for a process in which the surface or interfacial tension must be decreased to a certain, optimal level. And it stands for a problem to be solved, because there is neither a supersurfactant for all cases, nor a rule of thumb for the best concentration.

As the provider with the largest portfolio of methods in tensiometry, we help you optimize the use of surfactants with our instruments and their reliable results. Each of our many approaches for determining surface and interfacial tension as well as the contact angle illuminates another aspect of the behavior of interfaces in general and surfactants in particular.

Bubble pressure
Dynamic surface tension using the Laplace pressure of a gas bubble at a capillary in a liquid

Sorption
Contact angle between a liquid and porous material using the capillary force

Liquid density
Density determination of a liquid using the buoyancy of a probe immersed in the sample

Solid density
Density determination of a solid using the buoyancy of the sample immersed in a liquid

Sedimentation
Sedimentation speed of a dispersion

Penetration
Penetration resistance of a sediment against a probe

Wilhelmy contact angle
Contact angle using the wetting force of a liquid at a solid sample

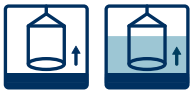
Spinning drop IFT
Interfacial tension using the diameter or curvature of a drop of a light phase inside a heavy phase in a rotating capillary

CMC
Automated determination of the critical micelle concentration by measuring the SFT at different concentrations

IEC 62961
Ageing check of transformer oils and other hydrophobic liquids using interfacial tension with water according to the IEC 62961 standard

ASTM D971
Ageing check of transformer oils and other hydrophobic liquids using interfacial tension with water according to the ASTM D 971 standard.

Ring SFT/IFT
Surface/interfacial tension using the tensile force of a lamella underneath a ring



Lamella tear-off SFT/IFT
Surface/interfacial tension using the tensile force of a lamella which is stretched until it disrupts

Wilhelmy SFT/IFT
Surface/interfacial tension using the wetting force of a liquid at a platinum plate or rod

Drop pull-off
Using force measurement and image analysis to determine the adhesion behavior of a drop brought in contact with and then pulled off a solid surface

Liquid polarity
Calculating the polar and disperse part of the surface tension from contact angle and surface tension data

Surface free energy
Surface free energy of a solid using contact angle data

Adhesion analysis
Calculating adhesion-related scientific parameters for the interfacial contact

Special purpose
Using a force sensor and a software-controlled sample stage for freely defined procedures

Cycle
Carrying out a measurement up to 20 consecutive times and displaying the results together

Run by ADVANCE
On the following pages, instruments with this icon are supported by our ADVANCE software

Bubble Pressure Tensiometer – BPT Mobile

Tasks and applications

Checking the content of cleaner or wetting agent in a bath or the surfactant content in general is an important QC task in many industrial processes:

- Cleaning as a preparation step before coating or bonding
- Electroplating
- Coating of solar cells
- Etching, e.g. for circuit boards
- Surfactant detection in wastewater treatment

Measuring methods and options

- Bubble Pressure method: SFT is measured using the internal pressure of a bubble at an immersed capillary
- Monitoring at a single surface age with evaluation based on predefined limits
- Determination of surfactant concentration based on SFT
- Continuous measurement of SFT while changing the concentration
- Determination of the SFT dependent on surface age between 10 and 30 000 ms
- Temperature measurement and documentation

Mobile quality control for cleaning and coating baths

Industrial quality assurance is about reliability, speed, and ease of use. When it comes to regular checks of the cleaner or wetting agent content in a bath, our Bubble Pressure Tensiometer – BPT Mobile is prepared for these demands.

Immerse – click – read out: Capture the surfactant content of your bath within seconds using surface tension with the BPT Mobile. The quality inspector using it knows immediately whether the bath is okay thanks to an ad-hoc evaluation. Moreover, for proactive adjustment of the bath, the BPT Mobile shows how the surfactant content decreases over time. With the intuitive touch display, which speaks seven languages, working with the BPT Mobile is almost like doing quality tests with a smartphone.

The touch display responds reliably even when using gloves

The concentration can be read out directly using a reference curve

Specifications

Pressure measurement	
Maximum pressure	1.25 kPa
Temperature measurement	
Range	0 to 100 °C
Surface tension	
Surface tension range	10 to 100 mN/m
Resolution	0.1 mN/m
Surface age range	10 to 30 000 ms

Touch display	
Integrated color IPS display	480 × 854 px, size 5“
Power supply	
Battery	10 h operating time
Dimensions	
Size	85 mm × 55 mm (W × D)
Height	220 mm
Weight	600 g

Bubble Pressure Tensiometer – BP100

Tasks and applications

- Surfactant development
- Optimization of spray processes
- Development of washing and cleaning processes
- Optimization of painting and printing processes
- Checking the surfactant content in galvanic and cleaning baths

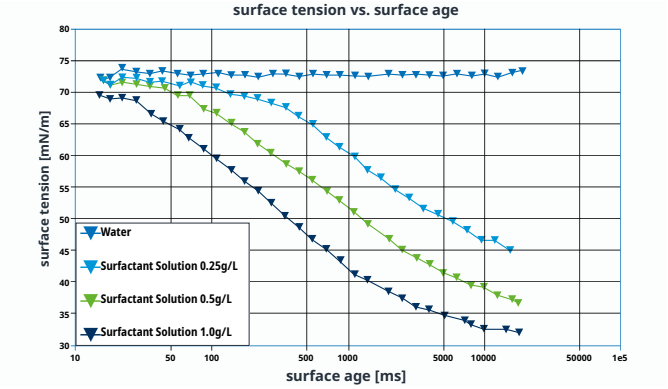
Measuring methods and options

- Measurement of surface tension as a function of surface age
- Long-term measurement of surface tension at constant surface age
- Determination of adsorption coefficient and diffusion coefficient
- Calculation of the surface tension of the solvent and the equilibrium surface tension (extrapolation in accordance with Hua & Rosen)
- Temperature control from -10 to 130 °C, temperature measurement with internal sensor

Analysis of surfactant solutions for dynamic processes

The Bubble Pressure Tensiometer – BP100 measures dynamic surface tension with high accuracy. It reliably analyzes the mobility of surfactants, thus enabling high-speed processes such as spraying, coating, printing, and cleaning to be optimized. The instrument covers a wide speed range as part of a single, fully automatic measuring process. This enables you to find out how quickly a surfactant acts and when the required surface tension has been reached. In this way, the BP100 assists in the development, selection and dosing of surfactants optimized for your process.

Sample stage with integrated temperature control



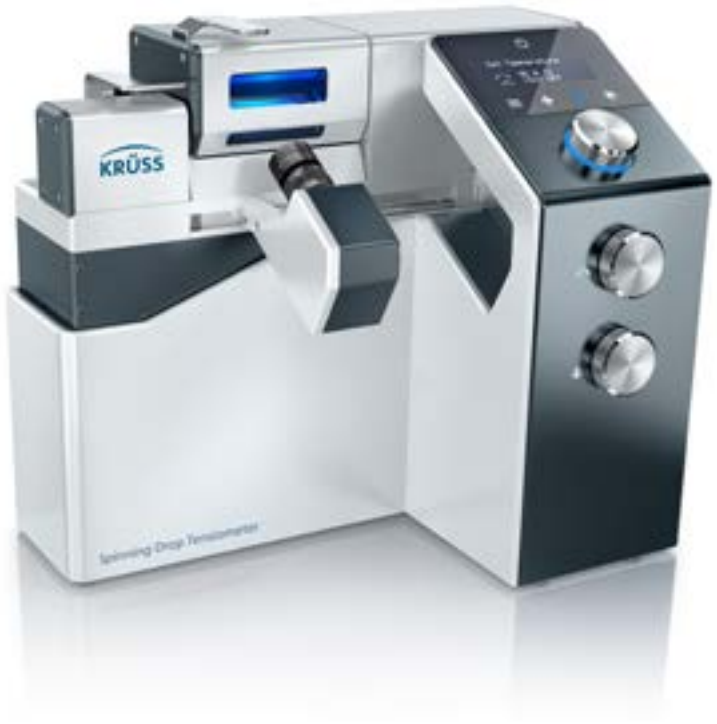
Dynamic behavior of a surfactant at different concentrations

Specifications

Pressure measurement	
Maximum pressure	3000 Pa
Measurement rate	20 kHz
Sample stage	
Travel distance	>110 mm
Drive	
Travel speed	0.1 to 500 mm/min

Temperature control	
Range	-10 to 130 °C
Surface tension	
Surface tension range	10 to 100 mN/m
Resolution	0.01 mN/m
Surface age range	5 to 200 000 ms

Spinning Drop Tensiometer – SDT



Tasks and applications

- Development of emulsions
- Enhanced oil recovery (EOR)
- Bioavailability of drugs
- Surfactant research
- Adsorption properties at phase boundaries

Measuring methods and options

- Measurement of interfacial tension in a wide range starting from 10^{-6} mN/m
- Analysis using the drop diameter according to Vonnegut
- Analysis using the drop shape curvature according to Young-Laplace
- Long-term measurement for analyzing surfactant dynamics
- Temperature-dependent analyses

Measurement of interfacial tension in an extremely wide range with especially simple sample exchange

Our Spinning Drop Tensiometer – SDT measures interfacial tension with a high degree of accuracy and a particularly wide measuring range. The SDT is the ideal solution for the quality control and development of emulsions and surfactants thanks to its enormous bandwidth, small sample volumes, and simple handling during preparation. Exact capture of extremely low interfacial tensions also makes the SDT an instrument particularly well-suited for analyzing the interfacial behavior of mini- and micro-emulsions, for example for tertiary oil recovery or the pharmaceutical industry.

Patented capillary concept for quick sample exchange

Clearly arranged display

SDT with tilted measuring unit

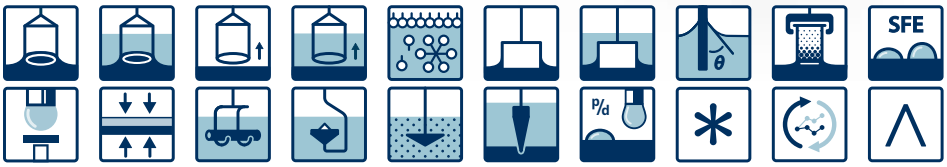
Camera parking position of the SDT

Specifications

Camera system	
Performance	15 fps at 2560 × 1920 px
Illumination	
Type	high power monochromatic LED and stroboscope
Sample stage	
Tilting	±20°
Capillary drive	
Resolution	0.1 rpm

Temperature	**control**	**measurement**
Range	-10 to 120 °C	-10 to 180 °C
Interfacial tension		
Range	10^{-6} to 2000 mN/m	
Resolution	10^{-6} mN/m	

Force Tensiometer – Tensíío®



Tasks and applications

- Determination of the effectiveness and efficiency of surfactants by CMC measurement
- Wetting behavior of tablets, pharmaceutical active ingredients, and excipients
- Wetting of varnishes and paints
- Analyzing the aging status of oils according to ASTM D 971 and IEC 62961
- Wetting and adhesion of coatings
- Development of cosmetic products
- Wetting properties of inks
- Wetting of fiber bundles and textiles
- Sedimentation and ductility of dispersions
- Checking of surface modifications
- Adhesion at superhydrophobic surfaces

Measuring methods and options

- Surface tension and interfacial tension using the ring, plate, and rod method
- Surface tension and interfacial tension using the ring tear-off method
- Critical micelle concentration (CMC) of surfactants
- Contact angle and surface free energy of solids, powders, or fibers
- Density of liquids and solids
- Sedimentation behavior of dispersions
- Penetration resistance of sediments
- Temperatures between -15 and 140 °C, temperature measurement with internal or external sensor

The next-generation tensiometer that grows with your tasks

Do you need a tensiometer that is tailormade for a specific task or an all-round solution for analyzing liquid and solid surfaces and interfaces? Let us equip your Tensíío with the many options you need – or the few. In any case, the high- resolution force sensor provides for maximum precision and is capable of measuring low interfacial tensions and even wetting forces at single fibers. Measurements are carried out quickly thanks to exceptionally fast, still very precise sample positioning. The optional camera enables monitoring the automatic measurements while the clear image-to-result assignment documents everything that happened during the measurement.

The optional camera records your adhesion measurement and paves the way for new methods.

Control and follow your analyses with the touch panel - perfectly synchronized with the ADVANCE software.

Specifications

Force measurement	
Resolution	standard: 100 µg; hi-res: 1 µg
Maximum load	standard: 250 g; hi-res: 210 g
Accuracy (calib.)	±0.15 mN/m
Measurement rate	100 Hz
Locking mechanism	automatic overload protection
Sample stage	
Travel distance	120 mm
Drive	
Travel speed	0.001 to 800 mm/min
Resolution	16 nm

Interfacial and surface tension		
Range	1 to 2000 mN/m	
Resolution	up to 0.001 mN/m	
Contact angle	**Washburn**	**Wilhelmy plate**
Range	0 to 90°	0 to 180°
Resolution	0.01°	0.01°
Temperature control	**Peltier**	**liquid**
Accessible range	-15 to 140 °C	-10 to 130 °C

Micro Dispenser for CMC Measurements

The specially developed Micro Dispensers equip the Tensíio for measuring the critical micelle concentration (CMC) with the utmost precision, using one or two dispenser units (DS1110 und DS1120). The surfactant concentration range is set up and then measured fully automatically.

- Using one Micro Dispenser to add liquid
- Using two Micro Dispensers to add and then remove liquid so that the concentration range is not limited by the vessel's capacity
- Adding surfactant to the solvent or diluting a stock solution (reverse CMC)

Two Micro Dispensers for an extended concentration range

Specifications

Dispensing accuracy (10 mL syringe)	
Resolution	0.1 µL
Dosing rates (software-controlled)	
10 mL dosing cylinder	5 to 100 mL/min
25 mL dosing cylinder	5 to 250 mL/min

Measuring methods and functionality	DS1110 Single Micro Dispenser	DS1120 Double Micro Dispenser
Maintaining constant liquid level	-	yes
Forward CMC	yes	
Reverse CMC	yes	
Definition of concentration range	upper and lower limit	
Ring method	yes	
Plate method	yes	

Temperature Control Units

TJ1150
Peltier temperature control unit

- Temperature control between -15 and 140 °C
- Quickly reaches the target temperature
- Software-controlled without external controller
- Enables automatic temperature ramping

In a range between -15 to 140 °C, the Peltier temperature control unit approaches the desired measuring temperature quickly and precisely. Next to measurements at high or low temperatures, the unit is especially suitable for analyses at accurately defined thermal standard conditions, which are hard to achieve with a simple liquid thermostat. Excellent insulation and an integrated stirrer provide for thermal stability and homogeneity.

With the additional Counter Cooler, a temperature control loop enables versatile integration into automation programs of ADVANCE. For example, a curve for temperature-dependent surface tension can be recorded, or measurements can be started automatically as soon as the target temperature is reached.

Force Tensiometer – K20

Tasks and applications

- Determination of the effectiveness of wetting agents
- Checking the surfactant content in solutions below the critical micelle concentration (CMC)
- Tank clearance and cleaning validation in the foodstuffs industry
- Measurement of interfacial tension for the quality assurance and optimization of emulsifiers
- Analyzing the aging status of oils according to ASTM D 971 and IEC 62961

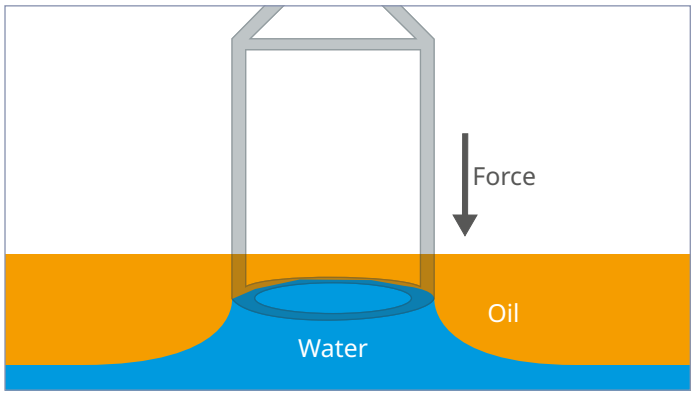
Measuring methods and options

- Surface tension using the ring and plate method
- Interfacial tension using the ring and plate method
- Surface tension and interfacial tension using the ring tear-off method
- Measuring the density of liquids
- Temperature control from -10 to 130 °C, temperature measurement with external sensor

The flexible tensiometer for basic quality assurance

Our Force Tensiometer – K20 is a robust, semi-automatic instrument for the precise measurement of surface tension and interfacial tension. Using the ring and plate method as the main tensiometric methods, it produces reliable measurements for the routine quality assurance of your surfactant solutions and interfacial processes.

Preset parameters for computer-independent measurements



ASTM D 971 and IEC 62961: Measuring interfacial tension of insulating oils

Specifications

Force measurement	
Resolution	100 µg
Maximum load	50 g
Accuracy (calib.)	-0.1/+0.2 mN/m
Measurement rate	5 Hz
Sample stage	
Travel distance	90 mm
Drive	
Travel speed	2.4 to 14 mm/min

Temperature	control	measurement
Range	-10 to 130 °C	-20 to 150 °C
Interfacial and surface tension		
Range	1 to 999 mN/m	
Resolution	up to 0.01 mN/m	
Liquid density		
Range	1 to 2200 kg/m³	
Resolution	1 kg/m³	

FORCE TENSIOMETER – K6

The manual tensiometer for clear and reliable basic measurements

The Force Tensiometer – K6 is a robust and reliable manual instrument for measuring surface tension and interfacial tension using the ring method. As a quality product from our precision mechanical workshop, it produces fast, easy and accurate measurements for surfactant solutions and solvents.

As well as simple investigations of liquid and liquid-liquid interfaces, our K6 is also suitable for training purposes in schools and universities for demonstrating the action of the surface tension force in a comprehensible manner.

Foam Analysis

Method Overview | Foam Analysis

Foam is soft, but shaping it for a certain product – or getting rid of it – can be very hard. We help you take control in your foam-related process with solid numbers for the foaming behavior of your liquids and the properties of the foam created.

Powered by our ADVANCE software, our instruments perform foam measurements under accurately repeatable conditions and win results using precise sensors and sophisticated image analysis. Get acquainted with our diverse range of methods for analyzing the foam-forming capacity of liquids and all aspects of foam behavior.

Foam height
Foamability and foam stability using the optically detected height of foam created reproducibly

Foam structure
Optically detected foam bubble sizes and their statistical distribution

Foam flash
Foam formation behavior of heavily foaming liquids using stirring cycles

Liquid content
Moisture and drainage behavior of foam using its electrical conductivity

High pressure foam
Foam height and foam structure simultaneously analyzed under high pressure

Cycle
Carrying out a measurement up to 20 consecutive times and displaying the results together

Run by ADVANCE
On the following pages, instruments with this icon are supported by our ADVANCE software

Dynamic Foam Analyzer – DFA100

Tasks and applications

- Foams for washing and cleaning
- Firefighting foams
- Foams in foodstuffs and personal care products
- Surfactant development
- Flotation as a method for separating solids
- Foam-inhibiting and foam-reducing agents (antifoamers/defoamers)
- Foam prevention for coatings, paints and varnishes, process wastewater, and cooling lubricants
- Foam prevention in amine gas treating (gas sweetening)

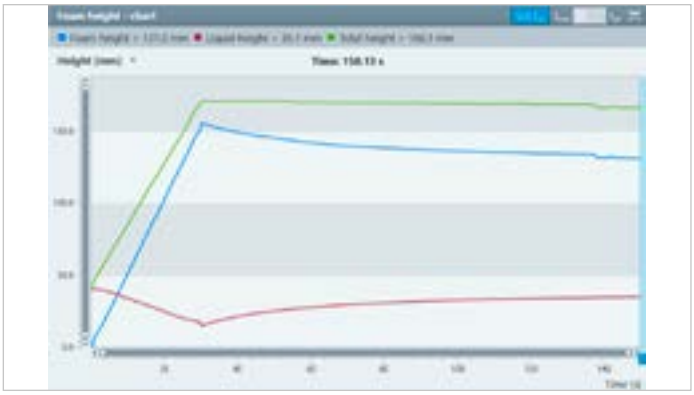
Measuring methods and options

- Measurement of foamability of liquids and foam decay
- Determination of total height, foam height, and liquid height
- Foaming by means of sparging or stirring
- Investigations of externally produced foams
- Foamability parameters, including maximum height, foam capacity, and foam density
- Temperature-controlled measurements at up to 90 °C
- Foaming with externally connected gases

Scientific analysis of liquid foams

Our Dynamic Foam Analyzer – DFA100 measures the foamability of liquids and the foam stability based on precise measurements of the foam height. With optional modules, it also measures the liquid content of the foam or analyzes the foam structure with regard to bubble size and distribution. The DFA100 assists you in the optimization of foam-forming products or, in the case of unwanted foam formation, helps with specific foam prevention.

Ergonomic sample holder



Simultaneous detection of total, foam, and liquid height

Specifications

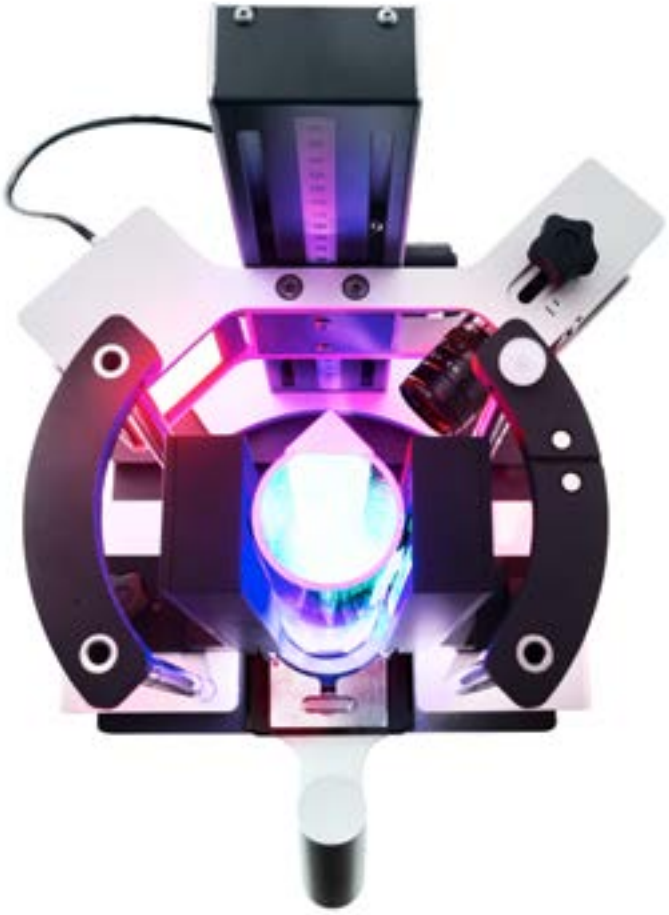
Line sensor	
Sensor resolution	1728 × 1 px
Height resolution	200 dpi | 0.125 mm
Temporal resolution	20 fps
Scanning length	216 mm

Operating system	
Gas flow rate (internal)	0.2 to 1.0 L/min
Gas flow rate (external)	0.05 to 1.0 L/min
Approved gases	air, nitrogen, carbon dioxide
Approved pressure	5 ± 0.5 bar
Stirring speed	up to 8000 rpm
Approved temperature	4 to 90 °C

Illumination	
Type	LED
Wavelength, dominant	469 nm (IR: 850 nm)

Analyzed foam characteristics	foamability and foam stability
Results	■ foam height ■ liquid height ■ total height ■ foam capacity ■ maximum foam density ■ expansion rate ■ foam half life time ■ drainage half life time ■ sample temperature

Foam Structure Module – FSM for DFA100



Tasks and applications

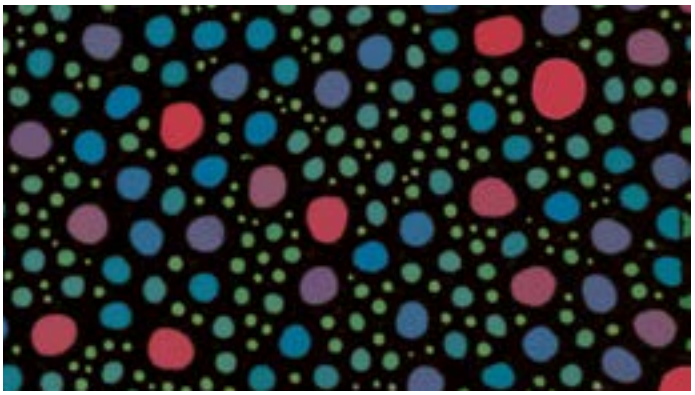
- Foams for washing and cleaning
- Foams in foodstuffs and personal care products
- Surfactant development
- Flotation as a method for separating solids

Measuring methods and options

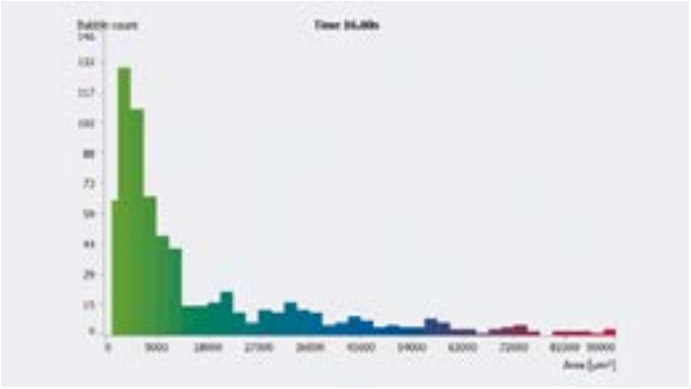
- Live analysis of foam structure in software ADVANCE
- Foam structure analysis at any position of column
- Measurement of bubble size distribution and the change in this distribution in different resolution ranges
- Calculation of mean bubble size and standard deviation
- Output of a histogram for each individual image in the series of measurements
- Simultaneous measurement of foam height and liquid content possible

Time-dependent analysis of bubble size in liquid foams

The Foam Structure Module – FSM of DFA100 reliably analyzes the size distribution of bubbles of liquid foam and the variation of this distribution with respect to time. The measuring method helps you to quantify and specifically optimize the consistency of a foam based on precise and intelligent video image analysis.



Foam structure analysis



Bubble size distribution histogram

Specifications

Illumination	
Type	LED
Wavelength, dominant	633 nm

Camera system	
Connection	USB 3.0
Performance	2 fps at 1280 × 1024 px
Diameter of minimum detectable bubble	50 µm
Mean field of view size	position 1: 285 mm² position 2: 140 mm² position 3: 85 mm²
Focus	manual

Analyzed characteristics	foam structure: homogeneity, stability, and aging
Results	■ mean bubble area ■ bubble count per mm² ■ standard deviation of mean bubble area ■ bubble size distribution ■ bubble count half life ■ Sauter mean radius ■ initial foam structure ■ final foam structure

Liquid Content Module – LCM for DFA100

Tasks and applications

- Foams for washing and cleaning
- Foams in foodstuffs and personal care products
- Surfactant development
- Flotation as a method for separating solids
- Firefighting foams

Measuring methods and options

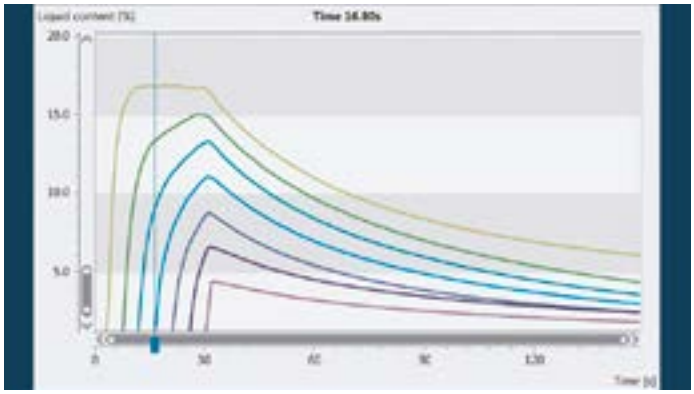
- Simultaneous measurement of moisture content at up to seven levels
- Maximum moisture content at every level
- Half life (time for the liquid content to reduce to one-half) at every level
- Simultaneous measurement of foam height and structure possible

Analyzing the liquid content of foams

The Liquid Content Module – LCM for our DFA100 measures the liquid content of foams and its change with respect to time by evaluating the conductivity of foam. The results provide information on the foam formation and help you to specifically optimize the liquid content and stability of foams.

The liquid content is measured simultaneously at up to seven height increments of the foam. This accurate height resolution shows how uniform the foam is and how the homogeneity changes with time.

Conductivity sensors for analyzing liquid content



Time-dependent liquid content measured at seven levels

Specifications

Electrodes	
Material	35 µm copper, finish: chemical gold
Highest sensor position	185 mm
Measured entity	electrical resistance in Ω
Theoretical measurement range	10 Ω to 2 MΩ

Analyzed foam characteristics	liquid content, drainage, and foam stability
Results	■ liquid content at 7 sensor positions ■ resistance at 7 sensor positions ■ 25 %, 50 %, and 75 % liquid content time

High Pressure Foam Analyzer – HPFA

Tasks and applications

- Foam-assisted EOR
- Foam properties of surfactants, polymers, acids, brines, liquefied gases, and mixtures
- Foam properties of drilling fluids
- Performance of defoamers

Methods and options under high pressure and temperature

- Measurement of foamability and foam stability based on the foam height and volume with respect to time
- Analysis of foam structure and its variation with respect to time based on the number, size, and statistical size distribution of the foam bubbles
- Measurements at pressures up to 350 bar and temperatures up to 120 °C
- Foaming with a diverse range of gases such as air, N_2, or CO_2
- Option of adding liquids during the measurement

Increase the yield with our solution for foam analysis under oil reservoir conditions

The High Pressure Foam Analyzer – HPFA is the world's only measuring instrument for simultaneously analyzing the amount and structure of liquid foams under high pressure. The instrument provides various options for investigating foam behavior under the real process conditions of foam-assisted flooding methods in EOR as well as hydraulic fracturing.

Camera recording foam structure

Mini Dosing System for adding liquids during measurements

Specifications

Measuring technique	
Type	foam height foam structure
Pressure measurement	
Maximum pressure	350 bar (5000 psi)
Temperature control	
Temperature range	room temperature up to 120 °C

Material of pressure chamber	
Type	stainless steel, Hastelloy©, titanium, Inconel©
Mini Dosing System	
Dosing	manual
Temperature	maximum 150 °C
Environment	
Temperature	operating: 10 to 40 °C
Interfaces	
PC	1 × USB 3.0

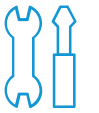
Services

Technical Services

Ensuring your investment is our personal concern

When you have found the right solution, you want to make sure that it will be available for a long time and continuously. We take care of your instrument from the very beginning, ensure its operational readiness with regular maintenance, and act quickly and dependably whenever you need our technical support.

We maintain the reliability of our measuring instruments constantly – significantly longer than is normal in the industry. Even when we have long since developed a successor for your instrument, we will make every technical effort to repair and even modernize it.



Set Up and Installation

Precise and reliable measurements from day one. Don’t lose time and let measuring be the first thing you do with your instrument.

Training

Start your analyses with solid know-how and refresh and deepen it during your instrument’s life cycle.

Maintenance and Repair

Developing high-tech instruments is creative. Keeping them running as long as possible is responsible. Expect your instrument to be a reliable long-term employee.

Upgrades

Start at the top and go up. Let your instrument and software grow more powerful with new measuring and automation options.

Instrument Rental

Use our instrument for your temporary project and expect a permanent impact – for a trial period or to bridge downtimes.

Instrument Qualification

Quality is not just an end result – it is a way of working. We help you pass every audit with tailor-made IQ/OQ verification and documentation.

Localized Service Packages

For some regions, we have put together comprehensive service packages for special measuring instruments. Contact us to find out more: **kruss-scientific.com/en/contact**

Measurement Services

Draw from our vast resources

We are glad to support you with our diverse application services – at our own premises or with a visit in your own lab. As the probably biggest power users of our instruments, our own Applications and Science team has enormous experience when it comes to carrying out precise analyses and finding solutions to complex tasks.

Application measurements:
Let us take care of your samples

Our application labs carry out analyses of your samples and provide application-related advice. Having the whole portfolio of equipment and methods you find in this product overview at hand, we can solve virtually any task in the area of interfacial and foam analysis. This comprises measurements in accordance with all relevant international standards, but also complex questions which require a combination of methods and activate the scientific creativity of our application team.

Lab consultancy visit:
Let us support you in your premises

Do you have challenging measurement tasks to solve with your instrument or would you like to receive a comprehensive training for different methods? The members of our application team would be happy to visit you in your lab. You can introduce our surface science expert to your regular procedures and together you can carry out measurements in accordance with these routines and find the best way of integrating our measurement methods.

Surface science lab day:
Let us dedicate our resources to your tasks

The complete range of our instruments and methods: for one day, it's all yours. On a laboratory day planned for your specific needs, we give you the opportunity to familiarize yourself with our measuring instruments, run analyses supported by our team of experts and work with them to evaluate your results. Together, we find optimal solutions for analyzing your samples and mastering your application tasks.

Seminars | Webinars | Training Courses

We provide know-how you can use – often even for free

What we love about surface science is that it can often be put into practice quickly and lead to immediate improvements. In our webinars, seminars, and training courses, our specialists, guest speakers, and industrial partners pass on their know-how to you even at your site, if requested. Our webinars are often free of charge and provide both a broad overview and deep insights into special aspects of interfacial analysis with examples from the latest research and development.

Webinar series

A comprehensive series of webinar events gives our team of application experts room to cover the various topics of interfacial analysis in breadth and depth. Get familiar with the theoretical background and learn about important measuring methods and their use in real-life examples. Look on our Website for future events or sign in for free to watch our recorded sessions.

Practical seminars

Attend professionally supported measuring exercises at the center of an intensive training course and receive helpful tips and tricks for successful measurements.

Overview seminars

Get an outline of the most important measuring methods and instruments for surface tension, contact angle, and foam analysis.

Focus seminars and webinars

Our focus webinars and seminars concentrate on one application area in a comprehensive talk or even an intensive course. Our Applications & Science specialists frequently partner up with industry experts to combine topics of interfacial analysis with application know-how, e.g. surface free energy determination in the context of plasma treatment.

Methodology seminars

Deepen your knowledge in the areas of surface tension, contact angle measurement, and foam analysis on one day each. Attend illustrative talks covering theory and applications and become familiar with the most important analysis methods in practical sessions.

Certificate course

You, as a user of our instruments, are the focus of our one-day certificate courses. You learn how to make optimum use of your instrument for different applications. You will apply the acquired knowledge in practical hands-on sessions and receive a certificate on completion of the course.

Our mission is to make surface science big

The surface of a material is all you can see and touch. It is the place where materials interact with their environment, and often also their most vulnerable part. Even if you think that something is happening inside, like emulsifying or foam formation, it is very likely that it is actually a game between surfaces. By rights, surface science should be one of the most important branches of research. Since KRÜSS began dedicating knowledge and engineering skills to developing instruments, the importance of surface science has increased enormously. We are proud to say that we not only followed this trend but are also a driving force behind it. But still we think that this is only the beginning. Our team of specialists is preparing for a future where interfacial analysis is part of the daily routine in almost every lab in R&D as well as quality control.

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Always close to you

At KRÜSS, we combine technical know-how and scientific expertise with plenty of passion. That is why we not only produce high-quality measuring instruments for surface and interfacial chemistry – we offer a unique combination of product and scientific consulting. Our continuous know-how transfer ensures that not only we at KRÜSS keep pace with scientific developments, but also our customers.

In this way, we help you to optimize and make better use of your technologies. This has made us the global market leader in the field of surface and interfacial tension measurement. As a matter of course, we will gladly support you with further information as well. Feel free to ask us about publications, application cases, and helpful information about other KRÜSS products. We are always close to you.

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We are ISO 9001 certified