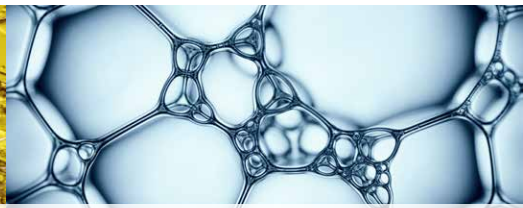
PRODUCT OVERVIEW
2018



CONTACT ANGLE



TENSIOMETERS



FOAM ANALYSIS



KRÜSS

Advancing your Surface Science

EDITORIAL



Thank you very much for your interest in our products.

As an answer to the diverse scientific tasks in interfacial science that have to be solved in research and quality control, we provide a large variety of measuring methods and options. I am proud to present to you this catalog which contains all our quality instruments.

Besides the presentation of ADVANCE, our innovative software platform for all our product fields, you will find our instruments for contact angle, surface and interfacial tension as well as foam analysis. Moreover, we present a large portfolio of accessories that make our modular devices highly flexible. In this diverse range, precision, ease of use, and durability are all what our products have in common.

Your Technical Consultant at KRÜSS or one of our appreciated distribution partners will be happy to provide you with further information on any instrument or accessory presented here and to find the best solution for your individual task.

Yours sincerely,

Florian Weser
Managing Director





3 EDITORIAL

6 METHOD OVERVIEW

8 SOFTWARE

10 CONTACT ANGLE

12 Drop Shape Analyzer – DSA100
13 Drop Shape Analyzer – DSA100HP
14 Drop Shape Analyzer – DSA30
15 Drop Shape Analyzer – DSA25
16 Measurement modules
17 Tilting tables
18 Dosing units
20 Temperature control equipment
22 Mobile Surface Analyzer – MSA
22 Large Surface Analyzer – LSA
23 Top View Analyzer – TVA100

24 TENSIOMETERS

26 Force Tensiometer – K100
27 Temperature control and CMC
28 Force Tensiometer – K20
28 Force Tensiometer – K6
29 Bubble Pressure Tensiometer – BP100
29 Bubble Pressure Tensiometer – BP50
30 Drop Volume Tensiometer – DVT50
31 Spinning Drop Tensiometer – SDT

32 FOAM ANALYSIS

34 Dynamic Foam Analyzer – DFA100
35 DFA100 with Foam Structure Module – FSM
35 DFA100 with Liquid Content Module – LCM
36 Ross Miles Foam Analyzer – RMFA
37 High Pressure Foam Analyzer – HPFA

38 SERVICES

40 ABOUT KRÜSS

METHOD OVERVIEW

Tensiometers



Wilhelmy contact angle

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



Sorption

Contact angle between a liquid and powder particles 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



Bubble pressure

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



Drop volume

Dynamic surface or interfacial tension using the volume of a drop when it detaches from a capillary



Surface free energy

Surface free energy of a solid using contact angle data



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



Ring SFT

Surface tension using the tensile force of a lamella underneath a ring



Ring IFT

Interfacial tension using the tensile force of a lamella underneath or above a ring



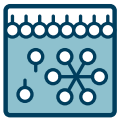
Lamella tear-off SFT

Surface tension using the tensile force of a lamella which is stretched until it disrupts



Lamella tear-off IFT

Interfacial tension using the tensile force of a lamella which is stretched until it disrupts



CMC

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



Wilhelmy SFT

Surface tension using the wetting force of a liquid at a platinum plate or rod



Wilhelmy IFT

Interfacial tension using the wetting force of the lighter liquid at a platinum plate or rod

Drop Shape



Sessile drop

Contact angle of a drop on a solid surface



Roll-off behavior

Roll-off angle as well as advancing and receding contact angle on a tilted 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



Pendant drop

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



Sessile drop top view analysis

Contact angle of a drop viewed from the top



Oscillating pendant drop

Interfacial rheological behavior of a pendant drop with periodically alternating volume



Captive bubble

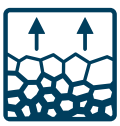
Contact angle using a gas bubble beneath a solid surface in a liquid

Foam



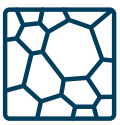
Foam height

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



Foam Flash

Foam formation behavior of heavily foaming liquids using stirring cycles



Foam structure

Optically detected foam bubble sizes and their statistical distribution



High pressure foam

Foam height and foam structure simultaneously analyzed under high pressure



Liquid content

Moisture and drainage behavior of foam using its electric conductibility



Ross Miles foam analysis (RMFA)

Foamability and foam stability according to ASTM D 1173

ADVANCE

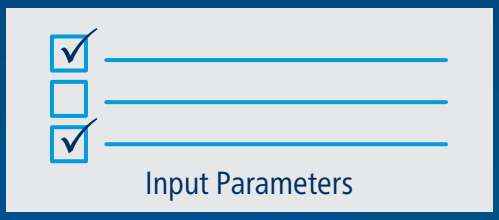
THE SOFTWARE THAT BRINGS OUR INSTRUMENTS TO LIFE

ADVANCE is our innovative software which maximizes the performance and versatility of our instruments for contact angle, surface and interfacial tension as well as foam analysis. Users of ADVANCE especially benefit from its combination of outstanding functionality and self-explanatory design.

ADVANCE sets new standards in intuitive operability. The functions that are relevant for the current step are arranged in tiles, and display all of the elements that are necessary in the context. By avoiding menus and pop-ups, ADVANCE eliminates unnecessary clicks and time-consuming searches for hidden elements. Measurements are carried out using easy-to-create automation programs that make the analysis repeatable and the results user-independent.

THE ADVANCE PRINCIPLE

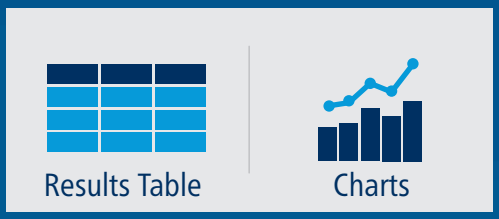
The operating concept of ADVANCE follows a universal workflow from preparation to evaluation on which every scientific measurement is based in principle. The software mirrors this workflow organically, thus making software operation intuitive.



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.

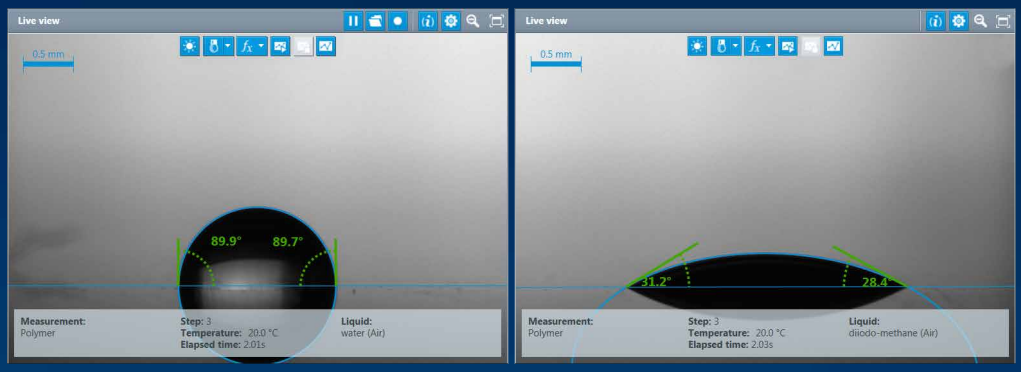


Step 4: Evaluating and exporting results
Finally, ADVANCE uses scientific models to calculate conclusive results from raw data. With a few clicks, comprehensive reports or export files are created for further processing or archiving. To gain a maximum of information from your results, measurements can be compared at will with just a few clicks.

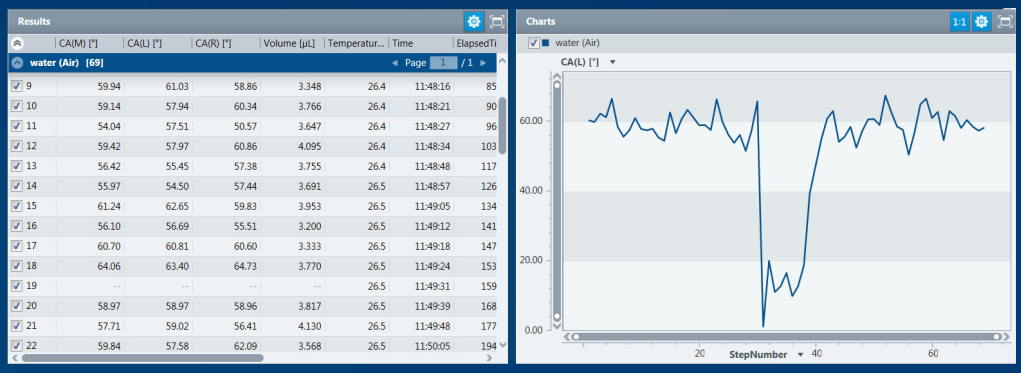
Related products	
Contact angle	DSA100 | DSA30 | DSA25 | MSA | LSA | TVA
Foam	DFA100 | RMFA | HPFA
Tensiometer	SDT | K100

ADVANCE – AN INSIGHT FOR DIFFERENT INSTRUMENTS

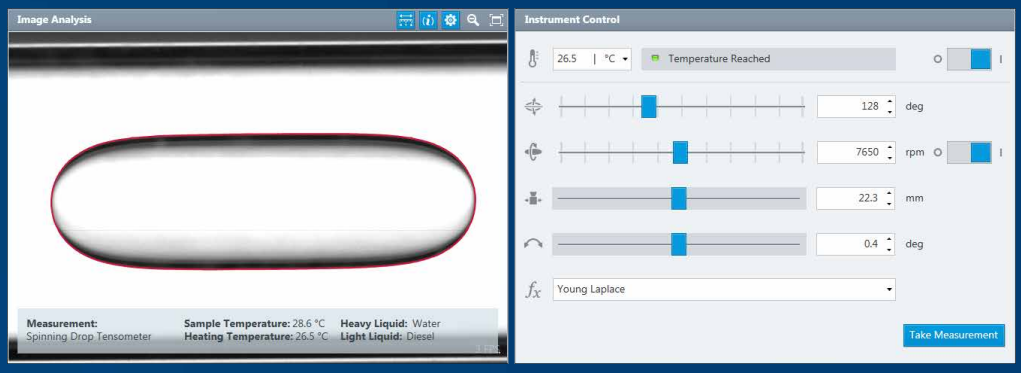
For our Mobile Surface Analyzer – MSA, ADVANCE displays and analyzes two dispensed drops in parallel. When controlling a fully automated measurement the surface free energy is carried out within a second.



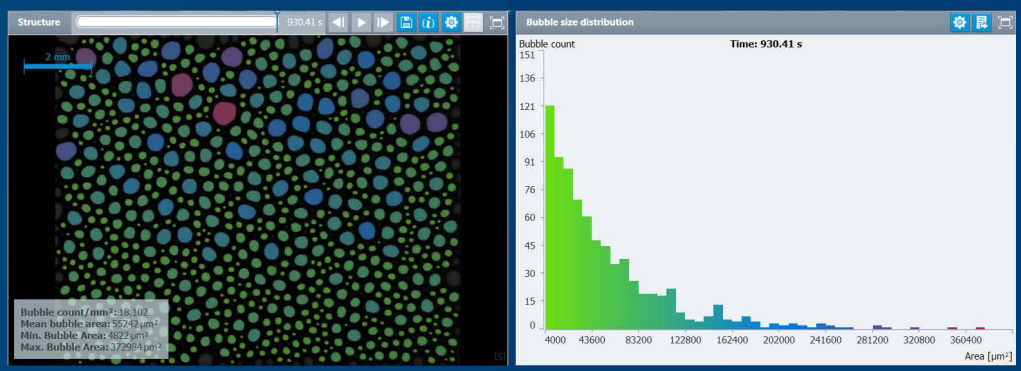
ADVANCE uses automated axes of our Drop Shape Analyzers to provide a position-dependent evaluation (Mapping) of a sample's wettability. The intuively programmed position map results in a contour plot, which clearly displays the effect of a plasma treatment along the diameter.



With our Spinning Drop Tensiometer – SDT, ADVANCE analyzes an image of a drop in a rotating capillary to measure the interfacial tension using the drop's diameter or curvature. The panel to the right gives complete control over the instrument, including a fully automated Drop Positioning feature which keeps the drop in the center of the image on the left.



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.





CONTACT ANGLE



DROP SHAPE ANALYZER – DSA100



Drop Shape Analyzer – DSA100E
(Expert configuration)

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

Our Drop Shape Analyzer – DSA100 is our high-quality system solution for almost all tasks in the analysis of wetting 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.

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
- Roll-off angle 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
- Surface rheological measurements (elasticity and viscosity)
- Measurements on inclined surfaces



Tasks and applications

- Characterization of surface pre-treatment 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
- Quality control for wafers and microelectronics
- Checking surface cleanliness
- Elasticity of liquid films
- Wetting of microscopically small surfaces



Drop Shape Analyzer – DSA100L
for large samples



Drop Shape Analyzer – DSA100W
for wafers

Technical specifications

Camera system	
Performance	CF03: up to 2000 fps CF06: up to 3400 fps
Illumination	
Type	high power monochromatic LED
Dosing System	
Dosing	up to 8× software-controlled or 1× manual
Double pressure dosing system	
Resolution	0.1 µL

Internal and external tilting	
Resolution	internal tilting: 0.01° | external tilting: 0.1°
Range	0 to 90°
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 – DSA100HP



Wetting and surface tension under extreme pressures and temperatures

Our 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 our Drop Shape Analyzer – DSA100 for optical drop shape analysis with a high-quality 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 tertiary 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.

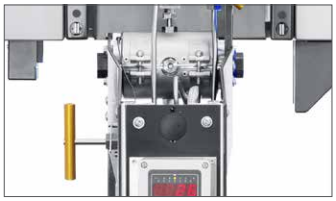
Measuring methods and options

- 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
- Roll-off angle on hydrophobic and superhydrophobic surfaces
- Measurement of surface tension and liquid-liquid interfacial tension using the Pendant Drop method

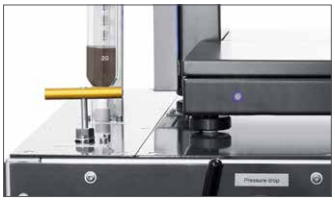
Tasks and applications

- Surface tension of flooding solutions and their interfacial tension with oil under storage conditions
- Wettability and extraction of oil from oil-bearing rock
- Pressure extraction by means of liquified gases, e.g. carbon dioxide
- Development of surfactants for liquid gases





Sample positioning with closed pressure chamber



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

Technical specifications

Camera system	
Connection	USB 3.0
Performance	CF03: up to 2000 fps CF06: up to 3400 fps
Optics	
Zoom	7× zoom, manual
Pressure control	
Maximum pressure	40 to 1750 bar (580 to 25000 psi)
Temperature control	
Range	up to 250 °C

Material	
Type	stainless steel, Hastelloy, Inconel
Contact angle	
Range	0 to 180°
Resolution	0.01°
Interfacial and surface tension	
Range	0.01 to 1000 mN/m
Resolution	0.01 mN/m

DROP SHAPE ANALYZER – DSA30



Drop Shape Analyzer – DSA30E
(Expert configuration)

Contact angle measurement in quality control

Our 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.

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
- Measurements on inclined surfaces
- Temperature-controlled measurements from -30 to 400 °C
- Measurements at controlled humidity
- Surface rheological measurements (elasticity and viscosity)

Tasks and applications

- Characterization of surface pre-treatment processes
- Investigation of the adhesion and stability of bonding and coating processes
- Checking the wettability of plastic, glass, ceramic, wood or metal
- Checking surface cleanliness
- Wetting of microscopically small surfaces





Drop Shape Analyzer – DSA30B
(Basic configuration)



Drop Shape Analyzer – DSA30S
(Standard configuration)

Technical specifications

Camera system	
Performance	CF03: up to 2000 fps CF06: up to 3400 fps
Illumination	
Type	high power monochromatic LED
Dosing System	
Dosing	up to 4× software-controlled + 1× manual
Double pressure dosing system	
Resolution	0.1 µL

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 – DSA25



Drop Shape Analyzer – DSA25E
(Expert configuration)

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 our DSA25 outstandingly suitable for occasional wetting measurements with changing tasks and sample types.

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
- Temperature-controlled measurements from -30 to 400 °C
- Measurements at controlled humidity
- Measurements on inclined surfaces

Tasks and applications

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





Drop Shape Analyzer – DSA25B
(Basic configuration)



Drop Shape Analyzer – DSA25S
(Standard configuration)

Technical specifications

Camera system	
Performance	CF03: up to 2000 fps CF06: up to 3400 fps
Illumination	
Type	high power monochromatic LED
Dosing System	
Dosing	manual and software-controlled
Double pressure dosing system	
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

MEASUREMENT MODULES

MICRO-DROP ANALYSIS MODULE



DSA100 with Micro-Drop Analysis Module



DSA30 with Micro-Drop Analysis Module

The modules for drops above 20 pL and for drops above 60 pL equip your DSA100 and DSA30 for precisely analyzing the wetting of tiny samples. The conversion option enables you to switch the measuring mode from conventional drop dosing to micro-drop analysis without the need for a second instrument frame.

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 two modules produce drops from 20 pL and 60 pL respectively, which are placed with pinpoint accuracy with the help of a micro-positioning unit. 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.

Drops	DSA100	DSA30
> 20 pL	CK3232	CK4232
> 60 pL	CK3234	CK4234

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

INTERFACIAL RHEOLOGY MODULE



DSA100 with Interfacial Rheology Module

The Interfacial Rheology Module 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 specifically changing drop sizes with associated electronics board
- Software for calculating interfacial rheological parameters from the raw data

	DSA100	DSA30
Model name	DS3265	DS4265

The module is already included in the instrument configuration DSA100R, which we have specially put together for interfacial rheology.

TILTING TABLES

EXTERNAL TILTING TABLES



DSA100 with External Tilting Table PA3220



DSA25 with External Tilting Table PA4020

The tilting device is our special unit 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 ultrahydrophobic 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
- 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

DOSING UNITS

MANUAL DOSING UNIT FOR ONE LIQUID



DSA30 with manual dosing unit for one liquid

With the dosing unit, drops of a single liquid can be manually dosed in a simple way. The slowly advancing forward feed with a micrometer screw ensures that dosing is carried out gently and the shape of the drop is not mechanically 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
Model name	DS3205	DS3205

SOFTWARE-CONTROLLED DOSING UNIT FOR ONE LIQUID

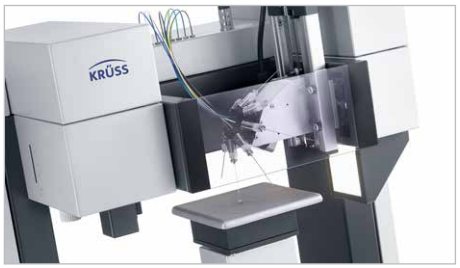


DSA100 with software-controlled dosing unit for one liquid

The software-controlled dosing unit 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
Model name	DS3210	DS4210

SOFTWARE-CONTROLLED MULTI-DOSING UNITS



DSA100 with software-controlled multi-dosing units

Our multi-dosing units equip the DSA100 for the fully automatic dosing of 2 to 8 liquids and the DSA30 of 2 to 4 liquids. 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, when combined with motorized axes, enables solids to be analyzed fully automatically. For example, the surface free energy of a solid can be determined based on contact angles with several liquids in a single measuring sequence.

The uniform dosing feed has a large dynamic range (10 to 900 µL/min with a volume resolution of 0.1 µL). It can be set to a very slow speed in order to accurately measure the advancing angle and the receding angle. On the other hand, service functions such as filling a syringe are carried out very quickly.

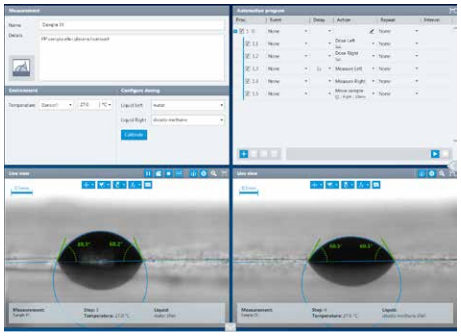
An additional manual syringe can be used for other substances, for example for measuring surface tension or analyzing contaminating liquids.

Number of Liquids	DSA100	DSA30
2	DS3222	DS4222
3	DS3223	
4	DS3224	DS4224
5	DS3225	
6	DS3226	
7	DS3227	
8	DS3228	

DOUBLE DOSING UNIT FOR FAST AND FULLY AUTOMATIC SFE MEASUREMENTS



Double-dosing unit for extremely fast SFE measurements



Software screenshot of the parallel drop evaluation

Our double-dosing module performs fully automated surface free energy (SFE) determinations, using an automation program in our ADVANCE software. The dosing unit has two pressure dosing mechanisms working in parallel, each simultaneously dispensing one drop of the test liquids water and diiodomethane onto the sample.

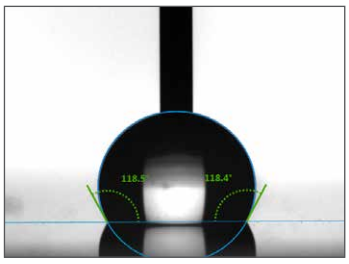
For carrying out the drop shape analysis, the image field of the high resolution camera is split into two video windows for viewing both drops at the same time in order to analyze the drops in parallel. The software then uses the resulting contact angles to calculate the SFE of the solid. The entire process, from the point when dosing starts up to the SFE calculation, is fully automatic and complete within a second. For this innovative measuring method, we hold a patent regarding the novel dosing technology.

The kinetic energy of the dosing process – despite its speed – is equivalent to gently dispensing a drop from a dosing needle. Most importantly, this noncontact method eliminates the risk of contamination or damage caused by inadvertently touching the sample. Cartridges that operators can remove quickly and fill directly with test liquids make the dosing system easy to handle. One filling is enough for approximately 1000 SFE determinations.

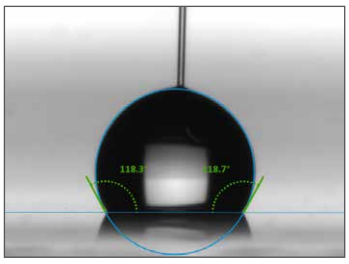
The double dosing unit requires our CF03 USB camera.

	DSA100	DSA30	DSA25
Model name	DS3252	DS3252	DS3252

LIQUID NEEDLE



Dosing with solid needle



Dosing with Liquid Needle

Revolutionary dosing technology for optical contact angle measurement developed by KRÜSS

The 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.

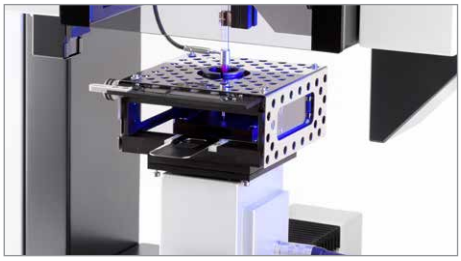
Dosing can be carried out much faster (< 0.1 s) with the Liquid Needle compared to a solid needle. Due to standardized dosing conditions, the dynamics and thus the reliability of the method are independent from decisions of the user. Furthermore, dosing drops on very hydrophobic samples is easier because the drop does not have to detach from another media (the needle).

The validity of the Liquid Needle method compared to the classic solid needle was proven in a thorough scientific study in which contact angles were measured on a broad range of samples, giving the same contact angle results for both dosing methods.

Find out more: **kruss.de/liquidneedle**

TEMPERATURE CONTROL EQUIPMENT

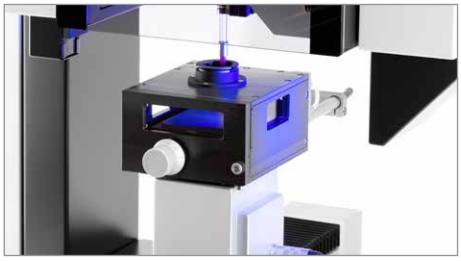
TC11 – TEMPERATURE CONTROLLED CHAMBER FOR LARGE SAMPLES



- **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.

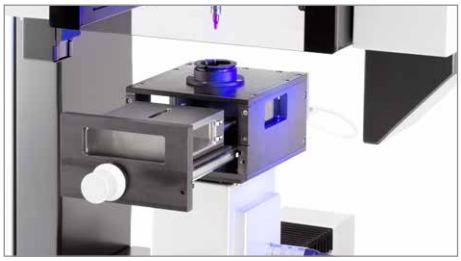
TC30 – TEMPERATURE CONTROLLED CHAMBER UP TO 90 °C



- **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.

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 control chamber TC40 is our flexible 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.

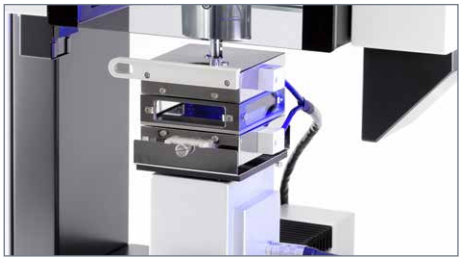
TC3212 – TEMPERATURE CONTROLLED UNIT FOR LIQUIDS



- **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 TC3212 tempers liquids for measuring contact angle or surface tension at up to 130 °C. Embedded in a heat-conducting metal sleeve, the filled syringe (excluded from delivery) 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.

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.

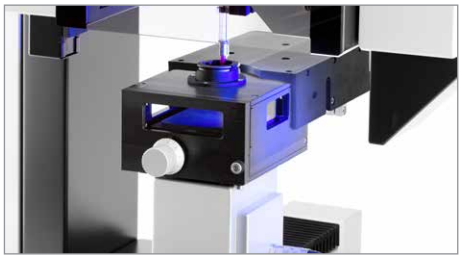
DS3241/DS4241 – HIGH-TEMPERATURE DOSING UNITS



- **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.

HC10 – 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 tempering chamber TC30 or TC40 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 optional 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.

The temperature equipment is available for:	DSA25	DSA30	DSA100
TC11	■	■	■
TC30	■	■	■
TC40	■	■	■
TC3212	■	■	■
TC21	■	■	■
DS3241	-	-	■
DS4241	-	■	-
HC10	■	■	■

MOBILE SURFACE ANALYZER – MSA



Measuring surface free energy in a second with only one click

Our innovative Mobile Surface Analyzer – MSA measures surface free energy with two liquids, fully automatically using our new "One-Click SFE" method. 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 pre-treatment and coating of solid materials in an ideal way.

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 pre-treatment 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, Fowkes and van Oss & Good







Non-destructive quality control



For vertical, overhead and curved samples

Technical specifications

Camera system	
Connection	USB 3.0
Performance	10 fps
Illumination	
Type	high power LED, adjustable
Dosing System	
Dosing	double pressure dosing or single direct dosing
Resolution	0.1 µL
Contact angle	
Range	0 to 180°
Resolution	0.01°
Instrument dimensions	
Footprint	106 mm × 59 mm (W × D)
Height	112 mm
Weight (without accessories)	0.85 kg

LARGE SURFACE ANALYZER – LSA



The robotic system for very fast wetting analysis of sizable samples

Fully automatic measurements on many positions of large sample areas: Our Large Surface Analyzer – LSA combines a precise positioning robot with our Mobile Surface Analyzer – MSA for measuring surface free energy within a second. The system is especially suitable for quality control of cleaned, pre-treated or coated large surfaces due to its easy handling and programming as well as high measuring speed for samples from 565 × 495 mm up to 2900 × 3150 mm.

Upon request customized systems in other sizes are possible.

TOP VIEW ANALYZER – TVA100



Instrument for measurements in depressions and on concave surfaces

Our Top View Analyzer – TVA100 is the only instrument in the world to use the top-view reflection 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 methods and options

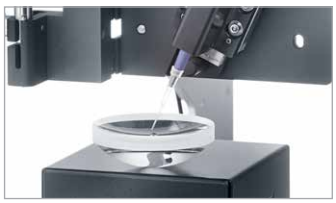
- Measuring the contact angle using our Top View Distance method
- Special contact angle method for measuring in recesses
- Surface free energy from contact angles of several test liquids using all common models
- Especially good resolution in the range of small contact angles
- Available as stand-alone instrument or as a measuring head module for DSA100, DSA30 or DSA25
- Special equipment for measuring in well plates available

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



Precision dosing unit



Measuring on a concave surface

Technical specifications

Camera system	
Connection	USB 3.0
Performance	CF03: up to 2000 fps
Optics	
Zoom	6.5× zoom, manual
Illumination	
Type	LED, adjustable

Dosing System	
Dosing	electronic pipette for precise drop generation
Resolution	0.2 µL
Minimum drop volume	0.5 µL
Capacity	10 µL
Contact angle	
Range	3.5° to 75 °
Resolution	±0.1° (for contact angles 3.5° to 23°) ±1° (for contact angles 23° to 75°)



TENSIOMETERS



FORCE TENSIOMETER – K100



The universal instrument for analyzing surfactants and solid surfaces

Our universal Force Tensiometer – K100 performs high-precision, automatic and reliable measurements of surface tension and interfacial tension, critical micelle concentration CMC and contact angle on solids, fibers and powders. With high-quality components and a uniquely wide range of methods, the instrument carries out many tasks in the fields of surfactant analysis and wetting measurement for your quality assurance or research.

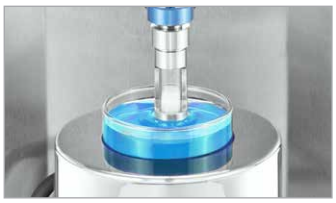
Measuring methods and options

- Surface tension and interfacial tension using the ring, plate and rod method
- Surface tension and interfacial tension using the ring tear-off method, for example for measurements in accordance with ASTM D-971
- Critical micelle concentration (CMC) of surfactants
- Contact angle and surface free energy of solids, powders or fiber bundles
- Density of liquids and solids
- Sedimentation behavior of dispersions
- Penetration resistance of sediments
- Measurement from -10 to 130 °C, temperature measurement with internal or external sensor



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
- Decomposition product content in oils
- Tank clearance and cleaning validation in the foodstuffs industry
- 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



Sorption measurement with K100



Single fiber measurement with K100SF

Technical specifications

Force measurement	
Maximum load	up to 210 g
Resolution	up to 10 µg
Measurement rate	50 Hz
Locking mechanism	automatic

Sample stage	
Travel distance	>110 mm
Travel speed	0.09 to 500 mm/min

Temperature	control	measurement
Range	-10 to 130 °C	-60 to 450 °C

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°

Density	liquid	solid
Range	1 to 2200 kg/m³	1000 to 20000 kg/m³
Resolution	1 kg/m³	1 kg/m³

TEMPERATURE CONTROL AND CMC

TJ50 – PELTIER TEMPERATURE CONTROL UNIT



- **Quickly attains the target temperature between -15 to 130 °C and keeps it stable**
- **Measurement of temperature dependence as well as analysis under standard conditions**

In a range between -15 to 130 °C, our 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.

TJ60 – HIGH TEMPERATURE CONTROL UNIT FOR UP TO 300 °C



- **Reliable analysis of samples such as polymer melts or bitumen**
- **Heats up fast to the desired temperature**
- **Disposable aluminum sample vessels avoid laborious cleaning**

With the high temperature solution for our K100, precise surface tension and dynamic contact angle data of hot liquids such as polymer melts or bitumen are easily accessible. The unit quickly heats up the sample to reach and keep a stable target temperature. Disposable sample vessels made of the good heat conductor aluminum solve the issue of persistent contaminations. Moreover, inert gas can be connected to prevent oxidation.

DS0810/DS0820 – MICRO DISPENSERS FOR CMC MEASUREMENTS



- **Fully automated measurement of the CMC of surfactants**
- **Greatly extended concentration range when using two dispenser units**

Our specially developed Micro Dispensers equip the K100 for measuring the critical micelle concentration (CMC) with the utmost precision, using one or two dispenser units (DS0810 or DS0820). The surfactant concentration range is set up and measured fully automatically.

Working with two Micro Dispensers, where one dispenses the liquid and the other extracts the same volume, has great advantages. This enables a very wide concentration range with a high density of measuring points to be created in order to measure the CMC with high accuracy. Wrong measurements due to a too highly concentrated base solution are virtually ruled out, as it can be diluted by several orders of magnitude and the CMC measured with high probability.

FORCE TENSIOMETER – K20



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.

Tasks and applications

- Determination of the effectiveness of wetting media
- 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
- Decomposition product content in oils according to ASTM D-971

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
- Testing of transformer oils in accordance with ASTM D-971
- Measuring the density of liquids
- Measurement from -10 to 90 °C, temperature measurement with internal sensor



Technical specifications

Force measurement		
Maximum load	up to 50 g	
Resolution	up to 100 µg	
Measurement rate	5 Hz	
Sample stage		
Travel distance	90 mm	
Travel speed	2.4 to 14 mm/min	
Temperature	**control**	**measurement**
Range	-10 to 90 °C	-20 to 150 °C
Interfacial and surface tension		
Range	1 to 999 mN/m	
Resolution	up to 0.1 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

Our 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.

BUBBLE PRESSURE TENSIOMETER – BP100



Analysis of surfactant solutions for dynamic processes

Our 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.

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 baths 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

Technical specifications

Pressure measurement		
Maximum pressure	up to 3000 Pa	
Measurement rate	20 kHz	
Sample stage		
Travel distance	>110 mm	
Travel speed	0.09 to 500 mm/min	
Temperature	**control**	**measurement**
Range	-10 to 130 °C	-10 to 130 °C
Surface tension		
Surface tension range	15 to 100 mN/m	
Resolution	up to 0.01 mN/m	
Surface age range	5 to 200000 ms	

BUBBLE PRESSURE TENSIOMETER – BP50



Measuring surfactant content and dynamic surface tension on the move

By checking the surfactant content of a cleaning or galvanic bath directly on site, with the utmost precision and in just a few seconds, our Bubble Pressure Tensiometer – BP50 provides optimum support for your process control. The BP50 measures the dynamic surface tension, which, particularly in the case of high surfactant content, reacts sensitively to changes in concentration. Our BP50 has been specially developed for use in quality assurance. During the flexible high-speed test, the software automatically signals whether the measured value lies within a limiting range that you have set or whether the surfactant content needs to be adjusted.

DROP VOLUME TENSIOMETER – DVT50



Analysis of emulsions under dynamic conditions

The effect of a surfactant as an emulsifier is based on the fact that it reduces the interfacial tension between phases which do not easily mix. As surfactants need a certain time to do this, the effect of an emulsifier depends on the mixing dynamics. With our Drop Volume Tensiometer – DVT50, you can measure the speed with which emulsifiers produce their effect and reduce the interfacial tension. The DVT50 spectrum ranges from very fast to very slow processes. This enables the dynamic mixing behavior as well as the stability of an emulsion at close to the quiescent state to be determined in a single measurement. The results of the measurement help to precisely optimize and dose surfactants for emulsions.

Measuring methods and options

- Measurement of dynamic interfacial tension between two liquids with free assignment of drop phase and bulk phase
- Measurement of surface tension of a liquid
- Temperature control from -10 to 90 °C

Tasks and applications

- Emulsifiers in the pharmaceutical and cosmetics industry
- Food production
- Tertiary oil recovery (Enhanced Oil Recovery, EOR)
- Cleaning
- Surfactant development
- Investigation of fuel-water mixtures





High precision drop dosing

Technical specifications

Volume measurement	
Maximum volume	220 µL
Resolution	1 nL
Measurement rate	4 Hz
Syringe drive	
Syringe drive	500 µL
Flow rate	0.265 to 1985 µL/min
Resolution	0.001 µL
Automation	
Fully automatic refill	yes

Temperature	control	measurement
Range	-10 to 90 °C	-20 to 150 °C
Interfacial and surface tension		
Range	0.1 to 100 mN/m	
Resolution	0.001 mN/m	

SPINNING DROP TENSIOMETER – SDT



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.

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

Tasks and applications

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



Patent pending capillary concept

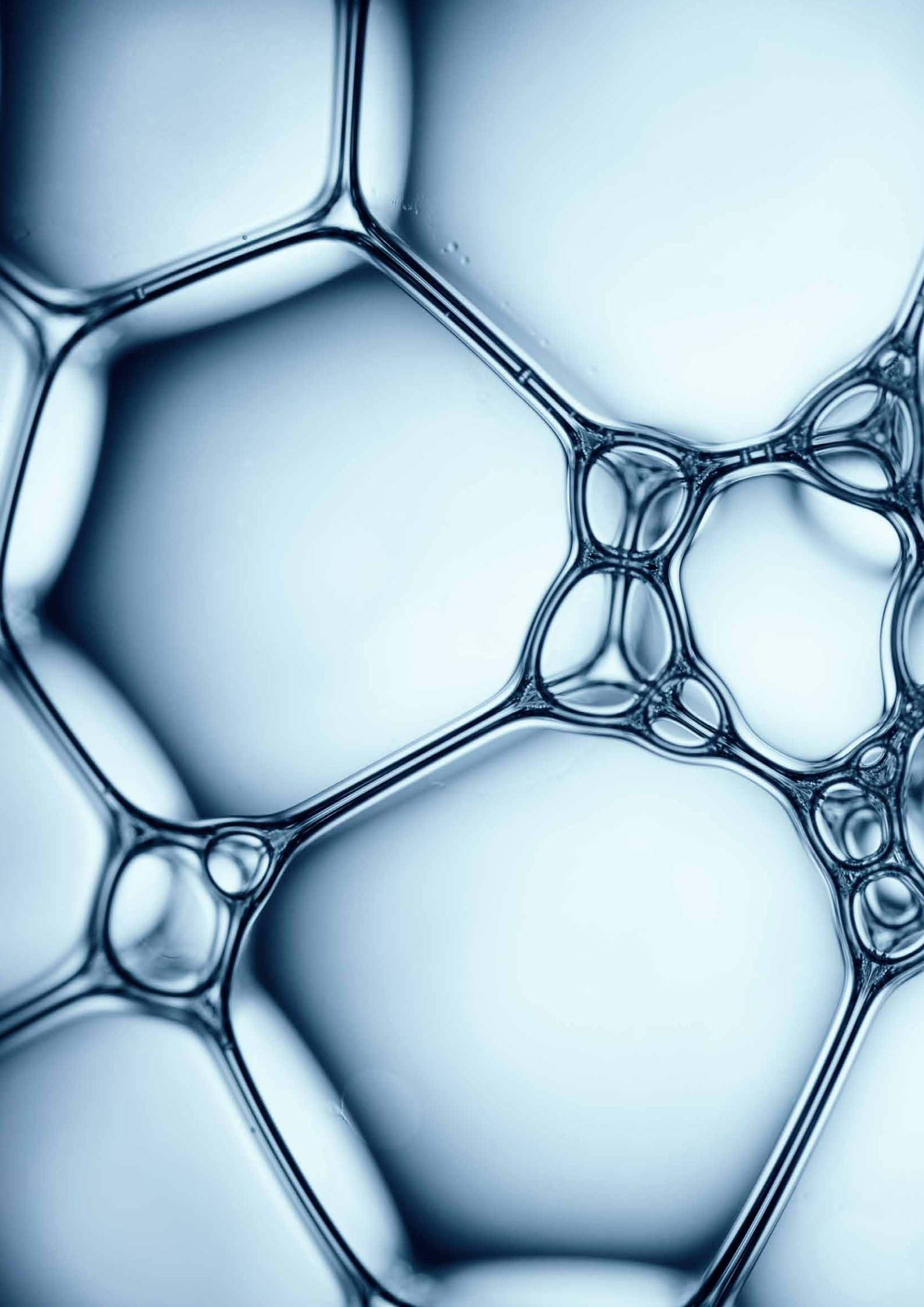


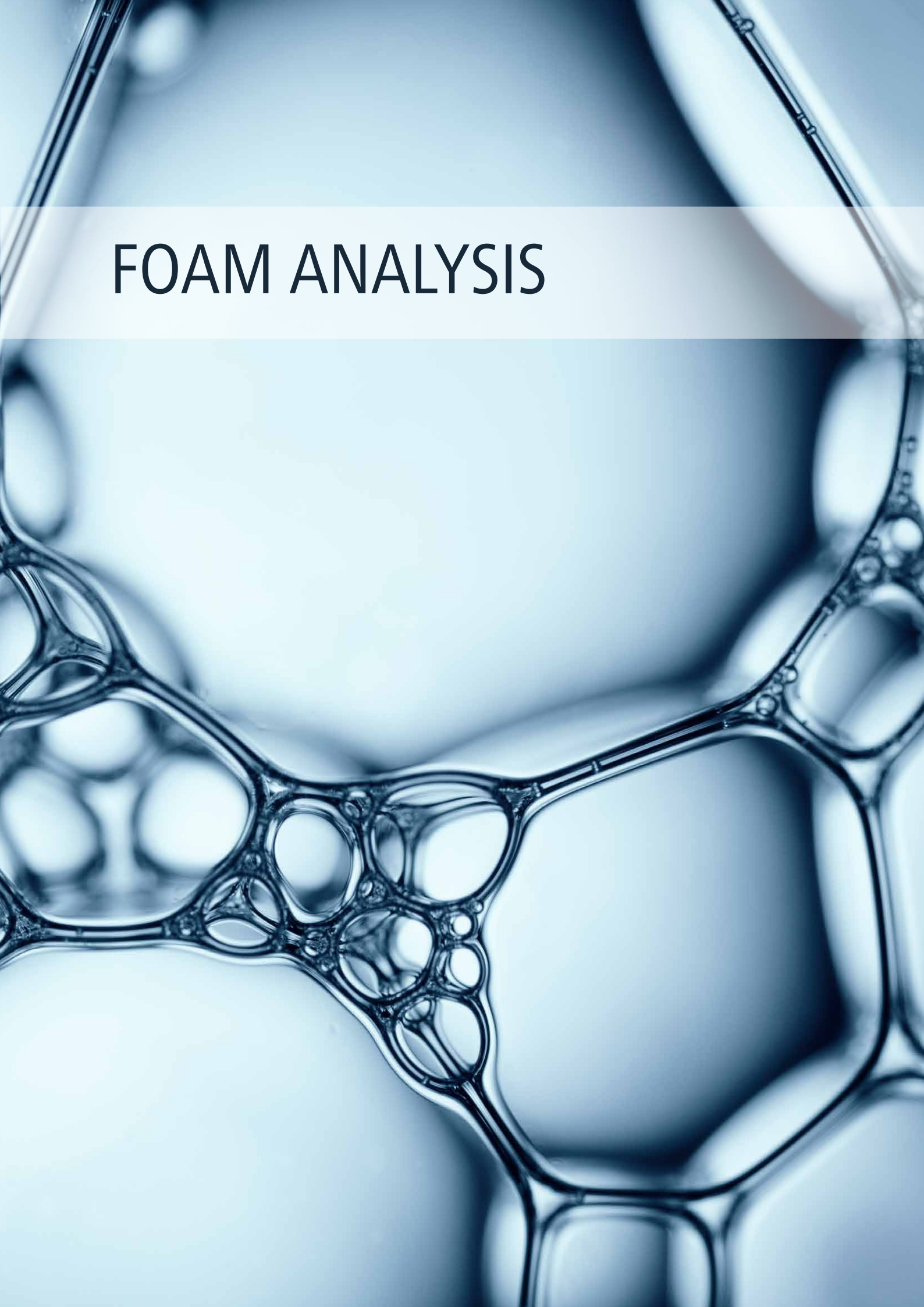
Clearly arranged display

Technical specifications

Camera system	
Performance	15 fps
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	





FOAM ANALYSIS

DYNAMIC FOAM ANALYZER– DFA100



Scientific analysis of liquid foams

Our DFA100 instrument for analyzing foams 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 in the optimization of foam-forming products or, in the case of unwanted foam formation, helps with specific foam prevention.

Measuring methods and options

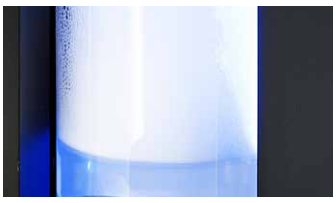
- Measurement of foamability of liquids and foam decay
- Determination of total height, foam height and liquid height
- Foaming by means of bubbles or stirring
- Investigations of externally produced foams
- Foamability parameters, including maximum height, foam capacity and foam density
- Temperature-controlled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

Tasks and applications

- Foams for washing and cleaning
- Firefighting
- Foams in foodstuffs and body care products
- Surfactant development
- Flotation as a method for separating solids
- Foam-inhibiting and foam-reducing agents (Antifoamers / Defoamers)
- Foam prevention for paints and varnishes, process and waste water and cooling lubricants



Ergonomic sample holder



Detection of liquid-foam-boundary

Technical specifications

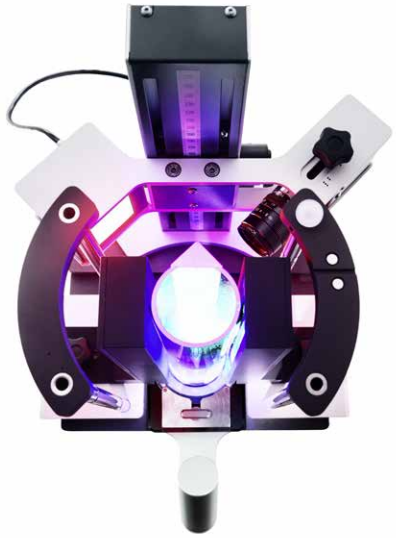
Line sensor	
Sensor resolution	1728 × 1 px
Spatial resolution	200 dpi | 0.125 mm
Temporal resolution	20 fps
Scanning length	216 mm

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
Wave length, dominant	469 nm (IR: 850 nm)

Analyzed foam characteristic	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

DFA100 WITH FOAM STRUCTURE MODULE – FSM



Time-dependent analysis of bubble size in liquid foams

The Foam Structure Module – FSM of our Dynamic Foam Analyzer – 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.

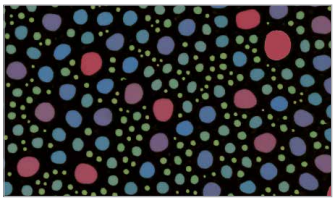
Tasks and applications

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

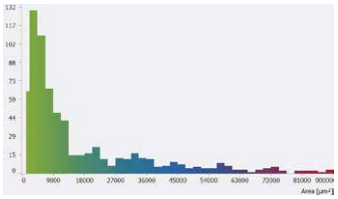
Measuring methods and options

- 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 measurement





Foam structure analysis



Bubble size distribution histogram

Technical specifications

Illumination	
Type	LED
Wave length, 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 foam characteristic	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

DFA100 WITH LIQUID CONTENT MODULE – LCM



Analyzing the liquid content of foams

The Liquid Content Module – LCM for our Dynamic Foam Analyzer – 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.

ROSS MILES FOAM ANALYZER – RMFA



Automatic foam analysis – following the standard and going beyond

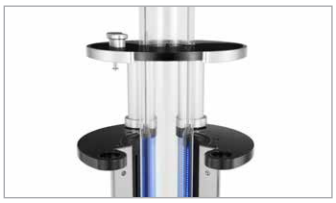
Our Ross Miles Foam Analyzer – RMFA is the world's first instrument for automatic measurements of foamability and foam stability in accordance with ASTM D 1173.

Tasks and applications

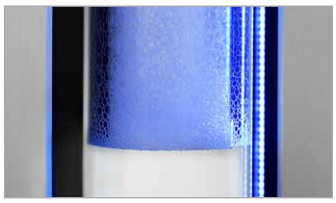
- Foams for washing and cleaning
- Foams in body care products
- Surfactant development
- Flotation as a method for separating solids
- Foam-inhibiting and foam-reducing agents (Antifoamers / Defoamers)
- Foam prevention for paints and varnishes, process and waste water and cooling lubricants

Measuring methods and options

- Automatic foam height measurement in accordance with ASTM D 1173 with a resolution of 0.4 mm
- Automatic start of measurement when the initial foam height is recorded
- Exact measurement of foam height after 60, 180 and 300 seconds
- Recording of the entire height curve
- Recording of the liquid level for measuring drainage
- Quick compilation of multiple measurements in comparison tables and charts



Easy-to-use and safe column support



Additional liquid height detection

Technical specifications

Line sensor	
Maximum measurable height	620 mm
Spatial resolution	1654 × 1 px
Height resolution	67 dpi | 0.375 mm
Temporal resolution	20 fps
Scanning length	620 mm
Illumination	
Type	LED
Wave length, dominant	469 nm
Sample volume	
Minimum required sample volume	250 mL

Instrument dimensions	
Footprint	245 mm × 275 mm (W × D)
Height	1360 mm
Weight (without accessories)	18.5 kg
Analyzed foam characteristic	electronic foam height detection
Foaming and measurement	according to ASTM D 1173

HIGH PRESSURE FOAM ANALYZER – HPFA



Our innovative solution for foam analysis under oil and gas reservoir conditions

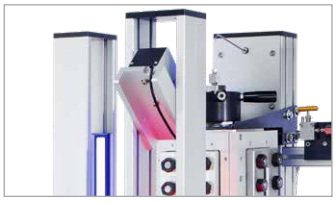
Our High Pressure Foam Analyzer – HPFA is the world's only measuring instrument for simultaneously analyzing the amount and structure of liquid foams under high pressure. The instrument provides various options for investigating foam behavior under the real process conditions of foam-assisted flooding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

Measuring methods and options

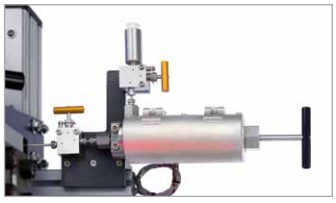
- Measurement of foamability and foam stability based on the foam height and volume with respect to time
- Analysis of foam structure and its variation with respect to time based on the number, size and statistical size distribution of the foam bubbles
- Measurements at pressures up to 350 bar and temperatures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

Tasks and applications

- Foam-assisted gas flooding
- Foam as fracking and stimulation liquid



Camera recording foam structure



Micro Dosing System for adding liquids during measurements

Technical specifications

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

Mini dosing system	
Dosing	manual
Temperature	maximum 180 °C
Environment	
Temperature	operating: 10 to 40 °C
Interfaces	
PC	1 × USB 3.0

TECHNICAL SERVICE



Ensuring your investment is our personal concern

Precision, quality and long-term functional reliability is the standard for us at KRÜSS Technical Support. We take care of you and your instrument from the very beginning, ensure its operational readiness with regular maintenance, and act quickly and dependably whenever you need our support.

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

For a support request visit: **kruss.de/supportrequest**

OUR RANGE OF SERVICES

Installation and training (IAT/RIAT)

Do you want to use your instrument with maximum efficiency and expert knowledge from day one?
We will arrange this and provide an installation and training (IAT/RIAT) for you and your staff.

Maintenance contract

Do you want to maintain the precision and reliability of your instrument at the same high level in the long term?
We will maintain, adjust and calibrate it as part of regular service visits.

Remote support

Do you face any technical issues and are relying on a quick solution?
We will provide direct support from screen to screen.

On-site service

Are you confronted with a failure of your instrument, or do you want to move it, recommission it or train new staff to use it?
We will respond quickly and flexibly with our on-site service.

Qualification (IQ/OQ)

Do you want to use your instrument and its methods as part of a standardized quality management system?
We will carry out Installation/Operation Qualification (IQ/OQ) and create documentation tailored to your purpose.

Extended warranty

Would you like our promise of long-term functional reliability in writing?
We can offer you an extension of the legal warranty.

SEMINARS



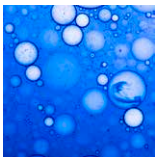
Expertise you can use

Our seminar team is made up of experienced scientists who love sharing what they know. Team members provide seminar participants with individual support and offer their services as expert contacts for theoretical and practical questions. Besides serving as a dynamic training platform, our seminars also leave plenty of room for sharing and dialog.

We regularly host respected guest speakers with exceptionally relevant insights into interfacial chemistry, both as a science and in its industrial applications. These individuals' presentations shed light on technical content by offering practical examples from the latest research and development.

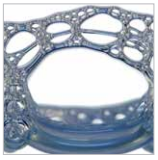
Check our seminar dates online: **kruss.de/seminars**

OUR RANGE OF SEMINARS



Overview seminars

Our overview seminars give you an outline of the most important measuring methods, applications and measuring instruments for surface tension, contact angle and foam analysis.



Foam analysis

Relevant in practice and exciting in theory: besides occupying manufacturers of foam-forming substances, foam analysis is important for suppressing foaming as well. In this seminar, we will share our knowledge of reproducible studies on liquid foams, introducing you to both the theory and practice of a variety of scientific methods.



Surface tension

Whether used for quality assurance or scientific research, tensiometry is the key measurement technique for analyzing the surface and interfacial phenomena of liquids. We will introduce you to the theory and practice of all of the methods commonly used for characterizing liquid surfaces.



Contact angle

Wettability, adhesion, surface free energy: when it comes to the surface properties of solids, contact angle measurements are an indispensable tool for material research and quality assurance. We would like to share our scientific expertise with you at this seminar and provide helpful knowledge for applying contact angle measurement techniques.



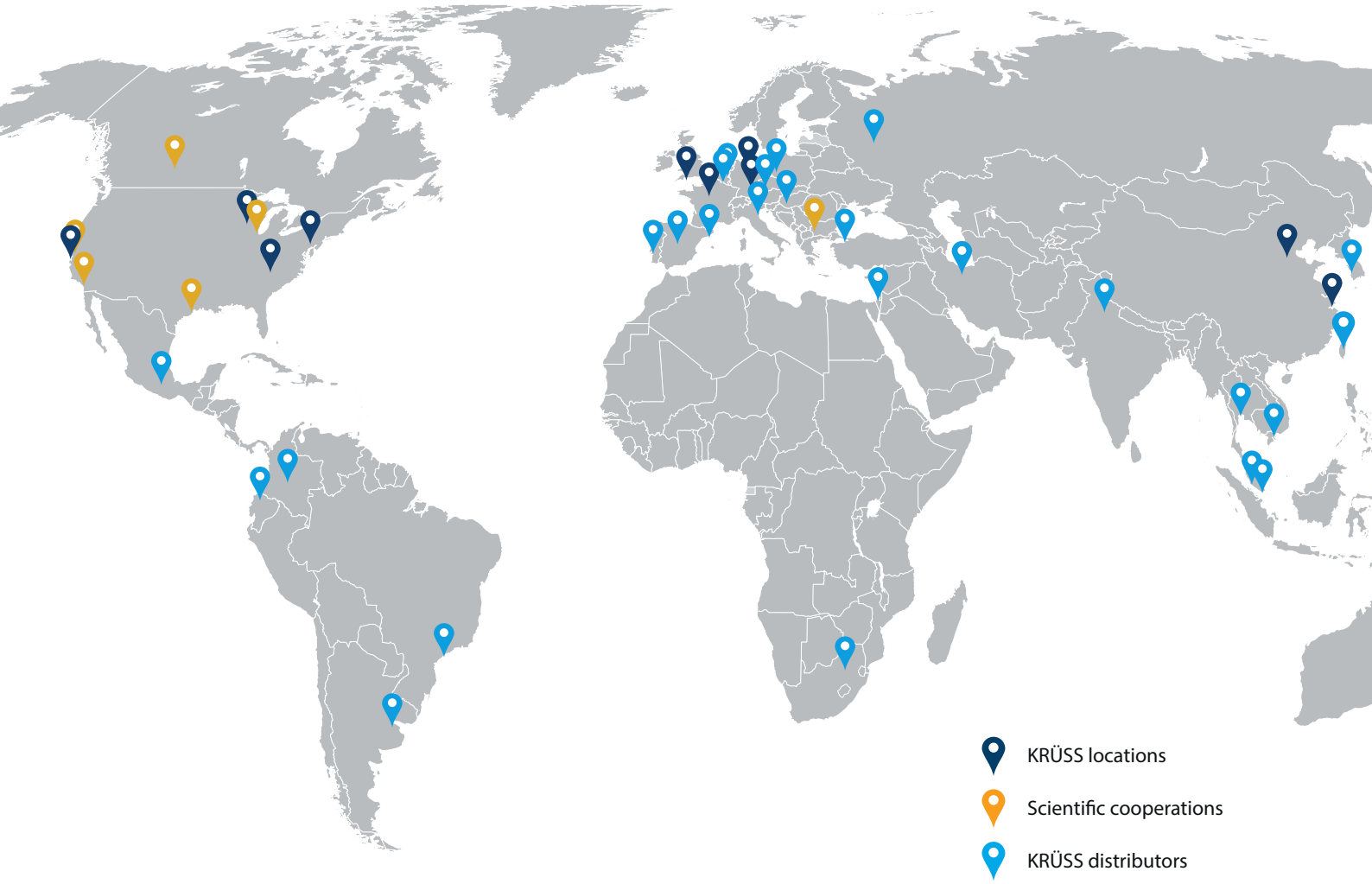
Practical seminars

Our practical seminars put professionally supported measuring exercises in center of an intensive two-day training course covering the areas of surface tension, contact angle measurement and foam analysis. You acquire theoretical basics of interfacial chemistry, familiarize yourself with new measuring methods and gain new or advanced skills for carrying out precise analyses.



Focus seminars

Our focus seminars concentrate on one important industrial application area of interfacial chemistry in an intensive two-day course. Together with our seminar team, an internationally recognized specialist carries out the respective seminar, covering scientific and measurement technical aspects of the subject in depth.



ABOUT KRÜSS

Advancing your Surface Science

At KRÜSS, we see ourselves as a company which generates something new from technical know-how, scientific expertise and an abundance of passion every single day. With this background, we do not only produce first-class measuring instruments for surface and interfacial chemistry - we also offer a unique combination of product and scientific advice. In this way, we help our partners to optimize and make better use of their technologies.

Technology meets science

With our internally produced, high-precision mechanical systems and innovative technical solutions, we satisfy in a highly complex market. We help people in research, development and industrial quality control in a wide variety of company sectors and with the most diverse requirements. As a full-range supplier with a wide product portfolio, software-controlled measuring technologies for the contact angle and static and dynamic measurement of surface and interfacial tension are just as much part of our range as measuring instruments for investigating foams. At our qualified contract measurement laboratory, we repeatedly set ourselves the challenge of researching and finding new ways and measuring methods for our customers.

Global market leader thanks to innovation and know-how

The combination of unique products and highly qualified advice has made us the global market leader in the field of surface tension and interfacial tension measurement. But we also know that we cannot rest on our laurels: for this reason, we are always searching for better solutions together with our customers. Our experience of the surfaces and interfaces of liquid and solid substances is what we provide on a personal basis in form of knowledge: in consultations, seminars, technical service, and our Applications & Science Center.

We can be found wherever theory and practice meet

Our responsibility does not stop with the delivery of our measuring systems. Installation, instruction and training are just as much a matter for us as continuous contact and interaction with our customers - worldwide.

We‘re always close to you

Our company is based in and originates in Hamburg (Germany), where we employ a staff of approximately one hundred. We have further subsidiaries in the USA, China, the United Kingdom and France in order to be as close as possible to our customers. Furthermore, we have a dense distributor network which works flexibly and quickly to ensure that our products and our expertise are always close at hand.



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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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