

FORCE TENSIOMETER – K100



THE HIGH-END SOLUTION FOR
MEASURING SURFACE
AND INTERFACIAL TENSION



KRÜSS

Advancing your Surface Science



MAXIMIZING THE VARIETY OF SURFACE AND INTERFACIAL TENSION MEASURING METHODS

- **Determines surface and interfacial tension, contact angles and more**
- **Offers a wide range of methods for individual requirements**

Success meets flexibility

The close contact we keep with our customers and scientists inspires us to develop measuring solutions that are perfectly designed for versatile and demanding applications – from research and development to in quality assurance. One of our top-selling results is the Force Tensiometer – K100, a multi-flexible instrument for analyzing surfaces and interfaces. It performs high-precision, automatic, and reliable measurements of surface and interfacial tension as well as critical micelle concentration (CMC) and measures the contact angle on solids, fiber bundles and powders. This versatility makes it the most-sold tensiometer worldwide.

A uniquely wide range of methods

The K100 is a champion in versatility – offering the greatest flexibility. It provides the world's largest selection of measuring methods for characterizing surfaces and interfaces. The principal methods are based on the precise detection of the force that occurs when wetting a measuring probe or a solid sample. It is easy to measure surface and interfacial tension using standardized methods including the Du Noüy ring, Wilhelmy plate or rod method. But the K100 provides also a series of other central methods for analyzing liquids and the wettability of solids in various forms. Furthermore, the density of solids and liquids can be determined exactly with our accessories.

Designed for flexible usage and reliable measurements

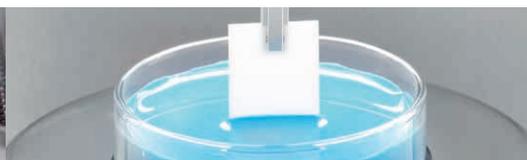
The K100 guarantees highly reliable recordings and fast temperature control between -10 and 130 °C. This enables thermal process conditions to be simulated. The simple changeover between different measuring methods and temperature conditions takes place entirely without reconfiguring the instrument. One of the biggest design advantages of our K100 is the large sample chamber that allows you to load the instrument more quickly, conveniently and safely. Even large-sized samples can be processed with maximum ease of use.

Fast and easy measurements of single-sided coated samples

The K100 has the option to obtain accurate contact angle results in the course of wetting and de-wetting of a solid, even for one-sided coated samples. With this extension of the dynamic contact angle, the K100 is able to analyze these samples fast and easily.

Measuring smaller sample volumes with the rod method

Our K100 performs the rod method perfectly. It uses a cylindrical rod with a small diameter instead of a plate. This allows measurements to be carried out in smaller vessels. The advantage, therefore, lies in reduced sample volumes.





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 food industry
- Wetting and adhesion of coatings
- Development of cosmetic products
- Wetting properties of inks
- Wetting of fiber bundles and textiles
- Sedimentation and penetration resistance of dispersions
- Analysis of surface modifications

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, e.g. for measurements in accordance with ASTM D971
- 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

SECURING CURRENT NORMS AND STANDARDS

With this unique instrument, we place great emphasis on the replicability and standardization of our measuring results. The K100 is designed in accordance with nearly all valid EU, ISO, DIN norms and ASTM standards regarding surface and interfacial tension.

Valid norms and standards

ASTM D971	Standard Test Method for Interfacial Tension of Oil Against Water by the Ring Method
ASTM D1331	Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface-Active Agents
ASTM D1417	Standard Methods of Testing Rubber Latices – Synthetic
DIN EN 14210	Surface active agents – Determination of interfacial tension of solutions of surface active agents by the stirrup or ring method
DIN EN 14370	Surface active agents – Determination of surface tension
ISO 304	Surface active agents – Determination of surface tension by drawing up liquid films
ISO 1409	Plastics/rubber – Polymer dispersions and rubber latices (natural and synthetic) – Determination of surface tension by the ring method
ISO 4311	Anionic and non-ionic surface active agents – Determination of the critical micellization concentration – Method by measuring surface tension with a plate, stirrup or ring
ISO 6889	Surface active agents – Determination of interfacial tension by drawing up liquid films
OECD 115	OECD Guideline for the testing of chemicals: Surface Tension of Aqueous Solutions



HIGH PRECISION SURFACE AND INTERFACIAL TENSION MEASUREMENT

- **High-precision force sensor with outstanding resolution**
- **Accurate and stable**
- **Large variety of sample holders**

High-quality components for precise measurements

With our Force Tensiometer – K100, made in Germany, we offer high-class solutions to our partners in research, development and industrial quality control. Thus, the K100 is equipped with a high-precision force sensor leading to a resolution of 0.001 mN/m. Furthermore, all measuring bodies as rings and plates are certified in accordance to the most valid standards.

More stability and smoothness for absolute precision

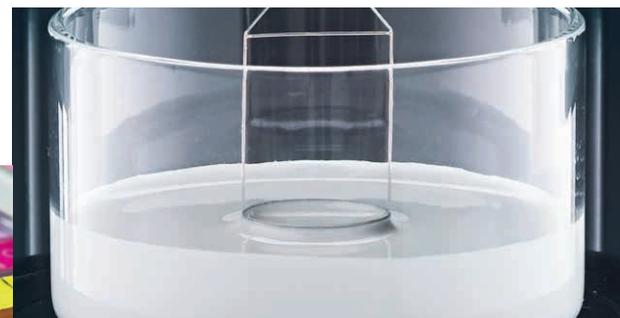
For maximum reproducibility, we eliminated the troublesome effect of vibration by using a dynamic and smooth running drive. Moreover, we reduced the long-term drift of the force sensor to a minimum.

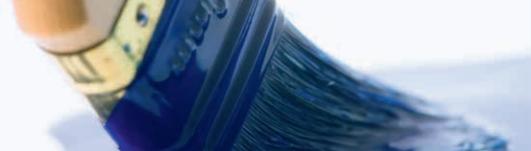
A broad range of sample holders for various applications

Depending on the measuring method, a large selection of accurately shaped sample holders can be adapted.

The right sample holder for your application:

- Sedimentation probe to characterize the sedimentation of dispersions
- Measurement cone to characterize the penetration into sediments
- Sample holder for foils and films
- Sample holder for single fibers
- Glass sample holder for measuring adsorption and wetting behaviors of powder samples
- Fiber chamber for investigating the wetting properties of fiber bundles, pigments or powders
- Sample holder for solid sample plates





WE CREATE INTELLIGENT AND TIME SAVING OPTIONS AROUND THE MOST IMPORTANT PART – YOUR APPLICATION

- **Intelligent features**
- **Very short preparation time**
- **Quickly repeatable conditions**

The K100 is an intelligent solution, full of high-quality components that makes it as time effective and comfortable as possible.

Our built-in ionizer for less static charge

An ionizer is integrated within the sample chamber and ensures reliable contact angle measurements on solid samples. It automatically eliminates static charge that could falsify the results.

Stirring without magnetic influence

The integral, automatic stirring function works without a permanent magnet. This non-magnetic stirring does not affect the sensitive scales and allows you to analyze even magnetic samples. Furthermore, it ensures optimum homogenization of dispersions before each measuring.

Illuminated measuring compartment

The illumination unit in the measuring compartment irradiates the sample surface as well as the probe which makes positioning of the sample very easy.

Precise and quickly repeatable

Accurately controlled sequences guarantee that the measuring conditions are precise and quickly repeatable. The sample stage has a high position resolution. This makes it possible to move it very slowly and carefully using our control pad. For setting up measurements rapidly, the stage can move very quickly, too. The sample stage positions can be saved – for a convenient and automatic approach.

Simple data export

All your measurement data files are convertible into Excel-files, which makes it easy to manage, report and organize your measuring data.



WE HAVE COMBINED SMART DESIGN WITH OUTSTANDING USABILITY

- Offers maximum ease of use
- Automated calibration
- Robust housing and components
- Made in Germany

Every feature sets a new standard

The Force Tensiometer – K100 is not only a universal measurement instrument – it satisfies a market that needs perfect lab solutions for highly demanding everyday applications.

Automated calibration

The K100 eliminates complicated or time-consuming calibrations. When setting-up the instrument, automatic adjustment of the force sensor provides for reliable measurement data. Our K100 stores the adjustment data internally and immediately uses them when measuring. This concept eliminates what is typical for other tensiometers: the need for adjustments on a daily basis or after changing the measuring probe.

Practically equipped

The large sample chamber has magnetically locked glass swinging doors, which shield it from troublesome air currents. A built-in spirit level helps you to adjust the sample stage precisely to enable accurate force measurements.

Easy and intuitive operation with our control pad

Intuitive operation by means of the control pad is a unique feature of our K100. It makes it easy to control the sample stage and other components before and during the measurement.

Transparency in measurement and data management

The simple operation of the K100 goes hand-in-hand with the clear user guidance of the software. Our software LabDesk™ supports simple result management with automatic overview diagrams, comprehensive measuring reports and transparent data organization, right down to the free combination of data measured with different KRÜSS tensiometers. The comprehensive and expandable substance database makes LabDesk™ a data pool with the substances which are important to you.

Designed to perform under intense daily use

All components of the K100 are robustly designed and engineered for your daily laboratory needs. They provide an excellent oil and solvent resistance.

Protected force sensor

The high sensitive force sensor is protected at all times by a lock mechanism that only releases the force sensor during measurements and activates itself automatically after the measurement.

Designed and engineered in Germany

Every Force Tensiometer – K100 was completely engineered, hand-built, assembled and tested in Germany. Therefore, every instrument that leaves our production center is a commitment to outstanding quality. It combines technical perfection and a highly scientific approach to an extraordinary result.





PERFECTLY EQUIPPED FOR CRITICAL MICELLE CONCENTRATION (CMC)

■ Fully automated CMC measurement

Our specially designed Micro Dispenser equips the K100 for measuring the critical micelle concentration (CMC). The surfactant concentration range is set up and measured fully automatically. Working with two micro dispensers – one for dispensing the liquid and the other one to aspirate the same volume – enables a very wide concentration range. A high density of measuring points can be created in order to measure the CMC with accuracy. False measurements due to an overly concentrated parent solution are virtually ruled out, as it can be diluted by several orders of magnitude and the CMC measured with high probability.

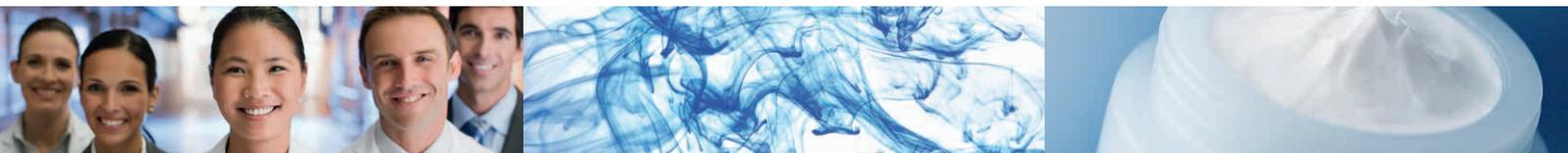


Force Tensiometer – K100 with Micro Dispensers

WE'RE 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 glad to help you.



KRÜSS GmbH – Germany

Borsteler Chaussee 85
22453 Hamburg, Germany
Phone: +49 40 514401-0
Fax: +49 40 514401-98
Email: info@kruss.de

KRÜSS GmbH – UK

School of Chemistry
University of Bristol
Cantock's Close
Bristol, BS8 1TS, UK
Phone: +44 117 325 0257
Email: info@kruss.co.uk

KRÜSS GmbH – France

14, avenue du Québec
Bât. Kerria 3 – Silic 605
91140 Villebon sur Yvette, France
Phone: +33 1 6014 9494
Email: info@kruss.fr

KRÜSS USA

1020 Crews Road, Suite K
Matthews, NC 28105, USA
Phone: +1 704 847 8933
Email: info@krussusa.com