

DROP SHAPE ANALYZER – DSA30R



INTERFACIAL RHEOLOGY FOR
FOAMS AND EMULSIONS

KRÜSS

Advancing your Surface Science



ANALYSIS OF OSCILLATING INTERFACES – TIME-SAVING AND REPRODUCIBLE

- Elastic and viscous moduli using exactly sinusoidal drop and bubble oscillation
- Innovations for simple preparation and measurements
- Exactly repeatable analysis sequences

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 bodycare products or influence the yield in tertiary crude oil production depends on how the surface 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.

Elasticity and viscosity analysis in a wide dynamic range

The measuring principle involves evaluating video images of drops or gas bubbles at a dosing needle to measure the surface or interfacial tension. The interface size is sinusoidally changed during this process. The SFT/IFT is measured as a function of the surface change and is also sinusoidal in the case of samples containing surfactants.

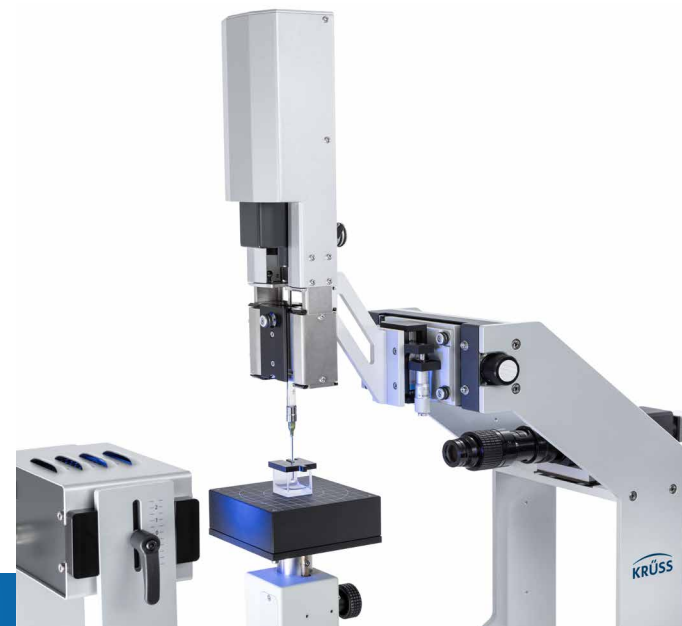
The dosing unit's extremely precise piezo drive enables exact sine waves in a frequency spectrum of 0.001 to 30 Hz, so the measurements cover a very wide dynamic range.

The elastic modulus E' and the viscous modulus E'' result from the evaluation. E' goes hand in hand with the change to the surfactant's surface concentration due to stretching and compression; E'' reflects the change in SFT/IFT with respect to time due to diffusion and interfacial adsorption of the dissolved surfactant. Both quantities are related to the mechanical and temporal stability of foams and emulsions.

Quick, simple and exactly repeatable measurements

Many innovations around the DSA30R turn formerly complex interfacial rheological analytics into an easy-to-follow method with quick sample changing. The liquid is simply added to a standard glass syringe, which is inserted in just a few steps, then fully automatically and magnetically coupled to the dosing feed. Cleaning is completely unproblematic thanks to the technical separation between the liquid reservoir and the oscillation drive. The same is true for the filling process with zero air bubbles, which prevents undesirable oscillation damping and thus guarantees reliable results.

The entire measurement process, from drop generation and oscillation to the results output, is fully automatic. This is ensured with easy-to-create ADVANCE software automation programs. The measuring conditions are optimally repeatable thanks to the fully software-controlled measurement using fixable parameters.



RELIABLE MEASUREMENT IN ALL PHASES



- Wide range of foam, emulsion and surfactant analytics
- Flexible temperature control from -10 to 70 °C
- ADVANCE software with simple operation and powerful evaluation

TASKS AND APPLICATIONS

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

MEASURING 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 gas bubbles
- Static surface and interfacial tension
- Measurement at temperatures ranging from -10 to 70 °C

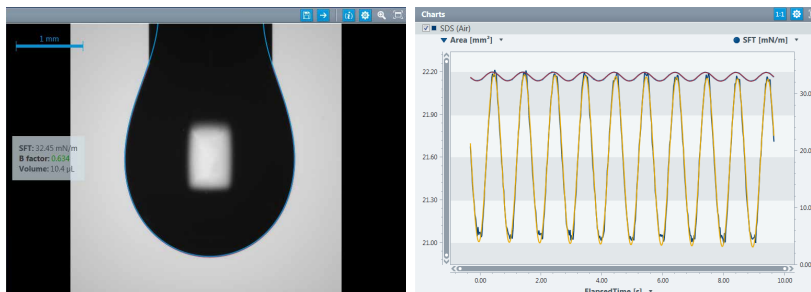
Measurements at a controlled temperature

To determine the influence of temperature, or to make investigations of high-viscosity systems easier, the syringe is embedded in a temperature-controlled sleeve for measurements between -10 and 70 °C, whereby the temperature of the surrounding phase can also be controlled. The ADVANCE software documents the temperature curve throughout the entire measurement. Also, the start of certain processes such as the beginning of oscillation can be automatically linked to the target temperature being reached. In this way, reproducible conditions without user interventions are guaranteed.

Intuitive software with excellent image evaluation

With our ADVANCE software, we are focusing on simple automation and intuitive usability. The user interface's clear design follows the workflow of scientific analysis, from preparation to measurement up to evaluation and result export.

Particularly powerful is the algorithm which ADVANCE uses to determine the SFT/IFT based on a drop image in real time and to provide a permanent illustration in a live image. For best possible transparency, any oscillating drop snapshots can be shown simply by clicking on the corresponding value in the data list or on the measuring point on the SFT/IFT sine wave.

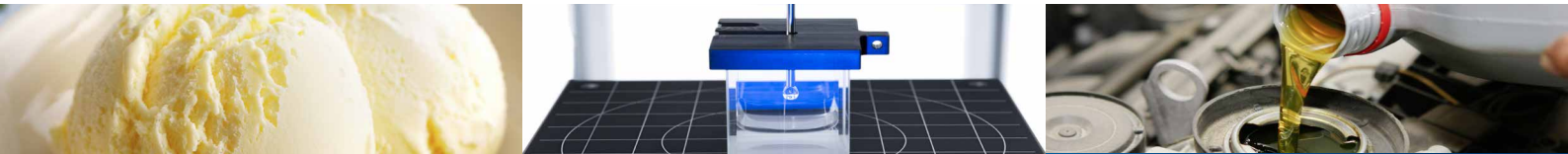


Oscillating drop and resulting sine wave of the SFT/IFT in ADVANCE

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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