DYNAMIC FOAM ANALYZER – DFA100

THE FLEXIBLE SOLUTION FOR SCIENTIFIC FOAM ANALYSIS

KRÜSS

Advancing your Surface Science

FOAM – THERE ARE MANY WAYS TO USE IT, WE ANALYZE IT SCIENTIFICALLY

- **Scientific analysis of liquid foams**
- **Reproducible, precise and process-related measurements**
- **Easy to use**

For many labs in research or industrial quality control, measuring and analyzing foam is a huge challenge. Most commonly, companies use handmade custom solutions to analyze their foam. However, such solutions are hardly related to standards and are highly user dependent. It is now possible to get science-based foam analysis results with our Dynamic Foam Analyzer – DFA100. This instrument supports you in the optimization of foam-forming or foam-prevention products – in the case of unwanted foam. It precisely measures the foam volume during the formation and the decay over time, for example, to analyze the foam stability. With two additional accessory modules, the instrument also measures the foam structure with regards to bubble size and distribution or the liquid content of the foam.

The eye of the analyzer: our optical sensor

The optical sensor dynamically measures the quantity of foam produced and the decay characteristics with high resolution over the whole measuring cylinder height, even with high speed for very short-lived foams. Simultaneously, the quantity of discharge of liquid from the foam (called drainage) into the liquid pool is measured by the same sensor to provide a full understanding of the dominant decay phenomena. For nontransparent liquids, an infrared light option offers a clear view.

Accurately controlled foaming

Efficient solutions with high-quality components and comprehensive scientific know-how – this is what KRÜSS stands for. Our DFA100 is a reliable instrument for analyzing the whole spectrum from slow to very fast decaying foams.

When foaming by means of sparging, exact repeatability of the conditions is provided by precise electronic flow control. Moreover, the instrument has many options to simulate industrial process conditions and to optimally transfer the results to large-scale applications. Among these features are the possible connection of gases such as carbon dioxide as well as foaming by means of a software-controlled stirrer with a variation of stirring blades, even with customized designs. Additionally, you can also use your own means for creating foam for subsequent analysis with the instrument. As a further option, you can set measurement temperatures up to 90 °C.

Easy to use and easy to clean

The usability of our DFA100 is of great advantage: the measuring cylinder is simply placed in the instrument using the plug-in unit. The flexible system enables components to be cleaned quickly and allows one sample to be prepared while another measurement is running. This means more measurements in the same time frame for you.

TASKS AND APPLICATIONS

- Foams for washing and cleaning
- Firefighting (liquid-content-dependent extinguishing and propulsion properties)
- Foams in foods and body care products
- Surfactant development
- Flotation as a method for separating solids, e.g. for paper recycling
- 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

Dynamic Foam Analyzer – DFA100

- Software-controlled foaming by means of sparging or stirring
- Investigations of externally produced foams
- Determination of total, foam, and liquid height
- Foamability parameters, including maximum height, foam capacity and foam density
- Decay parameters, including decay start and half life
- Temperature-controlled measurements up to 90 °C

With the Foam Structure Module – FSM:

- Measurement of bubble size distribution and the change in this distribution in different resolution ranges
- Calculation of mean bubble size and its standard deviation
- Output of a histogram for each individual image in the series of measurements

With the Liquid Content Module – LCM:

- Simultaneous measurement of liquid content up to seven levels
- Maximum liquid content at each level
- Half life (time for the liquid content to reduce to one half) at each level

Dynamic Foam Analyzer – DFA100

TAKE A CLOSE LOOK INTO YOUR FOAM WITH OUR FOAM STRUCTURE MODULE – FSM

- **Analyzes the bubble size distribution of liquid foams**
- **Easy measuring of bubble size and number**
- **Precise image analysis**

The Dynamic Foam Analyzer – DFA100 is not only a high-quality measurement instrument – it is an expandable system solution. One of our most demanded modules is the Foam Structure Module – FSM.

Time-dependent analysis of bubble size in liquid foams

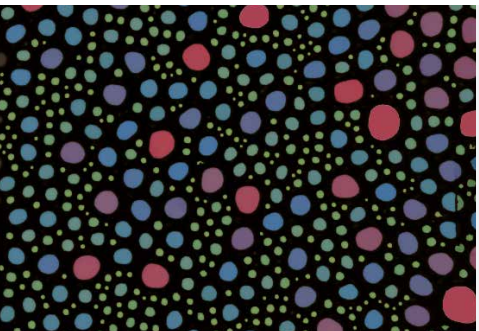
Our FSM reliably analyzes the size and distribution of bubbles of liquid foams and the variation of this distribution with respect to time. This measuring method helps you to quantify and specifically optimize the consistency of a foam, based on precise and intelligent image analysis.

Precise investigation of bubble size and quantity

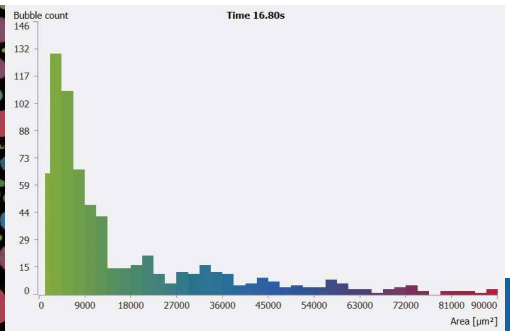
Analyzing the foam structure with our FSM gives you the number and size as well as size distribution of bubbles. As a result, the DFA100 helps you to optimize your foam in line with the required properties. To enable different types of foam to be investigated with the same precision, we have provided a system that allows flexible adjustments of the image resolution. This makes it easy to measure bubbles ranging in size from very small to very large.

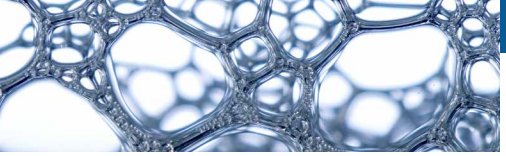
Precise and intelligent image analysis

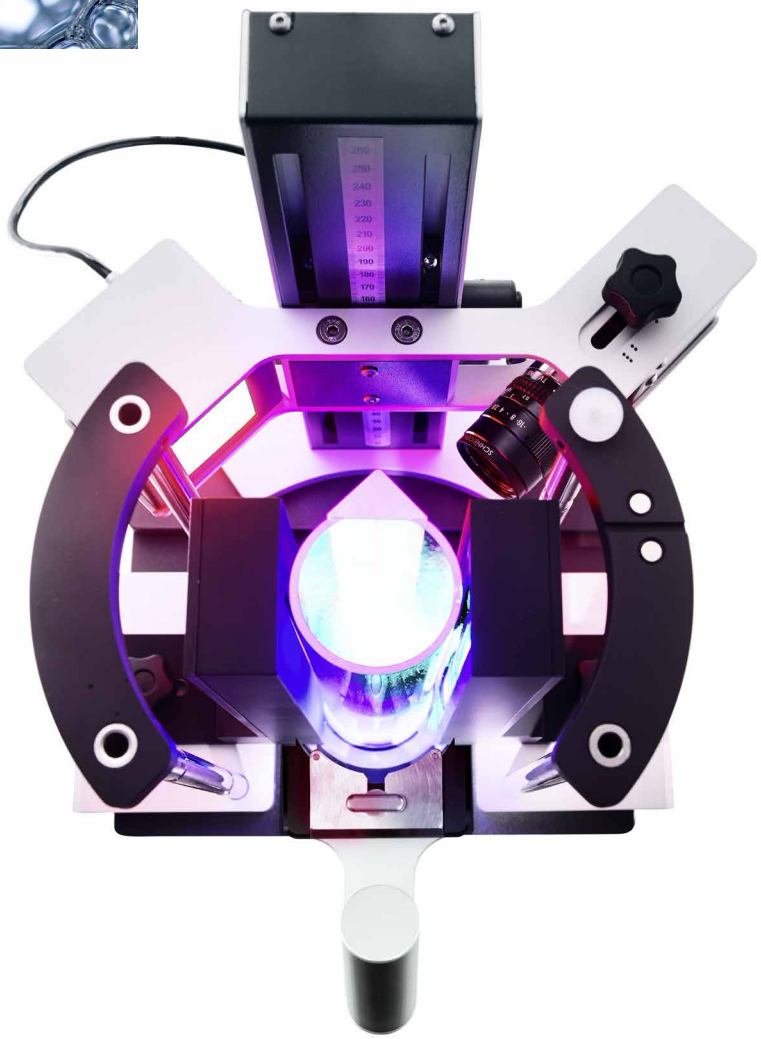
High resolution foam structure analysis



Histogram of bubble size distribution







Top view of the Dynamic Foam Analyzer with Foam Structure Module – FSM

Analysis of foam stability with structural change over time

Before a foam collapses, its structure changes: large bubbles are formed and smaller ones disappear. This process is recorded and analyzed with the help of our software. The results help to specifically optimize the composition of a liquid in order to obtain stable or rapidly decaying foam. With our integrated height measuring technique in combination with the FSM, a decay curve can be recorded at the same time as the foam structure is analyzed as part of a single measurement.

OUR LIQUID CONTENT MODULE – LCM REVEALS THE DRAINAGE, ESPECIALLY FOR STABLE FOAMS

- **Measures the liquid content of foams and its change**
- **Helps to optimize the stability of foams**
- **Analyzes up to seven height increments**

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

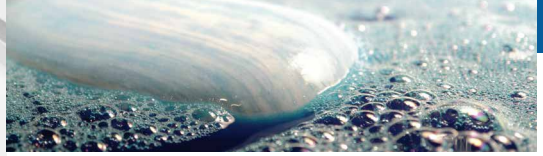
Fast measurement of foam stability

Drainage is always the first sign that a foam is starting to decay. Accurately and quickly measuring the liquid content in the foam enables reliable conclusions about the stability of slowly decaying foams. This saves measuring time and significantly increases sample throughput.

Accurate liquid analysis at seven height increments

The liquid content is measured simultaneously at up to seven height increments of the foam. This high resolution shows how uniform the drainage occurs and how the homogeneity changes over time. In addition, the dense arrangement of conductivity electrodes guarantees that a measurement is always available in the lower region and around the top of the foam. This makes comparative measurements of liquids with different foaming intensities more reliable and simplifies the optimization of the liquid content.

Liquid Content Module – LCM



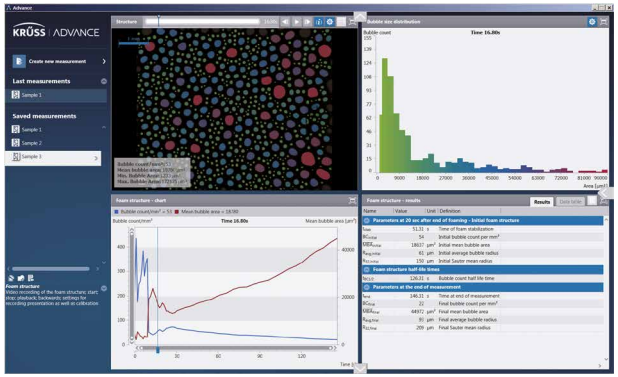
ADVANCE SOFTWARE: INTUITION NOW BECOMES A FEATURE

- **Easy and intuitive to use**
- **Comprehensive charts describe the foam**
- **Clear data management**

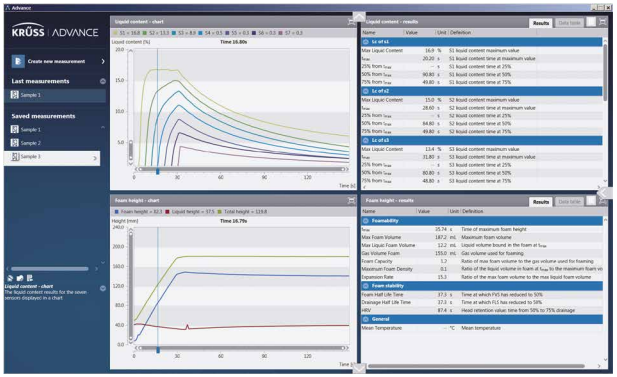
ADVANCE is our innovative software for foam analysis which sets new standards in intuitive operability. The relevant functions for each particular step are arranged in tiles which display all elements necessary in the context. By avoiding the use of menus and pop-ups, ADVANCE saves any unnecessary clicks and time-consuming searches for hidden elements.

Particularly simple is the programming of automatic sequences that integrate the software-controlled components of the Dynamic Foam Analyzer – DFA100 in complete sample analyses with maximum flexibility. Using these automation programs provides high reproducibility and reduces the user's influence on the results to a minimum.

Any combination of foam height, liquid content and foam structure analyses can be carried out simultaneously with all raw data and calculated results clearly displayed in respective tiles. With just a few clicks, data and result comparisons of freely selected measurements appear in illustrative tables and charts. Thus the influence of changed sample properties or measuring parameters on the foam behavior is immediately visible.



Results of a foam structure analysis



Results for liquid content and foam height detection

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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