

1-CUBE

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FOAM STABILITY ANALYZER – TYPE FSA COMFORT

Application:

The principle of the measurement is based on the automatic monitoring of the foam surface decrease using a conductivity sensor. The instrument automatically tracks the drop in the foam surface over time, which corresponds to consumer evaluation. Foam in the measuring cuvette can be generated in three different ways, each corresponding to a specific methodology for measuring its collapse:

1. Measurement of the collapse of foam created by high-pressure injection of beer through a nozzle according to the NIBEM method
2. Automatic measurement of foam collapse formed by pouring beer from a bottle into a glass
3. Measurement of the collapse of foam generated from liquids not saturated with gases

1. Measurement of foam collapse created by high-pressure injection of beer through a nozzle according to the NIBEM methodology (available in both the FSA-Comfort and FSA-according to Nibem models):

According to the NIBEM methodology, the time required for the foam surface to decrease by 10, 20, and 30 mm is measured using a system of movable electrodes. The central probe is immersed in the foam and slowly moves downward into it. If one of the side electrodes comes into contact with the foam surface, the downward movement stops until the contact is interrupted due to the foam collapse – after which the electrodes begin moving downward again and the cycle is repeated.

The measurement begins at the moment when the foam level drops 10 mm below the rim of the cuvette. The measurement continues until the foam has dropped by an additional 30 mm, i.e., 40 mm below the rim of the cuvette.



For measurement reproducibility, the method of foam generation is crucial to ensure that the foam structure remains consistent. Beer is taken from a bottle or can under a pressure of 2 bar using an ICAS sampler and a Flasher device, in which the beer is forced through a nozzle of very small diameter, thereby generating foam.

Foam generation according to the NIBEM methodology:

1– FSA Foam Stability Analyzer, 2–ICAS Sampler, 3–Flasher, 4–Measuring cuvette, 5–Connecting tubing

2. Automatic measurement of foam collapse formed by pouring beer from a bottle into a glass (available only in the FSA-Comfort model)

Foam is formed by the fall of beer saturated with carbon dioxide, automatically taken directly from a sealed bottle. This method simulates the natural pouring of beer. The beer is dispensed from a bottle or can into the measuring cuvette.

To adjust the foaming rate and standardize the measurement procedure, the filling time is recorded. Filling is automatically stopped upon the first contact of the electrode sensor with the foam surface. The electrodes are movable and gradually descend depending on the foam collapse. If the electrodes are in contact with the foam surface, they remain stationary. When the foam level drops below the electrodes, the electrodes move downward until the next contact with the foam.

The instrument measures the time of foam collapse at three different heights, freely preset by the user, for example after a 10, 20, and 30 mm decrease. A fourth height/time pair corresponds to the total foam height (down to the “bald spot”) formed in the cuvette and the time of its complete collapse.

This arrangement corresponds to pouring foam to a prescribed height and measuring the time of its complete collapse from the consumer’s perspective.

3. Measurement of foam collapse generated from liquids not saturated with gases (available only in the FSA-Comfort model):

In addition to the measurement methods described above, the instrument can generate foam from liquids not saturated with gases, for example from wort or hopped wort, and subsequently measure the rate of its collapse.

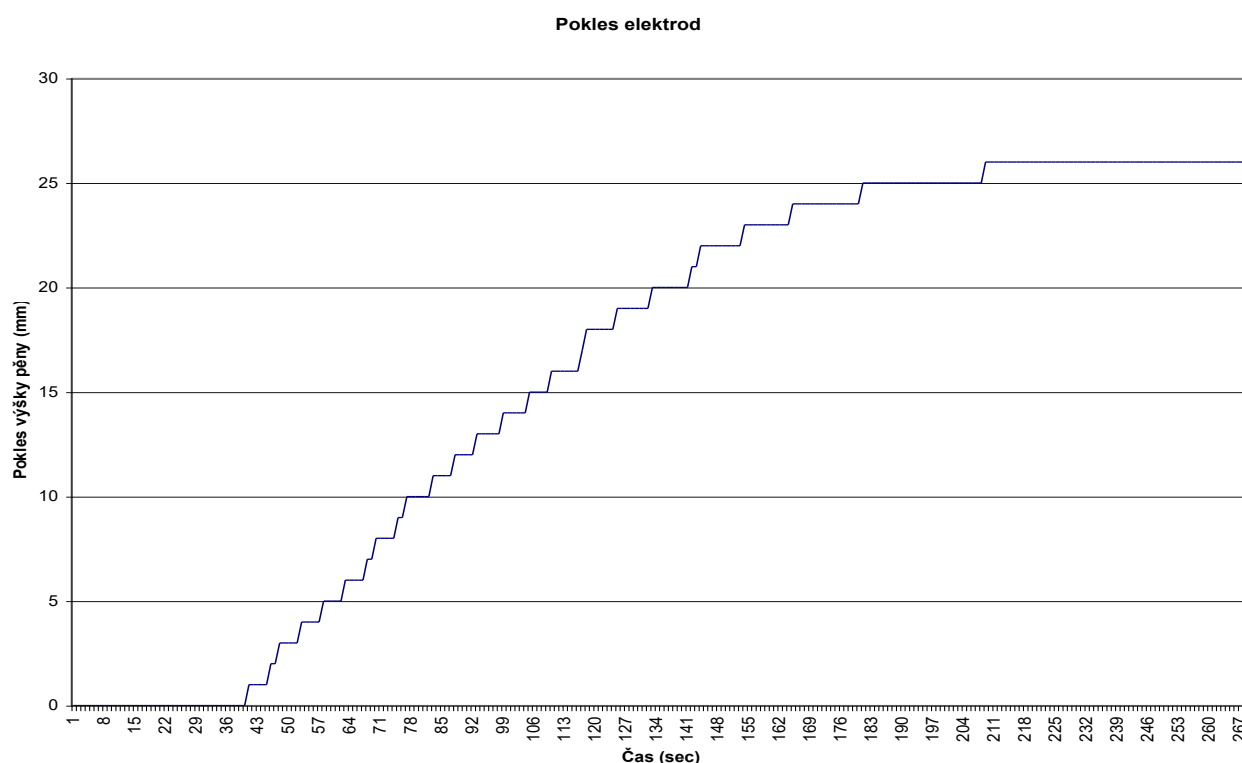
Beer or another liquid (e.g., wort) is foamed directly in the measuring cuvette by stirring, by stirring combined with bubbling, or by bubbling air alone (or another gas). The time required for the foam to decrease by 40 mm—defined by the distance between the electrode levels—is then measured.

The stirring speed and the flow rate of the bubbling gas can be adjusted, allowing preparation of foam with different structures, ranging from coarse to very fine. The foam then collapses over varying periods depending on its structure.

To ensure measurement reproducibility in repeated experiments, the last used values of the stirring speed and gas flow rate remain stored in the instrument’s memory. At the same time, the foaming time (the time from switching on stirring/bubbling to switching it off) is displayed and stored in the instrument memory.

Technical data:

Category	Parameter	Type FSA-according to Nibem	Type FSA-Comfort
Technical data	Power supply	230V / 50Hz	230V / 50Hz
Technical data	Protection	IP20	IP20
Technical data	Power consumption	200 W	200 W
Technical data	Display	LCD 4x20 characters	LCD 4x20 characters
Technical data	Memory	400 measurements	400 measurements
Technical data	Interface	USB / RS232	USB / RS232
Technical data	Dimensions (H x W x D)	530 x 390 x 300 mm	530 x 390 x 300 mm
Technical data	Weight	5 kg	5 kg
Adjustable parameters	Gas flow	NO	YES – for generating foam in liquids not saturated with gases using a float flowmeter with a needle valve
Adjustable parameters	Stirrer speed	NO	YES – for generating foam in liquids not saturated with gases using a membrane keypad
Accuracy	Foam height measurement accuracy	1 mm	1 mm
Accuracy	Foam collapse time measurement accuracy	1 sec	1 sec
Measurement range	Electrode movement	0 to 54 mm	0 to 54 mm
Measurement range	Time measurement	0 to 999 sec	0 to 999 sec



Example of a curve showing the decrease of the beer foam surface over time recorded by the **FSA-Comfort** instrument in the mode “Automatic measurement of foam collapse formed by pouring beer from a bottle into a glass” and displayed on a computer.

Scope of Delivery:

- Foam Stability Analyzer, type FSA-Comfort or type FSA-according to Nibem
- Cuvette

Accessories (optional):

- ICAS Sampler
- Flasher
- USB/RS232 cable

Main disadvantage:

- Neither model is equipped with automatic compensation for temperature, atmospheric pressure, or air humidity.

Advantages & Benefits:

- The FSA-Comfort model, in addition to measuring foam stability according to the NIBEM methodology, also allows measurement of foam collapse formed by naturally pouring beer from a bottle into a glass. It can also generate foam from liquids not saturated with gases and subsequently evaluate its collapse.
- High accuracy and calibration capability: Ideal for laboratories with an established ISO 9001/9002 quality system.

FAQ:

What accessories are required, in addition to the FSA instrument, for measuring foam stability according to the NIBEM methodology?

In addition to the foam stability measuring instrument itself, accessories are needed to generate the foam. This includes a pressurized gas cylinder with a pressure-reducing valve, an ICAS sampler for dispensing the beverage sample from the bottle, a Flasher for foam formation, and a measuring cuvette.