Attension Sigma

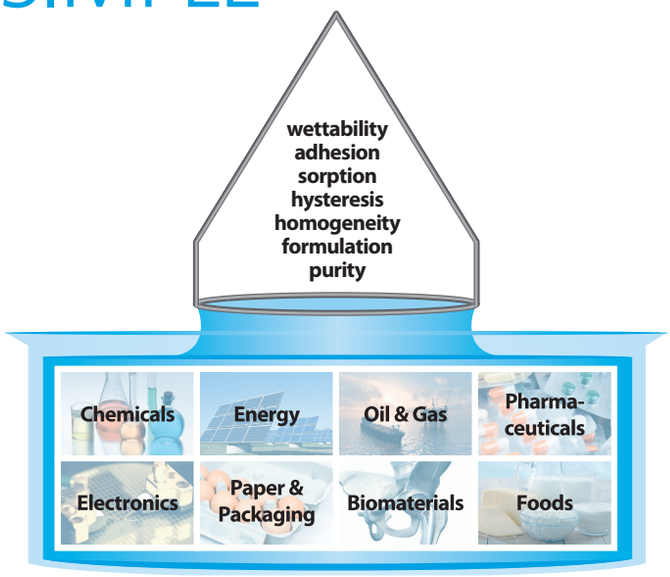
Complete Range of Force Tensiometers

Biolin Scientific
[Progress Together]

PRECISION MADE SIMPLE

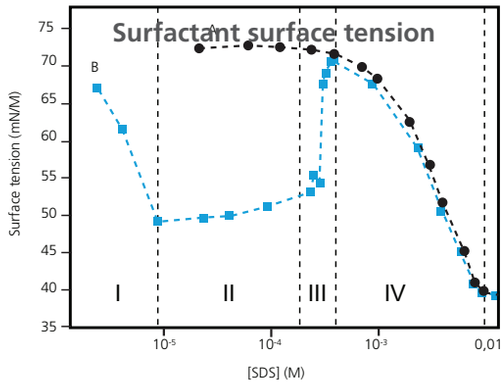
Attension® tensiometers inspire new discoveries and more confident decisions towards seamless production and higher quality products. With its intuitive user interface, slick design, and all-inclusive software, it is easy to operate with high flexibility and unrivaled automation options.

The Attension Force Tensiometer offering enables a wide range of applications from advanced research to quick quality control. Thanks to the versatility, you can get the combination of features that best fityour needs.



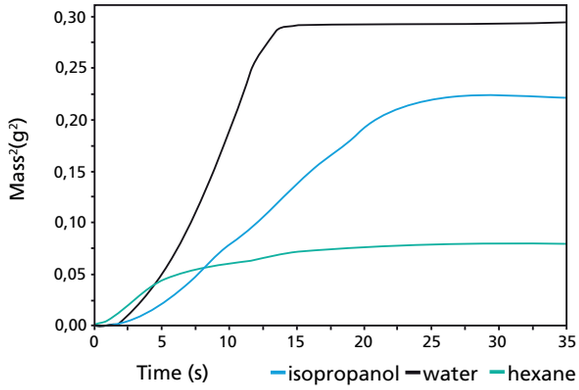
WEIGH THE POSSIBILITIES

Application Examples



Surface tension of SDS surfactant solution (A) in water and (B) with porphyrin present. Ref. O.Yaffe, E. Korin and Bettelheim, Langmuir 24 (2008) 11514.

Powder wettability and absorption



Wetting of lactose with different solvents. Measurement performed by Biolin Scientific.

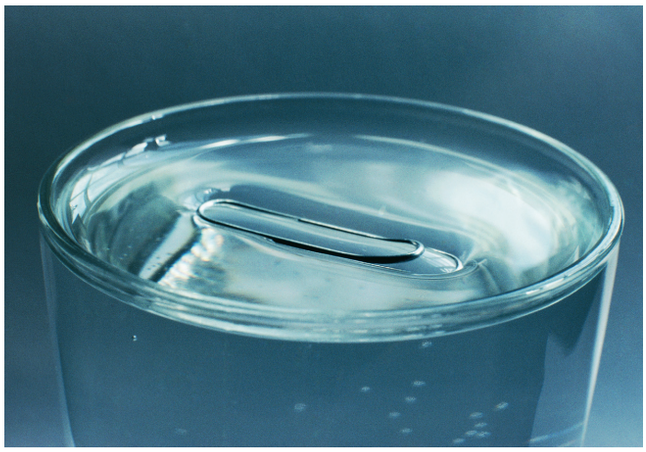
Attension Force Tensiometers

Technology

The basic principle of every Sigma measurement is to record and analyze the forces exerted onto a probe or solid sample using a sensitive microbalance. The force seen by the balance can be converted into surface tension or interfacial tension when a platinum Du Noüy ring or Wilhelmy plate is used for drawing up the liquid in a meniscus.

In Critical Micelle Concentration (CMC) measurement, the CMC point is determined by measuring surface tension of a solution at different concentrations. Dynamic contact angles are measured by dipping and withdrawing a solid sample into the liquid sample. By measuring contact angles with different liquids, the surface free energy of the solid can be defined. Powder wettability by the Washburn method is calculated by recording the mass uptake of a powder container brought to the liquid level. Adhesion force can by similarly quantified by measuring the force needed to detach a droplet from a solid surface. Sedimentation and liquid density can also be measured.

Attension offers a full range of force tensiometers from fully automatic models to fully manual model. The precision of each measurement is guaranteed by an ultrasensitive microbalance and accurate sample stage movement.

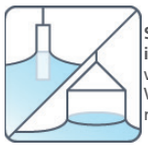


Measurements

Attension Force Tensiometers can measure:

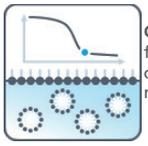
- Surface tension
- Interfacial tension
- Critical micelle concentration (CMC)
- Dynamic contact angle
- Surface free energy (SFE)
- Powder wettability (Washburn)
- Adhesion force
- Sedimentation
- Density

Measurement methods



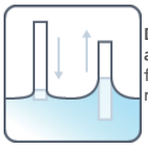
Surface tension / interfacial tension with Du Noüy ring, Wilhelmy plate or rod

Adhesion force for adhesion studies

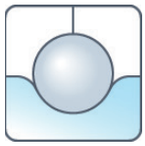


CMC for critical micelle concentration measurement

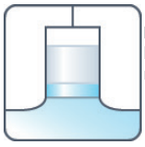
Sedimentation for sedimentation kinetics



Dynamic contact angle for advancing and receding angles



Density for liquid density measurements



Powder wettability by the Washburn method

Sigma 700 / Sigma 701 - Automation and versatility

Sigma 700/701 are the ultimate Attension force tensiometers enabling full automation and optimal ease of use even for the most demanding industrial and research applications.

Complete range of measurements

- Surface tension
- Interfacial tension
- Critical micelle concentration (CMC)
- Dynamic contact angle
- Surface free energy (SFE)
- Powder wettability (Washburn)
- Adhesion force
- Sedimentation
- Density

Full automation

The system can be fully automated, and measurements can be performed easily with a single click.

Versatility and precision

Sigma 700/701 have full support of all measurement modes. Sigma 700 is optimized for dynamic contact angle with heavy samples and powder wettability, and Sigma 701 is optimized for single fiber dynamic contact angle measurements.

Best-in-class software

OneAttension is an all-inclusive software providing all measurement modes, full automation, easy measurement setup, live results, and the friendliest user interface available.

SIGMA 700 / 701

Sigma 702 - Standalone

Sigma 702 is an accurate standalone force tensiometer with automation for quality control and research. With its precise functionality, surface tension and interfacial tension can be measured easily and quickly.

Accurate measurements of

- Surface tension
- Interfacial tension
- Critical micelle concentration (CMC) (manual)
- Density

Automated surface tension and interfacial tension

The surface tension and interfacial tension can be detected automatically and precisely thanks to the motorized sample stage and the ultrasensitive balance.

No need for external PC

Standalone system operated by the keyboard at the instrument – shows the results instantly on a large integrated digital screen. Results can be printed or imported to PC if desired.

Ease of use

Simple open design and easy-to-use user interface, guarantees that the instrument is quick to learn and easy to operate.

Sigma 702ET - Transformer Oil Analyzer

Sigma 702ET is specifically designed for the quality control of transformer oils. It follows IEC 62961 and ASTM D971 standards to measure the interfacial tension between a transformer oil and water as a quality control measure for the oil.

Accurate measurements of

- Interfacial tension between transformer oil and water (IEC 62961 and ASTM D971)
- Surface tension
- Interfacial tension
- Critical micelle concentration (CMC) (manual)
- Density

Specifically designed for IEC 62961 and ASTM D971

The embedded software will guide the user throughout the measurement and make sure the measurement is done automatically and in compliance with the standards.

No need for external PC

Standalone system operated by the keyboard at the instrument – shows the results instantly on a large integrated digital screen. Results can be printed or imported to PC if desired.

Ease of use

Simple open design and easy-to-use user interface, guarantees that the instrument is quick to learn and easy to operate.

SIGMA 702 / 702ET

Sigma 703D - Manual

Sigma 703D is an accurate manual standalone force tensiometer for quality control and research. Robust and convenient, it's the optimal tool for simple surface tension and interfacial tension measurements.

Accurate measurements of

- Surface tension
- Interfacial tension
- Critical micelle concentration (CMC) (manual)
- Density

No need for external PC

Standalone system operated by the keyboard at the instrument – shows the results instantly on a large integrated digital screen. Results can be printed or imported to PC if desired.

Ease of use

Simple open design and easy-to-use user interface, guarantees that the instrument is quick to learn and easy to operate.

Sigma accessories

Attension Sigmas can be complemented with a range of accessories to accommodate a number of applications.

Probes and related tools

Such as Platinum Du Noüy ring, Platinum Wilhelmy Plate, Platinum rod (for low volume samples), Powder Wettability containers, Adhesion Force probe, Density probe, Sedimentation probe, calibration tools and ring re-form tool make sure you can utilize your instrument to the maximum. Temperature and pH probes are also available as well as sample holders.

Temperature control vessels

For temperature control of the liquid sample are available from -20°C up to 200°C. A gas phase temperature controller can also be used for regulation of the air temperature during measurement.

CMC dispensers

For fully automated critical micelle concentration measurements with Sigma 700/701.

Active vibration isolation system and cabinet

To eliminate disturbing vibrations and air currents to maximize the precision of the measurements.

For a complete accessory description, please visit
www.biolinscientific.com/product/sigma-700-701.

SIGMA 703D

OneAttension software

OneAttension software combines the most intuitive user interface with a high level of functionality. Some of its main features includes:

Best-in-class user interface

The most intuitive user interface is the key for OneAttension. The software is easy to learn, and the logical interface allows even complex measurements to be performed with ease.

Live analysis

The results are shown real-time during the measurement. You can conveniently monitor your results without the need to switch between measurement and analysis tabs.

Full automation

OneAttension supports fully automatic measurements. Powerful recipe manager makes measurement setting convenient and simple.

Flexibility for every need

OneAttension has been designed to meet the requirements of almost any applications you may have. You can easily adjust measurement parameters to match your specific application needs.

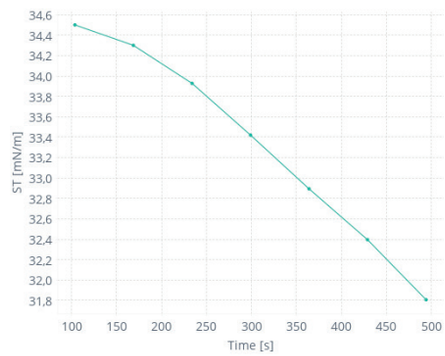
Data handling and exporting made simple

Data analysis, plotting, and statistical analysis can all be done with a few clicks to give you accurate results within seconds. All data can easily be exported further to Excel, for example.

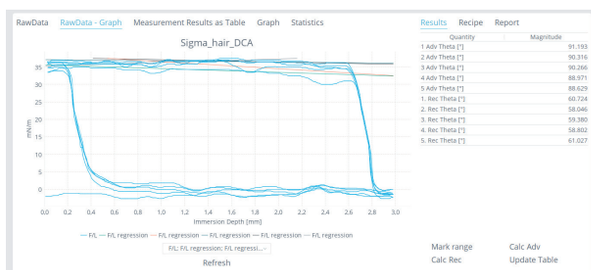
Optimal for industrial use

Measurement reports can be created with a few clicks and the user manager conveniently handles all different users – with desired privacy levels.

Intuitive user interface



Live results



Data handling made simple

Ver. 2025-03-13

Available Measurements	SIGMA 700	SIGMA 701	SIGMA 702	SIGMA 702ET	SIGMA 703D
Surface tension	•	•	•	•	•
Interfacial tension	•	•	•	•	•
Critical micelle concentration	automatic	automatic	manual	manual	manual
Dynamic contact angle	•	•	–	–	–
Surface free energy	•	•	–	–	–
Powder wettability	•	•	–	–	–
Density	•	•	•	•	•
Sedimentation	•	•	–	–	–
Adhesion force	•	•	–	–	–
Balance Specifications					
Measuring range (mN/m)	1...2000	1...2000	1...1000	1...1000	1...1000
Displayed resolution (mN/m)	0.001	0.001	0.01	0.01	0.01
Density range (g/cm3)	0...2.2	0...2.2	0...2.2	0...2.2	0...2.2
Density resolution (g/cm3)	0.0001	0.0001	0.0001	0.0001	0.0001
Maximum load (g)	210	5	5	5	5
Weighing resolution (mg)	0.001	0.005	0.01	0.01	0.01
Force resolution (µN)	0.1	0.05	0.1	0.1	0.1
Contact angle range	0...180°	0...180°	-	-	-
Contact angle resolution	0.01°	0.01°	-	-	-
Measuring Unit Specifications					
Sample stage	motorized	motorized	motorized	motorized	manual
Sample stage speed (mm/min)	0.01...500	0.01...500	0.01...500	0.01...500	-
Stage positioning resolution (µm)	0.016	0.016	0.26	0.26	-
Dimensions (cm)	L 33.3 * W 24.4 * H 62	L 33.3 * W 24.4 * H 62	L 33.3 * W 24.4 * H 62	L 33.3 * W 24.4 * H 62	L 27.5 * H 15.5 * H 39.2
Weight (kg)	16	13	11	11	5
Power supply (vac)	85...264	85...264	85...264	85...264	100...240
Power consumption (W)	13	13	13	13	7
Frequency (Hz)	47...440	47...440	47...440	47...440	50...60
Common Accessories					
Temperature control range (°c)	-20...+200	-20...+200	-20...+200	-20...+200	-20...+200
Stirrer	•	•	-	-	-
Software					
	OneAttension	OneAttension	Data receiver	Data receiver	Data receiver
System requirements					
Recommended system requirements	1 GHz processor, 1 GB ram, 40 GB hard disk drive (20 GB free), 1 usb port Accessories such as water bath and liquid dispenser may require a free rs-232 port				
Operating system requirements	Windows 7, 8 and 10 (32 or 64 bit)				

All specifications are subject to change without notice.

• : available – : not available/not applicable

About Us

Biolin Scientific is a leading Nordic instrumentation company with roots in Sweden and Finland. Our customers include companies working with life science, energy, chemicals, and advanced materials development, as well as academic and governmental research institutes. Our precision instruments help develop better solutions for energy and materials, and perform research at the frontiers of science and technology.

Biolin Scientific
[Progress Together]

Biolin Scientific AB
Hängpilsgatan 7, SE-426 77 Västra Frölunda
Phone: +46 31 769 7690 E-mail: info@biolinscientific.com
www.biolinscientific.com