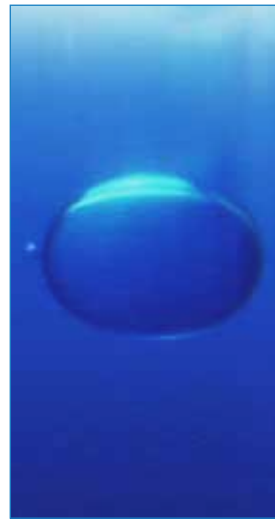
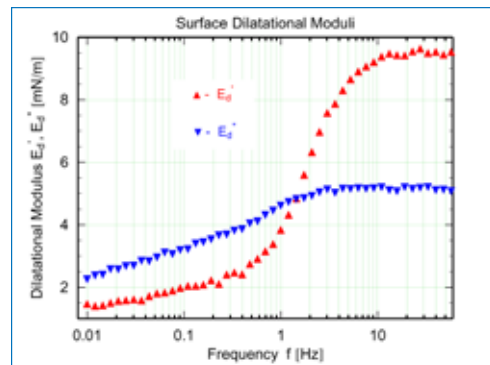


# SVT 20N

Spinning Drop Video Tensiometer





Surface dilatational modulus calculated at different frequencies

### Properties of the SVT 20N

The spinning drop video tensiometer **SVT 20N** is a special-purpose optical instrument for measuring high to extremely low interfacial tensions. A high-precise optics, a fast image processing system, a stroboscopic LED lighting, and an extremely high-dynamic, electronically commuted direct-drive combined with the very compact instrument design allows fast and precise results. This gives a decisive impetus to the research and development of membrane capsulated droplets and surfactants for various applications.

The various functions of the software packages SVTS 20, SVTS 21 and SVTS 22 in combination with the SVT 20N are:

- measurement of static, time-, and temperature-dependent interfacial tensions and dilatational elasticities between two not completely miscible liquids
- analysis of 2D and 3D extensional relaxation of visco-elastic liquids and liquid drops encapsulated or enclosed in membranes at varying speeds of rotation
- determination of yield stresses on liquid crystalline substances
- calculation of dispersive and polar contributions of liquids based on measured surface and interfacial tensions with error limits



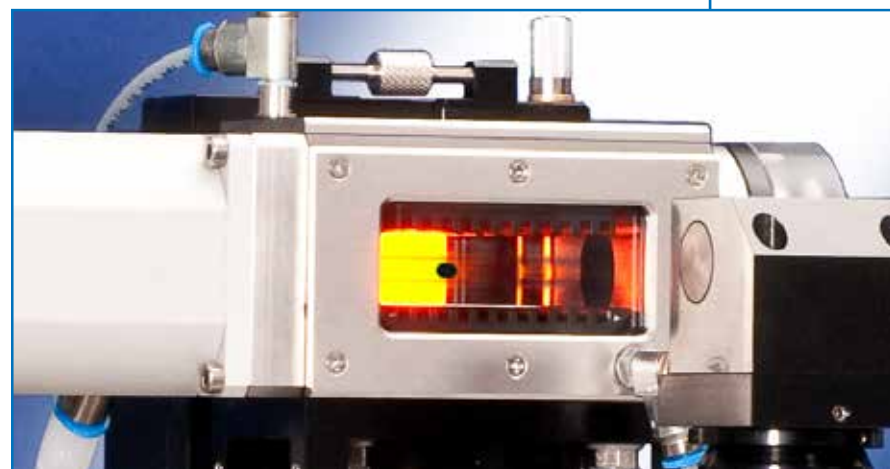
Spinning drop video tensiometer SVT 20N

### Standard components

- high-performance 6-fold power zoom lens with an integrated continuous fine focus and adjustable observation angle
- video measuring system with USB-camera (max. 123 images/s sample rate)
- software-controlled electronic tilting base for the measuring cell
- LED lighting with software controlled adjustable intensity and strobe frequency
- integrated touch screen for controlling basic functions
- automatic calibration function for correcting optical distortions caused by the capillaries (cylindrical lens effects)

### Optional complements and accessories

- easy mountable liquid/gas-temperature controlled measuring cell **MC-TFC 130**; temperature range -10 ... 130 °C
- easy mountable peltier/gas-temperature controlled measuring cell **MC-TPC 180**; temperature range -30 ... 180 °C;  $\pm 0.1$  K resolution with a heat up and cool down rate of  $\pm 1$  K/s,



Spinning drops in SVT 20N capillary



Fast exchange capillary FEC



Holder FEC-D with glass capillary DGC-T

### SVTS 20 – IFT

- video based measurement and presentation of the time and temperature-dependent interfacial tension
- presentation of measurement values as well as the storage of video sequences for the calculation of fast processes
- control of the rotational speed, the inclination of the tilting base with the measuring cell and the camera position
- calculation of interfacial tension based on spinning drop contours according to various methods including the Young-Laplace method
- automatic calibration of the magnification of the drop
- automatic “drop hold” function
- automatic temperature recording
- automatic compensation of density and refractive index as well as of temperature dependent changes
- statistical evaluations and error analysis
- liquids database

### SVTS 21 – Oscillation

- calculation of surface and interfacial tensions based on spinning drop contours, predefined speed increments and sinusoidal speed variations for relaxation measurements

- fast-exchangeable special high-temperature glass capillaries (up to 180 °C) **FEC 622/400-HT**
- holder **FEC-D** with cost-effective, fast-exchangeable glass capillary **DGC-T** or **DGC-M**
- calibration standard **DCS-SVT** made of polypropylene

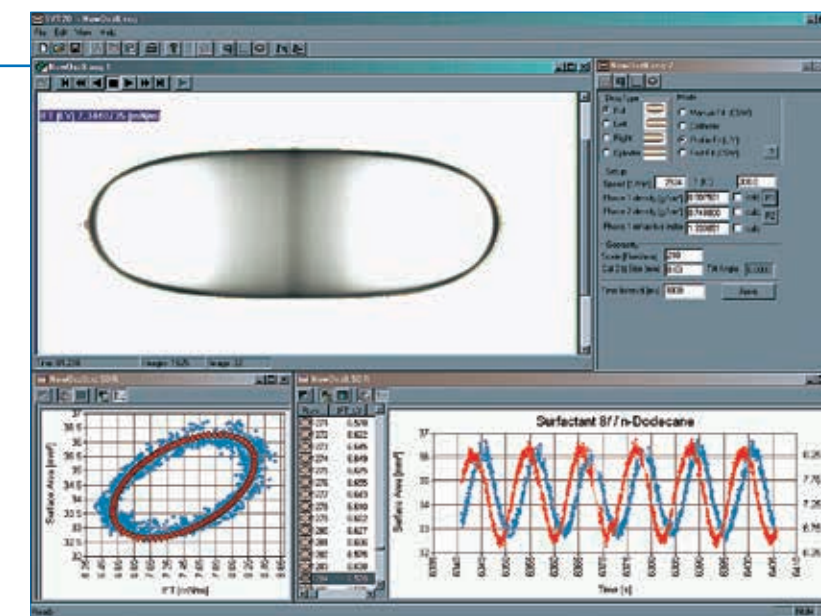
### Software for control, measurement, analysis and presentation

The **SVTS** software, developed for Windows® 7/XP®, is designed for simple use and fast access to all control elements and is available in the following modules:

- recording and evaluation of video sequences for analyzing fast relaxational oscillations and elongations of drops
- determination of dilatational interfacial elasticity of visco-elastic and viscoplastic materials

### SVTS 22 – Membrane covered drops

- determination of deformation and elasticity parameters of membrane covered or encapsulated spinning drops with contours deviating from corresponding Young-Laplace shapes
- calculation of the effective deformation in relation to spherical or ellipsoidal rest resp. reference contours
- calculation of centrifugal stresses as a measure of the membrane or capsule loads
- calculation of membrane resp. capsule elasticity parameters from the effective deformation measure and the centrifugal stress
- volume calculation by numerical integration over arbitrary, even strongly deformed but still axisymmetric drop resp. capsule contours



SVTS 20 and SVTS 21 – calculation of interfacial dilatational elasticity

## Technical data

Interfacial tension measuring range:	• $1 \cdot 10^{-6} \dots 2 \cdot 10^3$ mN/m
Rotational-speed range:	• 0 ... 20 000 rpm
Rotational-speed resolution:	• $\pm 0.001$ rpm
Speed long term stability:	• $\pm 0.5$ rpm
Maximum speed step (relaxational test):	• $\pm 2000$ rpm/s
Speed oscillation frequency:	• 0.01 ... 200 Hz
Tilt angle of capillary block:	• $\pm 10^\circ$ , resolution $\pm 0.0023^\circ$
Optics:	<ul style="list-style-type: none"> <li>• 6-fold zoom lens (0.7 ... 4.5 magnification) with integrated continuous fine focus (<math>\pm 6</math> mm) and high light transmitting capacity</li> <li>• LED lighting with software controlled adjustable intensity and strobe frequency</li> </ul>
Image processing system:	• USB-CCIR camera, max. pixel 768 x 576 resolution, max. sample rate 123 images/s,
Measuring methods:	<ul style="list-style-type: none"> <li>• Spinning Drop Method</li> <li>• Oscillating Spinning Drop Method</li> </ul>
Diameter of fast exchange capillary:	• outer 6.25 mm, inner 2.45 mm
Measuring cell options:	<ul style="list-style-type: none"> <li>• liquid/gas-temperature controlled measuring cell MC-TFC 130 for <math>-10 \dots 130</math> °C heat up and cool down rate dependent on liquid circulator bath</li> <li>• peltier/gas-temperature controlled measuring cell MC-TPC 180 for <math>-30 \dots 180</math> °C heat up and cool down rate of <math>\pm 1</math> K/s,</li> </ul>
Dimensions (L x W x H):	<ul style="list-style-type: none"> <li>• SVT 20N base unit: 420 x 290 x 370 mm</li> <li>• Power supply unit: 300 x 120 x 210 mm</li> </ul>
Weight:	<ul style="list-style-type: none"> <li>• SVT 20N base unit: 25 kg</li> <li>• Power supply unit: 10 kg</li> </ul>
Power supply:	• 100 ... 240 VAC; 50 ... 60 Hz; 450 VA

## Accessories

• liquid/gas-temperature controlled capillary chamber **MC-TFC 130** • peltier/gas-temperature controlled capillary chamber **MC-TPC 180** • fast-exchangeable high-temperature glass capillaries (up to 180 °C) **FEC 644/400-HT** • Holder **FEC-D** with cost-effective, fast-exchangeable glass capillary **DGC-T** or **DGC-M** • optical calibration standard **DCS-SVT** • dosing syringes **DS xx** • dosing needles **SNS xx** • dosing tubes **DT xx** • refrigerated/heating circulators

**For more information about a tailor made solution to your surface chemistry requirements, please contact us.**

**We will be pleased to provide a quotation, obligation free, for your instrument system.**

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