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DVT30

Drop Volume Tensiometer



A Landmark for the Measurement of Dynamic Interfacial Tension!

- Fully automatic measurement of dynamic interfacial tension
- Large measuring range of 100 to 0.05 mN/m
- High precision by using 1 capillary only
- No corrections of measured data necessary
- Preselectable temperature range of -10°C to 90°C
- Precise temperature measurement in test liquid
- Preselectable series of drop formation speeds
- Automatic cleaning cycles
- Easy to disassemble
- Software for WINDOWS™ 95/98/NT



DVT30: The measuring principle

Dynamic interfacial tension characterizes the diffusion and orientation behavior of surfactants and water-soluble polymers at interfaces.

The most important component of a drop volume tensiometer is the precision capillary connected to a dosing system. This is located in one of the two liquid phases involved. The dosing system forces the second liquid phase into the first liquid phase through the **precision capillary**. Depending on the particular liquid/liquid system and the flow rate a defined volume of liquid breaks up to form a different number of drops. Systems with a relatively low interfacial tension form a large number of small drops whereas systems with a relatively high interfacial tension form a correspondingly lower number of larger drops. During the drop formation at the tip of the capillary the forces are in equilibrium. When the drop reaches a size which is characteristic for the system it breaks away from the capillary. This drop volume is directly proportional to the interfacial tension between the two liquids.

The number of drops are measured by an infrared LED and a photodiode. From the flow rate and number of drops the tensiometer calculates the drop volume and therefore the interfacial tension for each drop as well as the mean value:

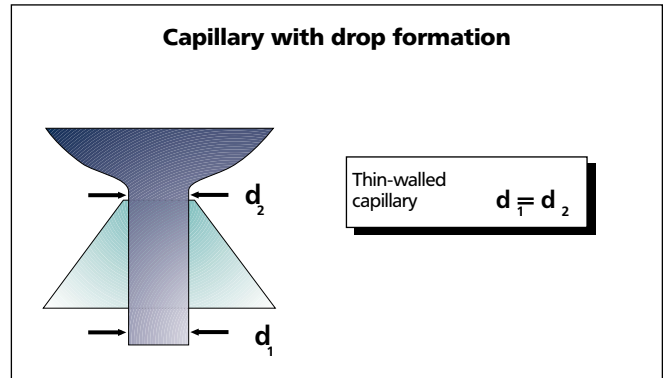
Interfacial Tension

$$\sigma_i = \frac{V_{\text{drop}} \cdot (\rho_H - \rho_L) g}{\pi d}$$

σ_i	= interfacial tension
V_{drop}	= volume of drop
ρ_H	= density of heavy phase
ρ_L	= density of light phase
g	= acceleration due to gravity
d	= diameter of capillary

The DVT30 has a special capillary tip with an extremely thin wall. The subsequent correction of the measured values, which is necessary for other makes of capillary with flat capillary tips, is no longer necessary.

Capillary with drop formation



The measuring instrument

The DVT30 offers fully automatic measurements at freely selectable dosing rates and temperatures. The special capillaries mentioned above allow **interfacial tension** to be **measured over the complete range from 100 to 0.05 mN/m** without having to make a correction for the measured value. Automatic cleaning cycles, measurement of the temperature directly in the sample liquid as well as an easily visible and well-illuminated capillary tip are standard. The exchange of individual com-

ponents such as tubing, tips or measuring cell is extremely simple and takes only a short time.

Either a specific lighter liquid can be pumped into a specific heavier liquid at a constant rate or vice versa, as selected. The operator selects the required dynamic range at the start of the measurement together with the number of measured dosing rates. The DVT30 measures the required number of drops completely automatically at the programmed rates.

Technical data

• Measuring range:	100-0.05 mN/m
• RSD:	<1%
• Temperature range:	-10°C to 90°C
• Drop Age:	0.1 - 10,000 sec
• Dimensions without liquid container (WxHxD in cm):	32 x 43 x 43
• Weight:	25.5 kg

Application

- **Emulsion techniques** such as in cosmetic industry, pharmacy, food processing etc. for characterization of suitable emulsifying agents.
- Manufacturers of surfactants for characterization of the **efficiency and dynamics** of these materials.
- Manufacturers of detergents, cooling lubricants etc. for **adjustment** of product properties as well as **removal, emulsification, demulsification** or **covering** of specific substances.



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