

# ViscoClock.

## If you need more accuracy:

The ViscoClock is the economically priced introductory model in the field of automatic viscosity measurements. Manual measurements with a stopwatch and a trained eye is therefore something of the past because time is money.

### The ViscoClock

The ViscoClock is an electronic time-measuring unit used to determine absolute and relative viscosity. It consists of a stand which is used to mount a viscometer and the electronic measuring unit. The two measuring levels are integrated in the stand made of high-quality PPA synthetic material, and the electronic measuring unit is included in a PP casing. The large LCD display allows the measured values to be read off easily.

### Range of use

The ViscoClock is designed for the use of an Ubbelohde viscometer, a Micro-Ubbelohde viscometer or a Micro-Ostwald viscometer made by SCHOTT Instruments. The ViscoClock automatically measures the flow-through time of temperature-stabilized liquids through the capillaries of the viscometer at temperatures ranging from  $-40\text{ }^{\circ}\text{C}$  to  $150\text{ }^{\circ}\text{C}$ .



For temperature stabilization in the thermostatic bath, the following tempering liquids are suitable: water, alcohol water (e.g. ethanol, methanol), paraffin oil, and silicone oil. Liquids can be measured that qualify for use with the viscometer being used in each instance.

### Accuracy

The most precise method used to determine the viscosity of liquids is their measurement in capillary viscometers; the ViscoClock functions according to this method. The operating time is indicated with a resolution of  $1/100$  sec. with quartz precision. The accuracy of  $0.01\%$  of the measured time used to calculate the absolute and relative viscosity is indicated as measuring uncertainty with a confidence level of  $95\%$ .

### Absolute viscosity

Only the calibrated viscometers made by SCHOTT Instruments are suitable for the calculation of absolute viscosity in the temperature-stabilized, transparent thermostatic bath.

### Relative viscosity

For the measurement and calculation of relative viscosity, all Ubbelohde viscometers, uncalibrated and calibrated, can be used for manual or automatic measurements.

*The ViscoClock can be used with any SCHOTT Instruments thermostats bath. The viscometer stand is included.*

# Technical data ViscoClock

<b>Measuring range - time</b>	up to 999.99 s; resolution 0.01 s
<b>Accuracy of time measurement</b>	$\pm 0.01$ s/ $\pm 1$ digit; however no more precise than 0.1 %; indicated as measuring uncertainty with a confidence level of 95 %
<b>Measuring range - viscosity</b>	0.35 ... 10,000 mm <sup>2</sup> /s (cSt) the absolute, kinematic viscosity is additionally dependent on the uncertainty of the numerical value of the viscometer constant and on the measuring conditions, in particular the measuring temperature
<b>Display</b>	5-digit LCD display, 20 x 48 mm (H x W), digit height 12.7 mm, seconds indication with 2 decimal digits after the decimal point, resolution 0.01 s
<b>Voltage supply</b>	low voltage U: 9 V
<b>Plug-in connection</b>	socket for low voltage connection: jack plug, internal contact $\varnothing = 2.1$ mm, plus pole at pin contact, for connection of a TZ 1848 or TZ 1859 power supply unit
<b>Power supply</b>	in accordance with class of protection III. degree of protection for dust and humidity IP 50 in accordance with DIN 40 050 power supply unit 230 V, 50-60 Hz (TZ 1848) power supply unit 115 V, 50-60 Hz (TZ 1859), with US-plug not suitable for use in areas subject to explosion hazards
<b>RS-232-C interface</b>	for connection of a printer with serial interface or of a computer (PC) for documentation of the data
<b>Plug-in connections</b>	4 pole circular plug, mini, DIN
<b>Configuration of RS-232-C interface, permanently set</b>	4800 baud, 7 bit word length, 2 stop bits, no parity; after each measurement, the measured value is transmitted automatically. the string of digits consists of 4 digits before the decimal point, 2 digits after the decimal point, and the terminating characters CR and LF.
<b>Ambient temperature</b>	+10 ...+40 °C for storage and transport
<b>Operating temperature</b>	stand: -40 ... +150 °C electronic measuring unit: +10 ... +40 °C
<b>Air moisture</b>	in accordance with EN 61 010, Part 1; max. relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % of relative humidity at a temperature of 40 °C
<b>Materials</b>	stand: polyphthalamide (PPA) casing*: polypropylene (PP) sealing membrane: silicone
<b>Dimensions</b>	approx. 490 x 95 x 50 mm (H x W x D)
<b>Weight</b>	approx. 450 g (without viscometer) power supply unit: approx. 220 g
<b>Country of origin</b>	Federal Republic of Germany
<b>CE symbol</b>	in accordance with Guideline 89/336/EWG (electromagnetic compatibility EMC): emitted interference in accordance with Standard EN 50 081, Part 1 interference immunity in accordance with Standard EN 50 082, Part 2, in accordance with Guideline 93/23/EWG (low voltage guideline), last altered by Guideline 93/68/EWG: Testing basis EN 61 010, Part 1
<b>Viscometer types</b>	Ubbelohde (DIN; ISO; ASTM; Micro), Micro-Ostwald
<b>Transparent thermostatic baths</b>	the ViscoClock can be used in every transparent thermostatic bath made by SCHOTT Instruments.

\* Use in heat carrier liquids can result in discoloration of the synthetic material. The discoloration does not, however, have any effect on the function and quality of the ViscoClock. DURAN® is a registered trademark of SCHOTT Glaswerke Mainz, Germany. Subject to technical changes.