

PORTABLE AND RUGGED VISCOMETER



**GRABNER
INSTRUMENTS**

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MINIVIS 445

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Features

- Excellent correlation to ASTM D445 and ISO 3104
- Viscosity index (ASTM D2270)
- Viscosity range of 0.2 - 2000 mm²/s (mPa.s)
- Only 25 mL sample
- Only 3 min. turnaround time for a sample with 100 cSt at 40°C
- Fast thermoelectric temperature control (Peltier)
- Automatic sample introduction
- Wide temperature range -20 to 110°C
- Automatic programmable cleaning cycles

Rugged, fast and easy to use viscometer

The MINIVIS 445 is an automatic, portable Mini-Viscometer for the precise determination of the viscosity in laboratories as well as in the field (mobile laboratories) with excellent correlation to standard ASTM D445 capillary viscometers.

The easy to operate instrument offers the combined measurement of kinematic and dynamic viscosity, as well as the density of the sample.

With a rugged metal housing it is the first choice for heavy duty environments and can be powered from a 12 V vehicle battery for field applications. Easy to clean measuring cells avoid any down time.



TECHNICAL DATA

Measuring range	kinematic (dynamic) viscosity: 0.2 - 2000 cSt/mm ² /s (mPa.s) density: 0.62 to 2 g/cm ³
Resolution	viscosity: 4 significant digits density: 0.0001 g/cm ³
Temperature range	0 - 110 °C (32 - 230 °F) with built-in thermoelectric Peltier system down to -20 °C (-4 °F) with 4 °C water counter cooling
Repeatability	viscosity: 0.3 % of measured value density: 0.0005 g/cm ³ thermostat: 0.02 °C
Required sample volume	25 mL
Sample throughput at constant temperature	20 samples per hour, including rinsing samples with 100 cSt/mm ² /s (mPa.s)
Sample throughput Viscosity Index	4 samples per hour (each measured at 40 °C and 100 °C)
Environmental conditions	temperature: +5 to 35 °C (40 to 95 °F) relative humidity: 10% to 90% r.h., non condensing
Interfaces	2 RS232 interfaces for printer and PC 1 interface for external keyboard
Power supply	100 - 240 V AC, 50/60 Hz, 85W (field application: 12V/4A DC)
Dimensions / weight	W x H x D: 200 x 320 x 240 mm (7.8 x 12.6 x 9.4 inch) / 11 kg

Improvement through Innovation

Design of the Instrument

The MINIVIS 445 is a combination of a rolling ball viscometer cell, an oscillating density meter and an automatic filling system. A fully automatic measurement of the kinematic viscosity can be performed within a wide temperature range from -20 to 110 °C and a viscosity range of $0.2 - 2000$ mm²/s.




The rugged measuring cell and the use of reflection sensors make it possible to cover a wide range of applications. Dark liquids such as used oil, heavy-oil, black ink and blood can be measured with highest accuracy and repeatability.

The extremely small sample volume and the straightforward measuring cell design eliminate the usual cleaning problems of capillary and rotational viscometers.

An automatic rinsing cycle with solvent or a new sample cleans the entire system. Due to its bayonet enclosure the viscosity cell is also easily removable for cleaning in an ultrasonic bath. The instrument is delivered with 2 viscosity cells to avoid any down time during cleaning.

The large, illuminated graphic display makes it easy to read the results, even under poor light conditions.

The MINIVIS 445 is available as a fully integrated system with automatic sample feeding and rinsing, with a built-in density measurement cell for kinematic and dynamic viscosity.

MINIVIS 445 FOR KINEMATIC/DYNAMIC VISCOSITY MEASUREMENTS	
	viscosity measurement cell
	density measurement cell for kinematic viscosity calculation
	automatic sample introduction for fully automated measurement

Measuring Principle

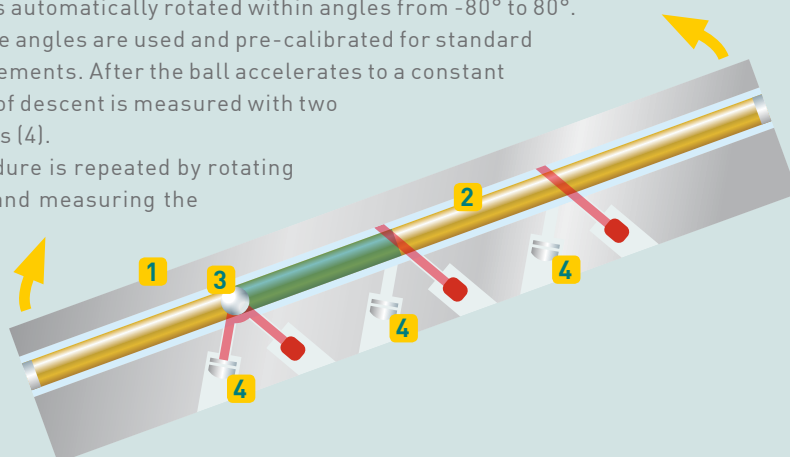
The measuring chamber (1) is a rugged glass tube (2) containing a metal ball (3).

The sample is fed into the glass tube by the automated sample introduction system or manually with a syringe. The temperature of the whole sample cell as well as of the sample introduction system is controlled by a thermoelectric (Peltier) system.

The sample cell is automatically rotated within angles from -80° to 80° .

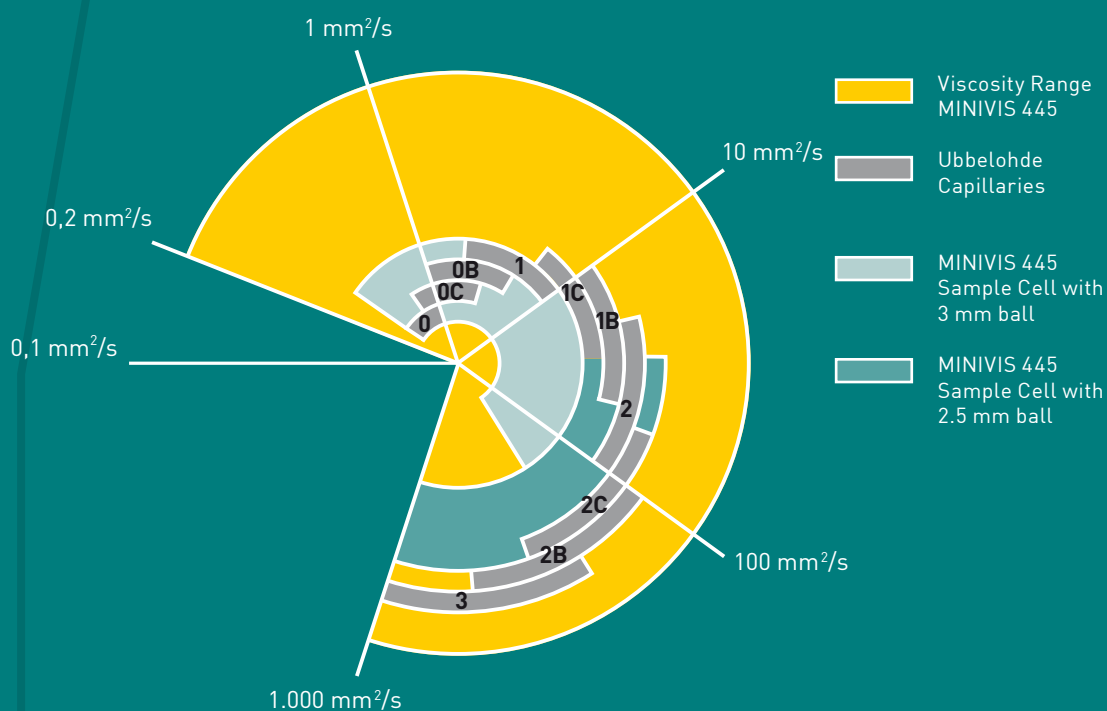
In this range three angles are used and pre-calibrated for standard viscosity measurements. After the ball accelerates to a constant velocity the time of descent is measured with two reflection sensors (4).

The whole procedure is repeated by rotating the sample cell and measuring the opposite direction.



MINIVIS 445

COMPARISON	MINIVIS 445	CAPILLARY VISCOMETERS
Instrument	rugged, portable, small, lightweight	large bench top analyzers with fragile glassware
Turnaround Time	only 3 min for viscosity & density	15-30 min for viscosity only
Temperature Control	built-in Peltier system	large water baths
Sample Introduction & Cleaning	fast & fully automated	time consuming manual procedure
Covering Viscosity Range (see diagram below)	two measuring cells	up to 12 capillaries



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