

The right temperature worldwide

**LAUDA**



Revolutionary viscometer DVS 1 measures dynamic viscosity and density of liquids at once.

**NEW**

**LAUDA**  
**Viscometer DVS 1**

Product information

# LAUDA Viscometer DVS 1

The LAUDA viscosity measuring system DVS 1 has been optimised specifically for the measurement of viscosity and density, especially of the smallest samples. The new measuring method and uncomplicated handling enable shorter measuring times than is the case with conventional viscometers. Thanks to the self-explanatory user guide, the simple measuring cell and

the compact structure of the instrument, the instrument is suitable for both R&D laboratories and the quality control of many liquids with approximate Newtonian flowability over a very wide viscosity range. The prerequisite for this is always the combination with a LAUDA thermostat from the Ecoline Staredition range.

## A new, pioneering measuring method

The viscosity measuring system DVS 1 by LAUDA calculates the dynamic viscosity and the density of liquids at once from the damping of a sphere oscillating in a test sample. Unlike rotation viscometers, this globally-unique method enables viscosities less than 1 mPas to be measured as precisely as viscous substances up to 1000 mPas.

The high level of accuracy, thanks to the very gentle measuring technique due to the small amplitudes, the small amount of samples amounting to only a few millilitres and the extremely simple operation via the separate remote control Command, turn this unit into an all-round measuring instrument.

### Example: flowability of crude oil through pipelines

The viscosity of crude oil flowing through above-ground pipelines varies with the ambient air temperature and climatic conditions.

#### Solution:

In order to re-regulate the power of the feed pumps corresponding to the dynamic viscosity, the temperature dependency of the dynamic viscosity of the oil must be known via the relevant temperature range. On the whole, 3 to 4 measuring points between 10 and 40 °C are sufficient to fit a functional dependence. With the DVS 1 and a thermostat RE 305, this dependence can be determined in a few minutes. The change of the density is determined at the same time. Measurements can also be taken of very small samples or used, worn oils.

The instrument reveals its advantages especially in those cases when standard viscometry fails, such as with glass capillaries, i.e. pigmented inks, foaming samples, biological or medical samples which are available in small amounts.

Even with polymer solutions, the level of precision is sufficient to make dissolving processes visible. Advantageous in this case is that a gold coating of the sensor achieves a high degree of resistance to solvents, which enables e.g. the use of acetone, dichloromethane as solvent/rinsing agent. Of course the measurements are corresponding to the GLP guidelines.

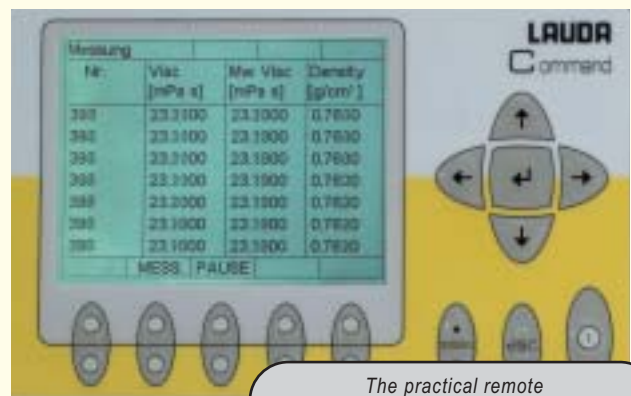


## Simple operation, even for the smallest samples

The oscillating sphere is located in a thermostated, cylindrical measuring cell. Background illumination allows to observe the measuring operation and to control the cleaning. The Pt 100-temperature probe located in the measuring cell surveys the precise temperature to the thermostat necessary for the measurement. Via the RS 232-interface, this sets the measuring cell temperature to the predetermined set value. Using a 2ml disposable syringe, the sample is inserted into the measuring cell via an ergonomically designed injection block. There, an overflow guarantees a constant liquid level. Following the measuring process, the sample is simply drawn back up into the syringe and is available for further tests. Cleaning also takes place by means of injecting solvent. A better way of observing the cleaning effect than via the observation window is by controlling the viscosity of the solvent. Following the blowing-out of the rinsing agent via an integrated membrane pump, the measuring cell is then dry, ready for the next measurement.

### Intuitive remote control

The external, handy remote control Command with its large, graphic display, can be used intuitively without any special knowledge. The measuring values (dynamic viscosity/density/temperature) are recorded in dependence with the time and reproduced on the display. Without having to take a detour via the PC, the remote control with its self-explanatory menu-driven operation offers an optimum degree of user-friendliness in order to take measurements as easily as possible at the touch of a button, to display the measuring results.



The practical remote control Command replaces the PC.

## Advantages of the new measuring opportunities

- Dynamic viscosity between 0.3 mPas and 50 mPas, 0.3 and 200 mPas, between 2 and 1000 mPas, as desired
- Precision better than 1 % of the measuring value; reproducibility <0.5 %
- Recalibration with standards possible
- Tabular representation of the dynamic viscosity, density, duration of the measurement and measuring temperature
- Storage of up to 200 measuring results plus the accompanying parameters
- Numeric description of the sample determined by the user
- Output of the measuring values on optional printer or PC (optional data transmission program required) via RS 232-interface
- Highly-precise temperature recording and control of the measuring cell by means of the Pt 100-temperature probe and the LAUDA Ecoline Staredition
- Small samples of only 2ml are sufficient
- Charging of sample and rinsing agent by means of standard commercial disposable syringes via ergonomically-designed injection block
- Control of the cleaning effect via the viscosity of the rinsing agent
- Integrated membrane pump for drying the measuring cell
- Handy, robust instrument also suitable for mobile use

# Technical Data DVS 1

Optionally, the measuring values can be printed out on a printer or output via a data transmission program to a PC by RS 232-interface. A suitable LAUDA thermostat from the Ecoline Staredition range with control head E 300 is necessary for the operation.

Technical Data DVS 1		
Measured value		Dynamic viscosity, density
Measuring method		Attenuation of a bead oscillating in the sample
Measuring range of the dynamic viscosity	mPas	0.3 to 1000
– Resolution	mPas	Range: 0.3 to 10 : 0.001 Range: 10 to 100 : 0.01 Range: 100 to 1000 : 0.1
Measuring range of density	g/cm <sup>3</sup>	0.3 to 2
– Resolution	g/cm <sup>3</sup>	0.001
Temperature range	°C	5 up to 110
Temperature measurement		By means of integrated Pt 100 connection to the LAUDA E 306, RE 304 or RE 305
– Resolution	°C	0.01
– Precision	°C	+ 0.1
Display	mm	320 x 240 graphic display, 11 x 40 symbols
Display modes		Tabular; dynamic viscosity, density, temperature as a function of the measuring duration
Selection of measuring modes		Menu controlled
Parameter input		Menu controlled
Sample description		Numerical
Measuring point distance	s	Selectable, 1 to 120
Measuring value		Max. 200 results, with date and time
Duration of experiment (at constant temperature)	min.	Min. 3 to 10 (depending on the measuring point density, per viscosity measuring)
Interfaces		RS 232
Documentation		Printer or PC (optional)
Data transmission software		For PC under WINDOWS 98 and higher (optional)
Weight	kg	7.0
Dimensions (WxDxH)	mm	280 x 250 x 290
Power supply	V	90 to 264

## Standard equipment

- ❖ 2 ml disposable syringes
- ❖ Set of 5cm test glasses

## Further equipment

- ❖ Protocol printer with accessories
- ❖ Data transmission software for PC under WINDOWS (optional)

## Necessary equipment

- ❖ LAUDA Ecoline Staredition thermostat, depending on the application, e.g. the RE 305 for fast temperature changes, the E 306 or RE 304 for permanent use at 100 or at 20 °C. Operation without a suitable LAUDA thermostats is not possible.



A protocol printer and appropriate syringes can be supplied.

Further viscosity measuring systems on demand.