

P 1.8.3

Viscosity

- P 1.8.3.1 Assembling a falling-ball viscosimeter to determine the viscosity of viscous fluids
- P 1.8.3.2 Falling-ball viscosimeter: measuring the viscosity of sugar solutions as a function of the concentration
- P 1.8.3.3 Falling-ball viscosimeter: measuring the viscosity of Newtonian fluids as a function of the temperature



Falling-ball viscosimeter after Höppner (P 1.8.3.2)

The falling-ball viscometer is used to determine the viscosity of liquids by measuring the falling time of a ball. The substance under investigation is filled in the vertical tube of the viscosimeter, in which a ball falls through a calibrated distance of 100 mm. The resulting falling time t is a measure of the dynamic viscosity h of the liquid according to the equation

$$\eta = K \cdot (\rho_1 - \rho_2) \cdot t$$

ρ_2 : density of the liquid under study,

whereby the constant K and the ball density ρ_1 may be read from the test certificate of the viscosimeter.

The object of the first experiment is to set up a falling-ball viscosimeter and to study this measuring method, using the viscosity of glycerine as an example.

The second experiment investigates the relationship between viscosity and concentration using concentrated sugar solutions at room temperature. In the third experiment, the temperature-regulation chamber of the viscosimeter is connected to a circulation thermostat to measure the dependency of the viscosity of a Newtonian fluid (e. g. olive oil) on the temperature.

Cat. No.	Description	P 1.8.3.1	P 1.8.3.2	P 1.8.3.3
379 001	Guinea-and-feather apparatus	1		
336 21	Holding magnet with clamp	1		
200 67 288	Steel ball, 16 mm dia., for 371 05	1		
336 25	Holding magnet adapter with release	1		
575 471	Counter S	1		
510 48	Pair of magnets, cylindrical	1		
300 01	Stand base, V-shape, 28 cm	1		
300 44	Stand rod, 100 cm	1		
300 41	Stand rod, 25 cm	1		
301 01	Leybold multiclamp	1		
301 11	Clamp with jaw clamp	1		
672 1210	Glycerine, 99 %, 250 ml	6		
311 77	Steel tape measure, 2 m	1		
590 08	Measuring cylinder, 100 ml, plastic	1*		
311 54	Precision vernier callipers	1*		
667 793	Precision electronic balance LS 200, 200 g : 0.1 g	1*		
665 906	Falling-ball viscosimeter C		1	1
313 07	Stopclock I, 30s/15min		1	1
666 768	Controlled-temperature recirculation unit, 30 ... 100°C			1
666 7703	Pump set			1
667 194	Silicone tubing, int. dia. 7 x 1.5 mm, 1 m			2

* additionally recommended