Anton Paar

Lovis 2000 M/ME

Microviscometer

Lovis 2000 M/ME …

… is a rolling ball viscometer which unites an established measuring principle (Höppler, DIN 53015 and ISO 12058) with innovative and performance-enhancing features. More than 25 years of experience make Lovis 2000 M/ME a highly precise, versatile and time-saving viscometer. **Lovis 2000 M/ME can be what you need it to be:**

Powerful, versatile microviscometer for R&D:

- Small sample amount (as low as 100 µL)
- Sample recovery
- Wide temperature range (-30 °C to 100 °C /-22 °F to 212 °F)
- Wide viscosity range (0.3 mPa.s to 10,000 mPa.s)
- High accuracy
- Variable inclination angle for testing shear-dependent flow behavior

Examples:
- Polymer & biopolymer solutions
- Nanomaterials in solution
- Ionic liquids
- Battery electrolytes

Time-saving, highly precise viscometer for pharmaceutical and medical labs:

- Included in US Pharmacopoeia
- Pharma qualification packages available
- Optional modular combination with Anton Paar instruments for measuring density, refractive index, turbidity, and pH value
- Flow-through filling for large sample throughput

Examples:
- Hyaluronic acid
- Nasal sprays, ear drops
- Blood plasma and biological liquids
- Infusion liquids and contrast media
- Microcrystalline cellulose
- Protein solutions & DNA

All-round viscometer for the chemical industry:

- Hermetically closed system for volatile or toxic samples
- High chemical resistance (borosilicate glass or PCTFE)
- Special polymer measuring and evaluation features
- Automatic filling using autosampler
- Testing of opaque samples

Examples:
- Polymer solutions
- Printer ink, inkjet ink
- Solvents
- Acids, bases

Touchscreen

The color touchscreen display makes user interaction easy. The flexible instrument software allows you to adapt the display to each measuring method. Set your favorites for quick access to your most important functions.

Capillary block

The auto-angle function and auto-distance function optimize the duration and stability of your measurement. The moving capillary block covers an angle range from 15° to 80° in either direction. Lovis 2000 M/ME also displays shear rate and supports automated zero-shear viscosity extrapolation.

Air cooling

Peltier elements provide fast and stable temperature control. The built-in fan provides sufficient air cooling for measuring temperatures as low as 5 °C (41 °F).

Flow-through filling

Use flow-through filling to enhance your sample throughput. Even in manual operation, flow-through filling makes your work easy: Just fill the syringe, plug it into the filling support and fill the sample into the system.

Option Low Temperature

Use the Option Lovis 2000 M/ME Low Temperature to reach a minimum temperature of -30 °C (-22 °F).

Versatile capillaries

Standard length capillaries are suitable for flow-through filling or for manual filling outside the capillary block. For small sample amounts as low as 100 µl, use short capillaries.

Capillaries are available made of borosilicate glass or PCTFE. Break-proof PCTFE capillaries enable you to test chemicals as aggressive as hydrofluoric acid.

One Viscometer – Many Combinations

Lovis 2000 M

The stand-alone viscometer determines the dynamic*, kinematic*, relative and intrinsic viscosity of liquids.

Lovis 2000 ME is a small measuring module which can be inserted into a DMA M density meter for combined measurement of density, kinematic viscosity and dynamic viscosity.

Lovis 2000 ME + DMA M density meter

Lovis 2000 ME + DMA M density meter + Xsample

This combined system determines the density, kinematic viscosity and dynamic viscosity of up to 96 samples fully automatically. Combinations with other parameters such as sound velocity are also available.

Lovis 2000 M + Abbemat refractometer

This combination allows you to determine kinematic*, dynamic* and intrinsic viscosity as well as refractive index.

Extend the measuring temperatures of Lovis 2000 M/ME down to the low range. Depending on ambient conditions, it is possible to reach -30 °C (-22 °F).

Lovis 2000 M + Option Low Temperature

Lovis 2000 M + pH ME

This combination determines kinematic*, dynamic* and intrinsic viscosity as well as the pH value.

*) with known density

Specifications

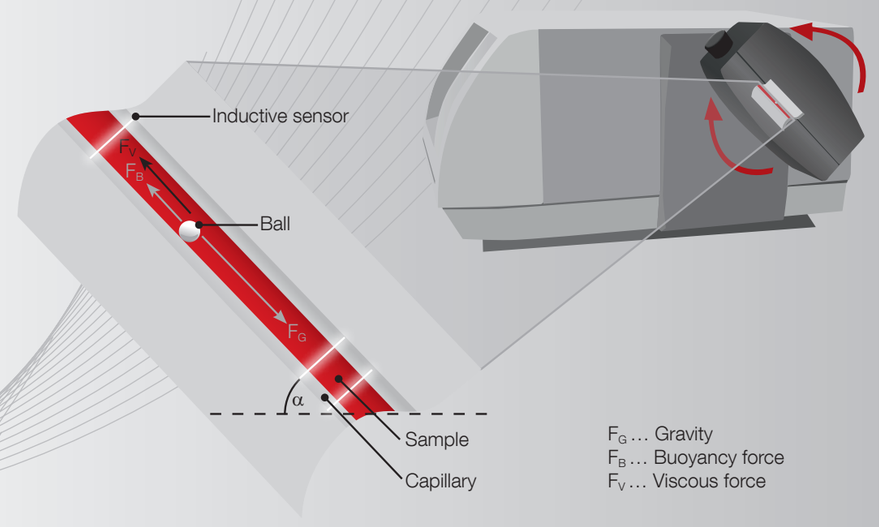
		Lovis 2000 M	Lovis 2000 ME & DMA M
Measuring range			
Parameters	Dynamic viscosity	0.3 mPa.s to 10,000 mPa.s	
	Inclination	15° to 80° in 1° steps	
	Shear rate	0.5 s^{-1} to 1000 s^{-1} influenced by capillary size and inclination	
	Density	-	0 g/cm³ to 3 g/cm³
Temperature	Viscosity	+5 °C to 100 °C (41 °F to 212 °F) [1] (without Option Low Temperature) -20 °C to 100 °C (-4 °F to 212 °F) [1] (with Option Low Temperature)	
	Density	-	0 °C to 100 °C (32 °F to 212 °F)
Precision of Lovis 2000 M/ME			
Temperature	Repeatability s.d.	0.005 °C	
	Accuracy	0.02 °C	
Inclination	Repeatability s.d.	0.02°	
	Accuracy	0.1°	
Measuring time	Resolution	0.001 s	
	Accuracy	0.05 %	
Viscosity	Repeatability s.d.	0.1 % [2]	
	Accuracy	0.5 % [3]	
Further specifications			
	Test duration	minimal 30 s, typical 3 min	
	Sample volume	0.1 mL to 0.8 mL	1 mL to 3 mL
	Dimensions (L x W x H)	482 mm x 420 mm x 231 mm	
	Weight	17.0 kg	27.3 kg
	Power supply	AC 100 V to 240 V; 50 Hz to 60 Hz; 190 VA	

[1] specified temperatures are valid for a max. ambient temperature of 35 °C (95 °F). Lower measuring temperatures are achieved in lower ambient temperatures and/or with special equipment. | [2] verified with a 1.59 capillary at 70° angle and Ethanol 96 % at 20 °C using the same ball for all repeated measurements. | [3] verified with a 1.59 capillary with a single-point adjustment performed on site at 70° angle; adjustment and all measurements performed with distilled water at 20 °C with the same ball.

DMA (EM013414867), Xsample (EM013856059)

Rolling-ball measuring principle

A ball rolls through a liquid-filled capillary that is inclined at a defined angle. Three inductive sensors measure the ball's rolling time through transparent and opaque liquids between defined marks. The liquid's viscosity is directly proportional to the rolling time.



F_G … Gravity
F_B … Buoyancy force
F_V … Viscous force

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