

||||| **Viscometer** – For the measurement
of kinematic viscosity



Precise measuring instruments to meet the highest demands

Precision, flexibility, and reliability – LAUDA Scientific offers proven solutions for viscosity measurements in research, quality control, polymer chemistry, and petrochemistry.

Modularity as well as a wide range of accessories allows you to configure measuring systems that can be used for a variety of applications in compliance with international standards. User and application specific solutions result in the highest level of safety and reproducibility.

Take advantage of our expert consulting services, assisting you with your application, at our corporate

headquarters in Lauda-Königshofen or one of our subsidiaries or agencies worldwide.

Our specialists and distribution partners will work with you to put together a system which meets your individual requirements – no matter if you plan a new installation or an upgrade of your existing unit.

But our support goes far beyond that: With our service and maintenance plans we make sure that you can rely on consistent results, year after year, independently from the solvents you use.



Custom configurations for all applications and standards

LAUDA Scientific offers an extensive viscometry portfolio. From crude oil to polymers and plastics: Our customized configurations are optimized for all relevant applications and according to the respective norms.

Applications for the polymer industry

Technical polymers

- Viscosity number of polyamides (PA) and polybutylene terephthalates (PBT)

DIN EN ISO 307
DIN EN 1628-5

Transparent polymers

- Viscosity number and IV value of polyesters (PC, PMMA, PET)

DIN EN 1628-4
DIN EN 1628-5
DIN EN 1628-6

Polyolefins

- Molar mass and IV value of polypropylene and polyethylene

DIN EN 1628-3

Polyvinyl chlorides

- IV value determination according to Fikentscher

DIN EN 1628-2
DIN EN 922

Medical polymers

- Molar mass and IV value of hyaluronic acid products and absorbable polymers compliant with pharmaceutical standards

European Pharmacopeia
DIN EN ISO 1628-1

Cellulose and papers

- Degree of polymerization of insulating paper using solution viscosity

IEC 60450
DIN 54270-1/-2/-3



Oil, lubricants, and other applications

Lubricants and fuels

- Viscosity index and kinematic viscosity of motor oils SAE/ISO at application temperatures
- Low temperature characteristics (paraffin formation) of motor oils, diesel, and kerosine

ISO 2909
ASTM D 2270

ASTM D 2532
ASTM D 445

Insulating oils

- Kinematic viscosity of transformer oils

DIN 51562
ASTM D 445

Oil transport

- Pumpability of crude oils

ASTM D 445

Wax, resins, silicones, and polyols

- Absolute kinematic and dynamic viscosity of highly viscous liquids and their temperature dependence

ASTM D 445
DIN 51562



LAUDA Scientific viscosity measuring system



Modules

The compact, easy-to-use iVisc or the modular processor viscosity system PVS – LAUDA Scientific can offer you the right technology for just about any application.



iVisc Capillary viscometer

- || Precise and reliable optical meniscus detection
- || Intuitive software or start/stop button
- || "Plug & Play" installation
- || Up to two iVisc can be used in parallel with one PC
- || Computer control and power supplied via USB
- || Measuring temperature from -20 to 150 °C



PVS Viscometer basic module

- || Suitable for Ubbelohde, Micro-Ubbelohde, Cannon-Fenske-Routine, Micro-Ostwald capillaries
- || Highly flexible and upgradable
- || Exact time measurement to the millisecond
- || Processor-controlled infrared (NIR) detection
- || Control unit can be extended with insert cards for additional S 5 stands, VRM modules, MT dosing systems and motor locks



VRM cleaning module

- || Fully automatic cleaning and drying of the viscometers
- || High level of safety-at-work by avoiding contact with hazardous chemicals
- || Inert and corrosion-free, even for the most aggressive solvents
- || Individual specification of the cleaning process using PC software



VAS fully automatic sampler 15/2 and 24/4

- || Automatic handling and filling of the capillaries
- || Optimized for high sample throughput
- || Easy to program sample processing
- || Software integration of automatic sample preparation
- || Flexible assignment of processing priorities

LAUDA Scientific accessories



Glass viscometers, viscothermostats, sample preparation

Viscothermostats from LAUDA Scientific are the optimal solution for standardized, precise temperature control thermostating all LAUDA glass capillary viscometers and automatic viscometers.



Glass capillary viscometer

- || Viscosity measurement with Ubbelohde, Cannon Fenske, and Micro-Ostwald capillary viscometers
- || Ring marks without detection disturbance
- || Corrosion-resistance labelling
- || Ubbelohde for dilution series with calibration certificate and filter frit



Viscotemp and Proline PV/PVL

- || Robust stainless steel baths with 15 to 44 liter bath volume
- || Proline PV/PVL with double chamber system for constant liquid level
- || Cover plates for up to 6 automatic or 12 stop watch measuring stations
- || Multi-glazing with optional heating to avoid condensation
- || Can be combined with LAUDA coolers for low temperatures



Viscocoool 6

- || Viscocoool 6 with Peltier technology for smallest bench space
- || Temperature range 15 to 90 °C without external cooling
- || Easy setup for quick cleaning
- || Controllable variopump for perfect homogeneity

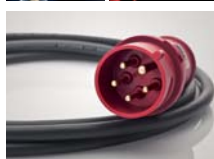
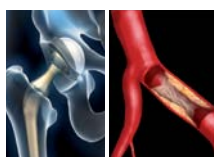


Sample Preparation

- || Automatic weighing and dosing of polymer solutions
- || Precise concentration control by automatic of solvent dosing
- || Minimizes contact with aggressive solvents

Comprehensive solutions

For the analysis of polymers and plastics



Easy to operate and compact: automatic, space-saving **iVisc** – your start with professional viscometry



For quality control and routine tests of polymers, recycled materials, and end products

- || Very bench-space sensitive by combining iVisc and Viscocool 6
- || Peltier-based, highly precise temperature control from 15 to 90 °C
- || Exceptional temperature stability < 0.01 °C without external cooling
- || Ideal platform for flexible polymer characterization
- || Comprehensive calculation algorithms already integrated
- || Sample throughput 2 to 4 samples per day

Modular solution: **PVS**, the processor viscosity system – flexible and upgradable



For determining Staudinger indices of hyaluronic acid products and other medical polymers

- || PVS 1/2 with up to 2 measuring stands S 5, Viscotemp ET 15 S, and dosing unit for determining concentration series
- || Automatic cleaning and drying
- || Software module for controlling concentration series and automatic IV number and molar mass determination
- || Meets GLP standards, e.g. for use in the pharmaceuticals industry
- || Sample throughput 2 to 6 samples per day



Automatic determination of intrinsic viscosity at 135 °C for polyolefins like polypropylene and polyethylene

- || PVS 1/2 with two measuring stands S 5 in viscothermostats PV 15 with dosing unit and integrated magnetic stirrers
- || Automatic cleaning and drying
- || Software module for automatic analysis
- || Meets GLP standards, e.g. for use in the pharmaceuticals industry
- || Sample throughput 2 to 6 samples per day
- || High level of operational safety through automatic processes



Fully automatic measurement of viscosity numbers in production control

- || PVS 1/4 with 4 measuring stands S 5, VAS automatic sampler and VRM cleaning modules
- || Automatic determination of polymer chain length
- || Fully automatic sample handling including active cleaning
- || Sample preparation, can be integrated into software control
- || Quality tests which meet all relevant norms and standards, even in multi-shift operation
- || Sample throughput 30 to 70 samples per day
- || Will accept up to 41 sample containers

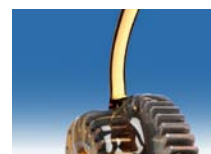
Comprehensive solutions

For determination of absolute viscosity of oils and other Newtonian liquids

Highest cost and handling efficiency based on **iVisc**

Quality control, research and development of lubricants

- || iVisc and Viscotemp 18 G are a budget and bench-space sensitive way to measure viscosity
- || Precise measurement in accordance to ASTM D 445 at temperatures between 40 and 100 °C
- || Compatible with Ubbelohde and Cannon-Fenske viscometers
- || External cooler for measurements at 20 °C (optional)
- || Sample throughput 1 to 5 samples per day



Flexible solution based on the modular viscometer **PVS**

Temperature-dependent viscosities of silicones, polyols, and other highly viscous liquids

- || PVS 1/2 with two measuring stands S 5 and VRM cleaning modules in Viscotemp 15 S
- || Viscotemp 15 G with DLK 10 for temperatures from 10 to 105 °C
- || Software module for measurement of temperature dependency
- || Can be extended to 8 measuring stands
- || Sample throughput 5 to 10 samples per day



Viscosity index measurement of oils in accordance with ASTM D 2270 and ISO 2909 with full ASTM D 445 compatibility

- || Up to 8 measuring stands S 5 in 2 viscothermostats PV 24 for temperatures from 10 to 150 °C
- || Simultaneous measurements of 4 samples at a time at 40 and 100 °C
- || Automatic cleaning with toluene, benzine etc. as well as drying without removal of viscometers
- || Full viscosity range of 1 to 2000 mm²/s without exchanging viscometer
- || Sample throughput 20 to 60 samples per day



Low temperature measurement of kerosine, motor oils, and brake fluids

- || PVS 1/2 with 2 (optionally 4) measuring stands S 5 in low temperature viscothermostat Proline PVL 15 or PVL 24
- || Heatable five-fold glazing to avoid fogging
- || Cold trap for dry and clean air supply
- || Automatic cleaning and drying at 0 °C using benzine and acetone
- || Software-controlled temperature profiles down to -60 °C
- || Sample throughput 4 to 8 samples per day





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