

# LAUDA Glass capillary viscometers

Viscosity measuring with Ubbelohde, Cannon-Fenske and Micro-Ostwald capillary viscometers



## Application examples






- Determining the viscosity number, intrinsic viscosity (mean molar mass) and other parameters of technical polymers such as PA, PET, PBT, PE, PP and PVC in accordance with EN-ISO 1628, ISO 307 for the quality control of plastics
- Measuring absolute viscosities of engine oils and other lubricants in accordance with ASTM D445, viscosity index in accordance with ISO 2909 at 40 and 100 °C

## Accurate and standard-compliant

Glass capillary viscometers are available in various designs, which differ with respect to application area, accuracy and operation. As of now, they can be supplied by LAUDA in the Ubbelohde, Cannon-Fenske, Micro-Ostwald and special designs. For high-precision, automatic measuring, the Ubbelohde version with the suspended level is preferred, among other reasons because the flow time is independent of the precise sample

volume. To keep the measuring times within the optimum range between approx. 60 and 600 s, different capillary diameters are supplied to cover the complete viscosity range. The procedure, particularly with automatic LAUDA measuring technology and precise temperature control using LAUDA clear-view thermostats, is unrivaled in terms of accuracy for measuring liquids with nearly Newtonian (ideal) flow properties.

# Your advantages at a glance

+	The glass capillary viscometer advantages	Your benefits
	<ul style="list-style-type: none"> <li>• Ring marks with no detection disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• Precise, positioned, NIR permeable ring marks with exactly 40 mm clearance. The capillary constant is valid for stopwatch and automatic measuring systems.</li> </ul>
	<ul style="list-style-type: none"> <li>• Corrosion resistant labelling</li> </ul>	<ul style="list-style-type: none"> <li>• There is no risk of abrasion or etching off of the labeling even with the use of strong acids and aggressive solvents used as samples or cleaning agents.</li> </ul>
	<ul style="list-style-type: none"> <li>• Ubbelohde for dilution series with calibration certificate and filter frit</li> </ul>	<ul style="list-style-type: none"> <li>• Absolute measuring now also possible with calibrated dilution viscometers. The integrated frit ensures filtration when the sample dissolves in the viscometer.</li> </ul>
	<ul style="list-style-type: none"> <li>• Complete application from one supplier</li> </ul>	<ul style="list-style-type: none"> <li>• LAUDA supplies all components for the viscosity application – clear-view thermostats, automatic viscosity measuring systems and glass capillary viscometers.</li> </ul>
	<ul style="list-style-type: none"> <li>• Customer-specific variants available on request</li> </ul>	<ul style="list-style-type: none"> <li>• LAUDA supplies special variants as desired by the customer, specifically for adaptation to automatic measuring systems.</li> </ul>

# LAUDA Glass capillary viscometers

## Ubbelohde Viscometers

For automatic and stopwatch measurement. Standard design with no thread for easy removal prior to external cleaning.

- ISO 3105, DIN 51562, BS 188, NFT 60-100
- Filling volume: 15...20 ml
- Total length: approx. 290 mm
- Measurement accuracy:  $\pm 0.2\%$

Also available in ASTM version

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
0c	0.003	0.7...3	0.3...2	0.47	EGV 700	EGV 709
0a	0.005	1...5	0.5...3	0.53	EGV 701	EGV 710
I	0.01	2...10	0.7...7	0.63	EGV 702	EGV 711
Ic	0.03	6...30	2...20	0.84	EGV 703	EGV 712
II	0.1	20...100	6...60	1.13	EGV 704	EGV 713
IIc	0.3	60...300	20...200	1.50	EGV 705	EGV 714
III	1	200...1,000	60...600	2.01	EGV 706	EGV 715
IIIc	3	600...3,000	200...2,000	2.65	EGV 707	EGV 716
IV	10	2,000...10,000	600...6,000	3.60	EGV 708	EGV 717
IVc	30	6,000...30,000	2,000...20,000	4.70	EGV 699	EGV 697



## Ubbelohde Viscometers for automatic cleaning

For automatic and stopwatch measurement. With screw connections and aspirating tube for permanent installation. Recommended for automatic cleaning with LAUDA VRM modules.

- ISO 3105, DIN 51562, BS 188, NFT 60-100
- Filling volume: 18...22 ml
- Total length: approx. 290 mm
- Measurement accuracy:  $\pm 0.2\%$

Also available in ASTM version

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm $\pm 0,01$	Cat. No. calibrated	Cat. No. uncalibrated
0c	0.003	0.7...3	0.3...2	0.47	EGV 930	EGV 940
0a	0.005	1...5	0.5...3	0.53	EGV 931	EGV 941
I	0.01	2...10	0.7...7	0.63	EGV 932	EGV 942
Ic	0.03	6...30	2...20	0.84	EGV 933	EGV 943
II	0.1	20...100	6...60	1.13	EGV 934	EGV 944
IIc	0.3	60...300	20...200	1.50	EGV 935	EGV 945
III	1	200...1,000	60...600	2.01	EGV 936	EGV 946
IIIc	3	600...3,000	200...2,000	2.65	EGV 937	EGV 947
IV	10	2,000...10,000	600...6,000	3.60	EGV 938	EGV 948



## Micro-Ubbelohde Viscometers

For small sample quantities and/or short measurement times. Designed with no thread for easy removal prior to external cleaning. Compatible with LAUDA VRM modules.

- DIN 51562/2
- Filling volume: 3...4 ml
- Total length: approx. 290 mm
- Measurement accuracy:  $\pm 0.5\%$

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
I	0.01	1...6	0.30...6	0.40	EGV 718	EGV 723
Ic	0.03	3...18	0.8...18	0.53	EGV 719	EGV 724
II	0.1	10...60	3...60	0.70	EGV 720	EGV 725
IIc	0.3	30...180	8...180	0.95	EGV 721	EGV 726
III	1	100...800	30...800	1.26	EGV 722	EGV 727



## Micro-Ostwald Viscometers

For small sample quantities and/or very short measurement times. Designed with no thread for easy removal prior to external cleaning. Compatible with LAUDA VRM modules. Precise volume input required. Especially recommended for heavy-foaming samples.

- Filling volume: 2 ml
- Total length: approx. 290 mm
- Measurement accuracy:  $\pm 0.5\%$

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
I	0.01	1...6	0.30...6	0.43	EGV 820	EGV 825
Ic	0.03	3...18	0.8...18	0.60	EGV 821	EGV 826
II	0.1	10...60	3...60	0.77	EGV 822	EGV 827
IIc	0.3	30...180	8...180	1.00	EGV 823	EGV 828
III	1	100...800	30...800	1.36	EGV 824	EGV 829



# LAUDA Glass capillary viscometers

## Cannon-Fenske Routine Viscometers for automatic cleaning

Viscometers for automatic and stopwatch measurement. With screw connections and aspirating tube for permanent installation. Recommended for automatic cleaning with LAUDA VRM modules. Precise volume input required.

- ISO 3105, ASTM D 2515, BS 188
- With filling and cleaning tube
- Filling volume: approx. 5...10 ml
- Total length: approx. 245 mm
- Measurement accuracy:  $\pm 0.3\%$

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
50	0.004	0.8...4	0.4...3	0.44	EGV 951	EGV 986
75	0.008	1.6...8	0.8...6	0.54	EGV 952	EGV 987
100	0.015	3...15	2...10	0.63	EGV 953	EGV 988
150	0.035	7...35	4...25	0.78	EGV 954	EGV 989
200	0.1	20...100	8...60	1.01	EGV 955	EGV 990
300	0.25	50...250	20...100	1.27	EGV 956	EGV 991
350	0.5	100...500	40...200	1.52	EGV 957	EGV 992
400	1.2	240...1,200	100...500	1.92	EGV 958	EGV 993
450	2.5	500...2,500	200...1,000	2.35	EGV 959	EGV 994
500	8	1,600...8,000	700...3,500	3.20	EGV 960	EGV 995
600	20	4,000...20,000	1,500...7,500	4.20	EGV 961	EGV 996



## Cannon-Fenske Routine Viscometers

For automatic and stopwatch measurement. Standard design with no thread for easy removal prior to external cleaning. Precise volume input required.

- ISO 3105, ASTM D 2515, BS 188
- Filling volume: approx. 5...10 ml
- Total length: approx. 245 mm
- Measurement accuracy:  $\pm 0.3\%$

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	DIN/ASTM mm <sup>2</sup> /s	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
50	0.004	0.8...4	0.4...3	0.44	EGV 861	EGV 873
75	0.008	1.6...8	0.8...6	0.54	EGV 862	EGV 874
100	0.015	3...15	2...10	0.63	EGV 863	EGV 875
150	0.035	7...35	4...25	0.78	EGV 864	EGV 876
200	0.1	20...100	8...60	1.01	EGV 865	EGV 877
300	0.25	50...250	20...100	1.27	EGV 866	EGV 878
350	0.5	100...500	40...200	1.52	EGV 867	EGV 879
400	1.2	240...1,200	100...500	1.92	EGV 868	EGV 880
450	2.5	500...2,500	200...1,000	2.35	EGV 869	EGV 881
500	8	1,600...8,000	700...3,500	3.20	EGV 870	EGV 882
600	20	4,000...20,000	1,500...7,500	4.20	EGV 871	EGV 883



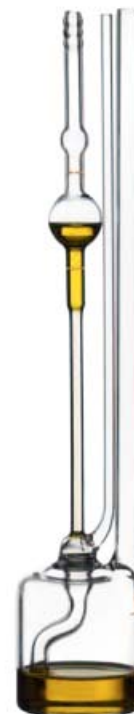
## Ubbelohde Dilution Viscometers

For convenient implementation of dilution series and determining concentration dependencies, e.g. IV value measuring of polymers. Standard design with no thread for easy removal prior to external cleaning. Can be connected with LAUDA VRM modules and dosing units. Recommended for automatic measuring with LAUDA viscosity measuring systems.

- Fill volume: 15...75 ml
- Total length: approx. 290 mm
- Measurement accuracy:  $\pm 0.2\%$

Type	Cap. const. mm <sup>2</sup> /s <sup>2</sup>	PVS or iVisc mm <sup>2</sup> /s	Ø i mm	Cat. No. calibrated	Cat. No. uncalibrated
0c	0.003	0.3...2	0.47	EGV 912	EGV 921
0a	0.005	0.5...3	0.53	EGV 913	EGV 922
0a	0.005	0.5...3	0.53	EGV 913-1*	EGV 922-1*
I	0.01	0.7...7	0.63	EGV 914	EGV 923
I	0.01	0.7...7	0.63	EGV 914-1*	EGV 923-1*
Ic	0.03	2...20	0.84	EGV 915	EGV 924
II	0.1	6...60	1.13	EGV 916	EGV 925

\*With integrated filter: porosity G 2



## Accessories

Cat. No.	Description
UG 003	Viscometer frame for Ubbelohde and Micro-Ubbelohde
UG 094	Viscometer frame for Micro-Ostwald
EZ 054	Cannon-Fenske viscometer holder for 2-legged capillaries (only for manual measuring)
EAO 156	Digital hand stop watch
EZ 287	Suction ball, 60 ml, opening 6.3 mm Ø
LZB 011	Labosol S for cleaning the glass capillary viscometer, 1 L
HKB 532	Adapter for Micro-Ubbelohde (for installation into automatic systems)



UG 003

## Application table

LAUDA supplies glass capillary viscometers in various designs. Use the following table to see which capillary is best suited for your application.

	Ubbelohde	Micro-Ubbelohde	Micro-Ostwald	Cannon-Fenske Routine
Manual measurement	++	++	+	+
Automatic measurement	++	++	+	+
Frothing liquids	○	○	+	+
Volatile samples	○	○	+	+
Small samples/detergent quantities	-	++	+	-
High/low temperature	+	+	○	○
Black and used oils	○	-	-	○

++ use by preference

+ well suited

○ less suited

- unsuitable