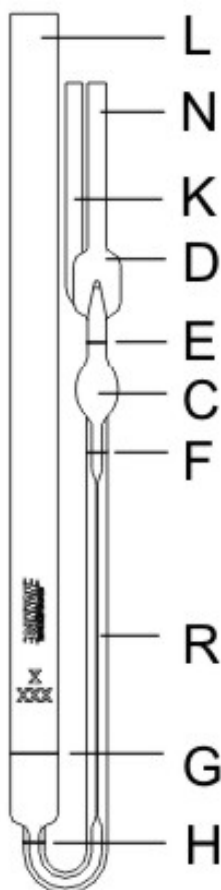


Instructions for the use of The Zeitfuchs[®] Viscometer for Transparent Liquids

See also ASTM D 445, ASTM D 446, and ISO 3105



1. Clean the viscometer using suitable solvents and dry it by passing clean, dry filtered air through the instrument to remove the final traces of solvents. Periodically, traces of organic deposits should be removed with chromic acid solution.
2. If there is a possibility of lint, dust, or other solid material in the liquid sample, filter the sample through a fritted glass filter or fine mesh screen.
3. Mount the viscometer in the constant temperature bath keeping tube L vertical.
4. Charge the viscometer by pouring enough sample through tube L to fill the lower reservoir to fill mark G.
5. Allow 15 to 25 minutes for the sample to attain bath temperature and become free of air bubbles.
6. Place a rubber stopper in tube K and, by means of vacuum to tube N, slowly draw the sample into timing bulb C until the lower meniscus is a point 2 to 5 mm above line E.
7. Place a finger over tube N (or rubber stopper in tube N) for the time shown in Table 1 to ensure the sample drains from the wall of tube L.
8. Adjust the working volume by drawing the lower meniscus exactly to mark H, making sure that sample completely fills the viscometer between mark F and the overflow tip in bulb D.
9. After this final adjustment of the working volume, remove the finger or the rubber stopper closing tube K and, with vacuum on tube K, draw out the excess sample from the overflow in bulb D if the tip E is covered.
10. To measure the efflux time, allow the liquid sample to flow freely down past mark E, measuring the time for the meniscus to pass from mark E to mark F to the nearest 0.1 second or 0.01 second.
11. Calculate the kinematic viscosity of the sample by multiplying the efflux time by the viscometer constant.
12. Without recharging the viscometer, make check determinations by drawing the sample into bulb C and 5 mm above mark E and repeating steps 10 and 11.

Zeitfuchs Viscometer For Transparent Liquids

Kinematic Viscosity mm^2/s (cSt)	Initial Temp. Equilibrium Time, Minutes	Final Drainage Times
Under 10	15	10 to 20
10 to 100	15	40 to 60
100 to 1000	20	100 to 120
Over 1000	25	180 to 200

Size	Approximate Constant mm^2/s^2 (cSt/s)	Range mm^2/s (cSt)
1	0.003	0.6 to 3
2	0.01	2 to 10
3	0.03	6 to 30
4	0.1	20 to 100
5	0.3	60 to 300
6	1.0	200 to 1000
7	3.0	600 to 3000

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The combined expanded¹ uncertainty with 95% confidence of the calibration measurements relative to the primary standard is as follows:

Range of Constants mm^2/s^2	Expanded Combined Uncertainty
<0.025	0.16%
0.025-0.25	0.22%
0.25-2.5	0.29%
2.5-25	0.38%
>25	0.44%

The assigned uncertainty of the primary viscosity standard at 20°C is $\pm 0.17\%$. See ISO 3666.

¹An expanded uncertainty U is determined by multiplying the combined standard uncertainty u_c by a coverage factor k: $U = k u_c$ where $k = 2$. See NIST Technical Note 1297, 1994 edition, *Guidelines for evaluation and Expressing the Uncertainty of NIST Measurement Results*.

THIS PRODUCT WAS CALIBRATED WITHIN A QUALITY SYSTEM WHICH IS REGISTERED TO ISO 9002.