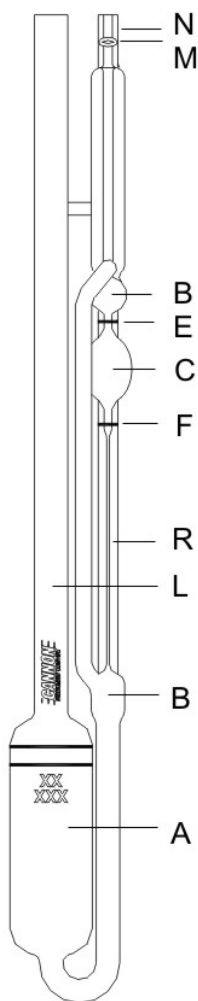


# Instructions for the use of The Cannon-Ubbelohde Dilution Viscometer

See also ASTM D 445, D 2170, ISO 3104 and ISO 3105



1. Clean the viscometer using suitable solvents, and dry 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 or non-chromium cleaning 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. For dilution work charge a measured volume of sample (8.00 to 10.00 mL) directly from the pipette through tube L into the lower reservoir of the viscometer. If dilutions are not to be made, it is not necessary to measure the volume of the sample.
4. Place the viscometer into the holder and insert it into the constant temperature bath. Vertically align the viscometer in the bath if a self-aligning holder has not been used.
5. Allow approximately 20 minutes for the sample to come to the bath temperature.
6. Place a finger over tube M and apply suction to tube N until the liquid reaches the center of bulb B. Remove suction from tube N. Remove finger from tube M, and immediately place it over tube N until the sample drops away from the lower end of the capillary into bulb B. Then remove finger and measure the efflux time.
7. 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.
8. Calculate the kinematic viscosity of the sample by multiplying the efflux time by the viscometer constant.
9. Without recharging the viscometer, make check determinations by repeating steps 6 to 8.
10. Dilute sample by adding measured quantity of solvent from pipette directly into the lower reservoir of the viscometer. Mix the original sample and the solvent by applying slight pressure to tube N several times, and shaking the viscometer while covering tube M.
11. Repeat steps 5 to 9. Additional dilution may be made if necessary.

## Cannon-Ubbelohde Dilution Viscometer

### RECOMMENDED VISCOSITY RANGES FOR THE CANNON-UBBELOHDE DILUTION VISCOMETER

Approximate Constant Size	mm <sup>2</sup> /s <sup>2</sup> , (cSt/s)	Kinematic Viscosity Range	mm <sup>2</sup> /s, (cSt)
25	0.002	0.5 to	2
50	0.004	0.8 to	4
75	0.008	1.6 to	8
100	0.015	3 to	15
150	0.035	7 to	35
200	0.1	20 to	100
300	0.25	50 to	250
350	0.5	100 to	500
400	1.2	240 to	1200
450	2.5	500 to	2500
500	8	1600 to	8000
600	20	4000 to	20000
650	45	9000 to	45000
700	100	20000 to	100000

The combined expanded<sup>1</sup> uncertainty with 95% confidence of the calibration measurements relative to the primary standard is as follows:

Range of Constants	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 ±0.17%. See ISO 3666.

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