

Zahn Cup Viscometers

- Quickly measures the viscosity of liquids such as paint, lacquer, varnish, syrup and oil.
- Boekel cup type viscometers measure viscosity in the 18 to 1725 centistokes range in 90 seconds or less.
- Five cups are available differing only in the size of the orifice
- Viscosity is expressed in Zahn seconds which are correlated to viscosity in centistokes
- Cup volume is 44 ml
- Compact and easy to use
- Rapid results
- Inexpensive

SPECIFICATION

CUP RANGE	SECONDS RANGE	CENTISTOKE SENSITIVITY	MIDRANGE OIL NUMBER ¹	CALIBRATION NUMBER ²
1	40 to 60	10 to 36	1.3	G-10/19
2	20 to 60	19 to 156	3.3	G-60/117
3	12 to 60	64 to 596	10.5	G-200/458
4	10 to 60	79 to 784	13.9	G-200/458
5	10 to 60	161 to 1401	24.2	G-360/878

$$1 \text{ m}^2/\text{s} = 10,000 \text{ cm}^2/\text{s} [\text{stoke}] = 1,000,000 \text{ mm}^2/\text{s} [\text{centistoke}]$$

$$1 \text{ cm}^2/\text{s} = 1 \text{ stoke}$$

$$1 \text{ mm}^2/\text{s} = 1 \text{ centistoke}$$

Viscosities of Selected Materials (note the change in unit prefixes)

simple liquids	T (°C)	η (mPa·s)	gases	T (°C)	η (μPa·s)
alcohol, ethyl (grain)	20	1.1	air	15	17.9
alcohol, isopropyl	20	2.4	hydrogen	0	8.42
alcohol, methyl (wood)	20	0.59	helium	0	18.6
blood	37	3 – 4	nitrogen	0	16.7
ethylene glycol	25	16.1	oxygen	0	18.1
ethylene glycol	100	1.98	complex materials	T (°C)	η (Pa·s)
Freon 11 (propellant)	-25	0.74	caulk	20	1000
Freon 11 (propellant)	0	0.54	glass, room temperature		$10^{18} - 10^{21}$
Freon 11 (propellant)	+25	0.42	glass, strain point		$10^{13.6}$
Freon 12 (refrigerant)	-15	??	glass, annealing point		$10^{12.4}$
Freon 12 (refrigerant)	0	??	glass, softening		$10^{6.6}$
Freon 12 (refrigerant)	+15	0.20	glass, working		10^3
glycerin	20	1420	glass, melting		10^2
glycerin	40	280	honey	20	10
mercury	15	1.55	ketchup	20	50
milk	25	3	lard	20	1000
oil, vegetable, canola	25	57	molasses	20	5
oil, vegetable, canola	40	33	mustard	25	70
oil, vegetable, corn	20	65	peanut butter	20	150 - 250
oil, vegetable, corn	40	31	sour cream	25	100
oil, vegetable, olive	20	84	syrup, chocolate	20	10 - 25

oil, vegetable, olive	40	??	syrup, corn	25	2 - 3
oil, vegetable, soybean	20	69	syrup, maple	20	2 - 3
oil, vegetable, soybean	40	26	tar	20	30,000
oil, machine, light	20	102	vegetable shortening	20	1200
oil, machine, heavy	20	233			
oil, motor, SAE 10	20	65			
oil, motor, SAE 20	20	125			
oil, motor, SAE 30	20	200			
oil, motor, SAE 40	20	319			
propylene glycol	25	40.4			
propylene glycol	100	2.75			
water	0	1.79			
water	20	1.00			
water	40	0.65			
water	100	0.28			

¹ Stated as centistokes per second of efflux time.

² Centistoke values are nominal - actual values printed on labels

Viscosity is the measurement of a fluid's internal resistance to flow. This is typically designated in units of centipoise or poise but can be expressed in other acceptable measurements as well. Some conversion factors are as follows:

100 Centipoise = 1 Poise

1 Centipoise = 1 mPa s (Millipascal Second)

1 Poise = 0.1 Pa s (Pascal Second)

Centipoise = Centistoke x Density

Approximate Viscosities of Common Materials (At Room Temperature-70°F) *	
Material	Viscosity in Centipoise
Water	1 cps
Milk	3 cps
SAE 10 Motor Oil	85-140 cps
SAE 20 Motor Oil	140-420 cps
SAE 30 Motor Oil	420-650 cps
SAE 40 Motor Oil	650-900 cps
Castrol Oil	1,000 cps
Karo Syrup	5,000 cps
Honey	10,000 cps

Chocolate	25,000 cps
Ketchup	50,000 cps
Mustard	70,000 cps
Sour Cream	100,000 cps
Peanut Butter	250,000 cps