

VISCOSITY OF LIQUIDS

Viscosity of liquids in centipoises (cp) including elements, inorganic and organic compounds and mixtures.

Liquid	Temp. °C	Viscosity cp	Liquid	Temp. °C	Viscosity cp
Acetaldehyde	0	.2797		700	1.26
	10	.2557		800	1.08
	20	.22		850	1.05
Acetanilide	120	2.22	Benzaldehyde	25	1.39
	130	1.90	Benzene	0	.912
Acetic acid	15	1.31		10	.758
	18	1.30		20	.652
	25.2	1.155		30	.564
	30	1.04		40	.503
	41	1.00		50	.442
	59	.70		60	.392
	70	.60		70	.358
	100	.43		80	.329
anhydride	0	1.24	Benzonitrile	25	1.24
	15	.971	Benzophenone	55	4.79
	18	.90		120	1.38
	30	.783	Benzyl alcohol	20	5.8
	100	.49	Benzylamine	25	1.59
Acetone	-92.5	2.148	Benzylaniline	33	2.18
	-80.0	1.487		130	1.20
	-59.6	.932	Benzyl ether	0	10.5
	-42.5	.695		20	5.33
	-30.0	.575		40	3.21
	-20.9	.510	Bismuth	285	1.61
	-13.0	.470		304	1.662
	-10.0	.450		365	1.46
	0	.399		451	1.280
	15	.337		600	.998
	25	.316	Bromine, liq	-4.3	1.31
	30	.295		0	1.241
	41	.280		12.6	1.07
Acetonitrile	0	.442		16	1.0
	15	.375		19.5	.985
	25	.345		28.9	.911
Acetophenone	11.9	2.28	o-Bromoaniline	40	3.19
	23.5	1.59	m-Bromoaniline	20	6.81
	25.0	1.617		40	3.70
	50.0	1.246		80	1.70
	80.0	.734	p-Bromoaniline	80	1.81
Air, liq	-192.3	.172	Bromobenzene	15	1.196
Alcohol. See Ethyl, Methyl, etc.				30	.985
Allyl alcohol	0	2.145	Bromoform	15	2.152
	15	1.49		25	1.89
	20	1.363	Butyl acetate	30	1.741
	30	1.07		0	1.004
	40	.914		20	.732
	70	.553	n-Butyl alcohol	40	.563
Allylamine	130	.506		-50.9	36.1
Allyl chloride	15	.347		-30.1	14.7
	30	.300		-22.4	11.1
Ammonia	-69	.475		-14.1	8.38
	-50	.317		0	5.186
	-40	.276		15	3.379
	-33.5	.255		20	2.948
n-Amyl acetate	11	1.58		30	2.30
	45	.805		40	1.782
alcohol	15	4.65		50	1.411
	30	2.99		70	.930
ether	15	1.188	sec-Butyl alcohol	100	.540
Aniline	-6	13.8		15	4.21
	0	10.2	n-Butyl bromide	15	.626
	5	8.06	n-Butyl chloride	15	.469
	10	6.50	Butyl chloride, tertiary	15	.543
	15	5.31	n-Butyl formate	0	.940
	20	4.40		20	.689
	25	3.71	Butyric acid	0	2.286
	30	3.16		15	1.81
	35	2.71		20	1.540
	40	2.37		40	1.120
	50	1.85		50	.975
	60	1.51		70	.760
	70	1.27		100	.551
	80	1.09	Cadmium, liq	349	1.44
	90	.935		506	1.18
	100	.825		603	1.10
Anisol	0	1.78	Carbolic acid. See Phenol.		
	20	1.32	Carbon dioxide, liq., pressure that of saturated vapor	0	.099
	40	1.12		10	.085
Antimony, liq	645	1.55		20	.071
				30	.053

ENS-LYON

F-41

PL05L

VISCOSITY OF LIQUIDS (Continued)

Liquid	Temp. °C	Viscosity cp	Liquid	Temp. °C	Viscosity cp
disulfide.....	-13	.514	Ethyl acetate.....	-40	.461
	-10	.495		-20	.362
	0	.436		0	.2842
	5	.380		17	.240
	20	.363		20	.2332
Carbon tetrachloride.....	40	.330	25	.222	
	0	1.329	40	.197	
	15	1.038	60	.166	
	20	.969	80	.140	
	30	.843	100	.118	
	40	.739	0	.582	
	50	.651	8.96	.516	
	60	.585	10	.512	
	70	.524	15	.473	
	80	.468	20	.455	
Cetyl alcohol.....	90	.426	25	.441	
	100	.384	30	.400	
Chlorine, liq.....	50	13.4	50	.345	
	-76.5	.729	75	.283	
	-70.5	.680	Ethyl alcohol.....	-98.11	44.0
	-60.2	.616		-89.8	28.4
	-52.4	.566		-71.5	13.2
-35.4	.494	-59.42		8.41	
0	.385	-52.58		6.87	
Chlorobenzene.....	15	.900	-32.01	3.84	
	20	.799	-17.59	2.68	
	40	.631	-.30	1.80	
	80	.431	0	1.773	
Chloroform.....	100	.367	10	1.466	
	-13	.855	20	1.200	
	0	.700	30	1.003	
	8.1	.643	40	.834	
	15	.596	50	.702	
o-Chlorophenol.....	20	.58	60	.592	
	25	.542	70	.504	
	30	.514	Ethyl alcohol, anh.....	-148	8,470
	39	.500		-146	5,990
	25	4.11		-130	467
	50	2.015		25	2.04
	25	11.55		17	.691
	m-Chlorophenol.....	50	4.99	20	2.24
		50	3.36	Ethyl benzoate.....	-120
	p-Chlorophenol.....	1,100	3.33		-100
1,150		3.22	-80		1.81
Copper, liq.....	1,200	3.12	0		.487
	40	4.49	10		.441
o-Cresol.....	10	43.9	15	.418	
	20	20.8	20	.402	
m-Cresol.....	40	6.18	30	.348	
	40	7.00	15	.711	
p-Cresol.....	20	12.0	15	.868	
	20	1.64	0	2.438	
Cresote.....	13.5	1.02	17	1.95	
Cycloheptane.....	17	68	20	1.721	
Cyclohexane.....	20	.896	40	1.286	
Cyclohexanol.....	13.5	.86	67.3	.922	
	20	.86	70	.903	
Cyclohexene.....	13.5	2.35	82.2	.750	
Cyclooctane.....	13.5	.493	99.0	.648	
Cyclopentane.....	20	.92	0	1.077	
n-Decane.....	25	.346	15	.887	
Diethylamine.....	25	.367	19.4	.800	
	5	3.84	40	.652	
Diethylaniline.....	20.0	2.18	50	.565	
	25.0	1.95	70	.479	
	15.0	7.34	20	19.9	
Diethylcarbinol.....	15	.493	40	9.13	
Diethylketone.....	10	1.69	60	4.95	
Dimethylaniline.....	20	1.41	80	3.02	
	25	1.285	100	1.99	
	30	1.17	-49.8	.577	
	40	1.04	-38.2	.488	
	50	.91	-21.0	.394	
Dimethyl- $\alpha$ -naphthylamine.....	130	.868	0	.320	
Dimethyl- $\beta$ -naphthylamine.....	130	.952	20	.402	
Diphenyl.....	70	1.49	0	.727	
Diphenylamine.....	100	.97	15	.617	
	130	1.04	20	.592	
Dodecane.....	25	1.35	40	.495	
Ether (diethyl-).....	-100	1.89	70	.391	
	-80	.958	24.7	3.016	
	-60	.637	15	2.31	
			oxide.....		
			glycol.....		
			malate.....		
			oxalate.....		
			chloride.....		
			ethyl formate.....		
			iodide.....		
			ethyl benzoate.....		
			ethyl bromide.....		
			ethyl aniline.....		
			ethyl benzene.....		
			ethyl alcohol, anh.....		
			ethyl alcohol.....		
			ethyl acetate.....		
			carbon tetrachloride.....		
			disulfide.....		

VISCOSITY OF LIQUIDS (Continued)

Liquid	Temp. °C	Viscosity cp	Liquid	Temp. °C	Viscosity cp
propionate.....	15	.564	Isopropyl alcohol.....	15	2.86
Eugenol.....	0	29.9		30	1.77
	20	9.22	Isoquinoline.....	25	3.57
	40	4.22	Isosafrol.....	25	3.981
Fluorobenzene.....	20	.598	Lead, liq.....	350	2.58
	40	.478		400	2.33
	60	.389		441	2.116
	80	.329		500	1.84
	100	.275		551	1.70
Formamide.....	0	7.55		600	1.38
	25	3.30		703	1.349
Formic acid.....	7.59	2.3868		844	1.185
	10	2.262	Menthol, liq.....	55.6	6.29
	20	1.804		74.6	2.47
	30	1.465		99.0	1.04
	40	1.219	Mercury.....	-20	1.855
	70	.780		-10	1.764
	100	.549		0	1.685
Furfural.....	0	2.48		10	1.615
	25	1.49		19.02	1.56
Glucose.....	22	9.1 × 10 <sup>11</sup>		20	1.554
	30	6.6 × 10 <sup>11</sup>		20.2	1.55
	40	2.8 × 10 <sup>11</sup>		30	1.499
	60	9.3 × 10 <sup>7</sup>		40	1.450
	80	6.6 × 10 <sup>6</sup>		40.8	1.45
	100	2.5 × 10 <sup>5</sup>		41.86	1.44
Glycerin.....	-42	6.71 × 10 <sup>8</sup>		50	1.407
	-36	2.05 × 10 <sup>8</sup>		60	1.367
	-25	2.62 × 10 <sup>8</sup>		70	1.331
	-20	1.34 × 10 <sup>8</sup>		80	1.298
	-15.4	6.65 × 10 <sup>8</sup>		90	1.268
	-10.8	3.55 × 10 <sup>8</sup>		100	1.240
	-4.2	1.49 × 10 <sup>8</sup>		150	1.130
	0	12,110		200	1.052
	6	6,260		250	.995
	15	2,330		300	.950
	20	1,490		340	.921
	25	954	Methyl acetate.....	0	.484
	30	629		20	.381
Glycerin trinitrate.....	10	69.2		40	.320
	20	36.0	Methyl alcohol.....	-98.30	13.9
	30	21.0	(Methanol)	-84.23	6.8
	40	13.6		-72.55	4.36
	60	6.8		-44.53	1.98
Heptane.....	0	.524		-22.29	1.22
	17	.461		0	.82
	20	.409		15	.623
	25	.386		20	.597
	40	.341		25	.547
	70	.262		30	.510
n-Heptyl alcohol.....	15	8.53		40	.456
Hexadecane.....	20	3.34		50	.403
Hexane.....	0	.401	Methyl amine.....	0	.236
	17	.374	aniline.....	25	2.02
	20	.326		30	1.55
	25	.294	chloride.....	20	.1834
	40	.271	Methylene bromide.....	15	1.09
	50	.248		30	0.92
Hydrazine.....	1	1.20	chloride.....	15	.449
	10	1.12		30	.393
	20	.97	Methyl iodide.....	0	.606
Hydrogen, liq.....		.011		15	.518
Iodine, liq.....	116	2.27		20	.500
Iodobenzene.....	15	1.74		30	.460
Iron, 2.5% carbon, liq.....	1,400	2.25		40	.424
Isoamyl acetate.....	8.97	1.030	Naphthalene.....	80	.967
	19.91	.872		100	.776
alcohol.....	10	6.20	Nitric acid.....	0	2.275
amine.....	25	.724		10	1.770
Isobutyl alcohol.....	15	4.703	Nitrobenzene.....	2.95	2.91
amine.....	25	.553		5.69	2.71
Isobutyric acid.....	15	1.44		5.94	2.71
	30	1.13		9.92	2.48
Isoeugenol.....	25	26.72		14.94	2.24
Isoheptane.....	0	.481		20.00	2.03
	20	.384	Nitromethane.....	0	.853
	40	.315		25	.620
Isohexane.....	0	.376	o-Nitrotoluene.....	0	3.83
	20	.306		20	2.37
	40	.254		40	1.63
Isopentane.....	0	.273		60	1.21
	20	.223	m-Nitrotoluene.....	20	2.33

VISCOSITY OF LIQUIDS (Continued)

Liquid	Temp. °C	Viscosity cp	Liquid	Temp. °C	Viscosity cp
	40	1.60	<i>n</i> -Propyl alcohol.....	0	3.883
	60	1.18		15	2.52
<i>p</i> -Nitrotoluene.....	60	1.20		20	2.256
<i>n</i> -Nonane.....	20	.711		30	1.72
<i>n</i> -Octane.....	0	.706		40	1.405
	16	.574	<i>n</i> -Propyl alcohol.....	50	1.130
	20	.542		70	.760
Octadecane.....	40	.433	Propyl aldehyde.....	10	.47
<i>n</i> -Octylalcohol.....	40	2.86		20	.41
Oil, castor.....	15	10.6		40	.33
	10	2,420	bromide.....	0	.651
	20	986		20	.524
	30	451		40	.433
	40	231	chloride.....	0	.436
cottonseed.....	100	16.9		20	.352
cylinder, filtered.....	20	70.4		40	.291
	37.8	240.6	<i>n</i> -Propyl ether.....	15	.448
	100	18.7	Pyridine.....	20	.974
cylinder, dark.....	37.8	422.4	Salicylic acid.....	10	3.20
linseed.....	100	24.0		20	2.71
	30	33.1		40	1.81
	50	17.6	Salol.....	45	.746
machine, light.....	90	7.1	Sodium bromide.....	762	1.42
	15.6	113.8		780	1.28
	37.8	34.2	chloride, liq.....	841	1.30
	100	4.9		896	1.01
machine, heavy.....	15.6	660.6		924	.97
	37.8	127.4	nitrate, liq.....	308	2.919
Oil, olive.....	10	138.0		348	2.439
	20	84.0		398	1.977
	40	36.3		418	1.828
	70	12.4	Stearic acid.....	70	11.6
rape.....	0	2,530	Sucrose (cane sugar).....	109	2.8 × 10 <sup>4</sup>
	10	385		124.6	1.9 × 10 <sup>5</sup>
	20	163	Sulfur (gas free).....	123.0	10.94
	30	96		135.5	8.66
soya bean.....	20	69.3		149.5	7.09
	30	40.6		156.3	7.19
	50	20.6		158.2	7.59
	90	7.8		159.2	9.48
sperm.....	15.6	42.0		159.5	14.45
	37.8	18.5		160.0	22.83
	100.0	4.6		160.3	77.32
Oleic acid.....	30	25.6		165.0	500.0
Pentadecane.....	22	2.81		171.0	4,500.0
Pentane.....	0	.289		184.0	16,000.00
	20	.240		190.5	19,700.0
<i>o</i> -Phenetidine.....	0	16.5		197.5	21,300.0
	30	6.08		200.0	21,500.0
	30	4.22		210.0	20,500.0
<i>m</i> -Phenetidine.....	30	12.9		217.0	19,100.0
<i>p</i> -Phenetidine.....	20	12.9		220.0	18,600.0
	30	8.3	Sulfur dioxide, liq.....	-33.5	.5508
Phenol.....	18.3	12.7		-10.5	.4285
	50	3.49		0.1	.3936
	60	2.61	Sulfuric acid.....	0	48.4
	70	2.03		15	32.8
	90	1.26		20	25.4
Phenyleyanide.....	.28	1.96		30	15.7
	20.0	1.33		40	11.5
Phosphorus, liq.....	21.5	2.34	Sulfuric acid.....	50	8.82
	31.2	2.01		60	7.22
	43.2	1.73		70	6.09
	50.5	1.60		80	5.19
	60.2	1.45	Tetrachloroethane.....	15	1.844
	69.7	1.32	Tetradecane.....	20	2.18
	79.9	1.21	Tin, liq.....	240	2.12
Potassium bromide, liq.....	745	1.48		280	1.678
	775	1.34		300	1.73
	805	1.19		301	1.680
nitrate, liq.....	334	2.1		400	1.43
	358	1.7		450	1.270
	333	2.97		500	1.20
	418	2.00		600	1.08
Propionic acid.....	10	1.289		604	1.045
	15	1.18		750	.905
	20	1.102	Toluene.....	0	.772
	40	.845		17	.61
Propyl acetate.....	10	.66		20	.590
	20	.59		30	.526
	40	.44		40	.471

VISCOSITY OF LIQUIDS (Continued)

Liquid	Temp. °C	Viscosity cp	Liquid	Temp. °C	Viscosity cp
<i>o</i> -Toluidine.....	70	.354	Turpentine, Venice.....	70	.728
<i>m</i> -Toluidine.....	20	4.39	<i>n</i> -Undecane.....	17.3	1.3 × 10 <sup>5</sup>
<i>p</i> -Toluidine.....	20	3.81	<i>o</i> -Xylene (xylol).....	20	1.17
Triacetin.....	50	1.80		0	1.105
Tributyrin.....	17	28.0		16	.876
Trichlorethane.....	20	11.6		20	.810
Tridecane.....	20	1.2	<i>m</i> -Xylene (xylol).....	40	.627
Triethylcarbinol.....	23.3	1.55		0	.806
Tripalmitin.....	20	6.75		15	.850
Tristearin.....	70	16.8		20	.620
Turpentine.....	75	18.5		40	.497
	0	2.248	<i>p</i> -Xylene (xylol).....	16	.696
	10	1.783		20	.648
	20	1.487	Zinc, liq.....	40	.513
	30	1.272		280	1.68
	40	1.071		357	1.42
				389	1.31

VISCOSITY OF GASES

Gas or vapor	Temp. °C	Viscosity micro-poise	Gas or vapor	Temp. °C	Viscosity micro-poise
Acetic acid, vap.....	119.1	107.0	Benzene, vap.....	14.2	73.8
Acetone, vap.....	100	93.1		131.2	103.1
	119.0	99.1		194.6	119.8
	190.4	118.6		252.5	134.3
	247.7	133.4		312.8	148.4
	306.4	148.1	Bromine, vap.....	12.8	151
Acetylene.....	0	93.5		65.7	170
Air.....	-194.2	55.1		99.7	188
	-183.1	62.7		139.7	208
	-104.0	113.0		179.7	227
	-69.4	133.3		220.3	248
	-31.6	153.9	Bromoform, vap.....	151.2	253.0
	0	170.8	Butyl alcohol, <i>n</i> , vap.....	116.9	143
	18	182.7	<i>tert</i> , vap.....	82.9	160
	40	190.4	chloride, <i>n</i> , vap.....	78	149.5
	54	195.8	iodide, vap.....	130	202
	74	210.2	$\beta$ -Butylene.....	18.8	74.4
	229	263.8		100.4	94.5
	334	312.3		200	119.2
	357	317.5	Butyric acid, vap.....	161.7	130.0
	409	341.3	Carbon dioxide.....	-97.8	89.6
	466	350.1		-78.2	97.2
	481	358.3		-60.0	106.1
	537	368.6		-40.2	115.5
	565	375.0		-21	129.4
	620	391.6		-19.4	126.0
	638	401.4		0	139.0
	750	426.3		15	145.7
	810	441.9		19	149.9
	923	464.3		20	148.0
	1034	490.6		30	153
	1134	520.6		32	155
				35	156
Alcohol. See <i>Ethyl, Methyl, etc.</i>				40	157
Ammonia.....	-78.5	67.2		99.1	186.1
	0	91.8		104	188.9
	20	98.2		182.4	222.1
	50	109.2		235	241.5
	100	127.9		302.0	268.2
	132.9	139.9		490	330.0
	150	146.3		685	380.0
	200	164.6		850	435.8
	250	181.4		1052	478.6
	300	198.7	disulfide, vap.....	0	91.1
Argon.....	0	209.6		14.2	96.4
	20	221.7		114.3	130.3
	100	269.5		190.2	156.1
	200	322.3		309.8	196.6
	302	368.5	monoxide.....	-191.5	56.1
	401	411.5		-78.5	127
	493	448.4		0	166
	584	481.5		15	172
	714	525.7		21.7	175.3
	827	563.2		126.7	218.3
Arsenic hydride (Arsine).....	0	145.8		227.0	254.8
	15	114.0		276.9	271.4
	100	198.1	tetrachloride, vap.....	76.7	195.0