

Properties of Common Organic Solvents

Chem 2312H

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TABLE 2 (taken from <http://murov.info/orgsolvents.htm>)

<u>Solvent</u>	formula	boiling point (°C)	melting point (°C)	density (g/mL)	solubility in H ₂ O ¹ (g/100g)	relative polarity ²	eluant strength ³	threshold limits ⁴ (ppm)	vapor pressure 20 °C (hPa)	dipole moment (D)	dielectric constant	viscosity 10 ⁻³ Pa s
cyclohexane	C ₆ H ₁₂	80.7	6.6	0.779	0.005	0.006	0.04	100	104	0	2	0.89
pentane	C ₅ H ₁₂	36.1	-129.7	0.626	0.0039	0.009	0.00	600	573	0	1.84	0.23
hexane	C ₆ H ₁₄	69	-95	0.655	0.0014	0.009	0.01	50	160	0	1.9	0.29
heptane	C ₇ H ₁₆	98	-90.6	0.684	0.0003	0.012		400	48	0	1.9	0.39
carbon tetrachloride	CCl ₄	76.7	-22.4	1.594	0.08	0.052	0.18	5	120	0	2.3	0.90
carbon disulfide	CS ₂	46.3	-111.6	1.263	0.2	0.065	0.15	10	400	0	2.6	0.36
<i>p</i> -xylene	C ₈ H ₁₀	138.3	13.3	0.861	0.02	0.074	0.26	100	15	0	2.27	0.65
toluene	C ₇ H ₈	110.6	-93	0.867	0.05	0.099	0.24	50	29	0.36	2.4	0.55
benzene	C ₆ H ₆	80.1	5.5	0.879	0.18	0.111	0.32	0.5	101	0	2.3	0.60
ether	C ₄ H ₁₀ O	34.6	-116.3	0.713	7.5	0.117	0.38	400	587	1.25	4.3	0.22
methyl <i>t</i> -butyl ether (MTBE)	C ₅ H ₁₂ O	55.2	-109	0.741	4.8	0.124	0.20		250*	1.4	2.6	0.36
diethylamine	C ₄ H ₁₁ N	56.3	-48	0.706	M	0.145	0.63	5	260	1.2	3.8	0.32
dioxane	C ₄ H ₈ O ₂	101.1	11.8	1.033	M	0.164	0.56	20	41	0.4	2	1.18
N,N-dimethylaniline	C ₈ H ₁₁ N	194.2	2.4	0.956	0.14	0.179						
chlorobenzene	C ₆ H ₅ Cl	132	-45.6	1.106	0.05	0.188	0.30	10	12	1.54	5.7	0.75
anisole	C ₇ H ₈ O	153.7	-37.5	0.996	0.10	0.198			3.5*	1.4	4.3	1.05
tetrahydrofuran (THF)	C ₄ H ₈ O	66	-108.4	0.886	30	0.207	0.57	200	200	1.63	7.5	0.46
ethyl acetate	C ₄ H ₈ O ₂	77	-83.6	0.894	8.7	0.228	0.57	400	97	1.78	6.0	0.43

ethyl benzoate	C ₉ H ₁₀ O ₂	213	-34.6	1.047	0.07	0.228			2.0	6.0		
dimethoxyethane (glyme)	C ₄ H ₁₀ O ₂	85	-58	0.868	M	0.231			1.7	7.3	1.1	
diglyme	C ₆ H ₁₄ O ₃	162	-64	0.945	M	0.244			1.9	7.23	1.88	
methyl acetate	C ₃ H ₆ O ₂	56.9	-98.1	0.933	24.4	0.253		200	220	1.7	6.68	0.36
chloroform	CHCl ₃	61.2	-63.5	1.498	0.8	0.259	0.40	10	210	1.0	4.8	0.54
3-pentanone	C ₅ H ₁₂ O	101.7	-39.8	0.814	3.4	0.265		200	37.7*	2.8	17.0	
1,1-dichloroethane	C ₂ H ₄ Cl ₂	57.3	-97.0	1.176	0.5	0.269		100	240	1.8	10	
di-n-butyl phthalate	C ₁₆ H ₂₂ O ₄	340	-35	1.049	0.0011	0.272						16.6
cyclohexanone	C ₆ H ₁₀ O	155.6	-16.4	0.948	2.3	0.281		25	5	2.9	15	2.00
pyridine	C ₅ H ₅ N	115.5	-42	0.982	M	0.302	0.71	5	20	2.2	13	0.88
dimethyl phthalate	C ₁₀ H ₁₀ O ₄	283.8	1	1.190	0.43	0.309						
methylene chloride	CH ₂ Cl ₂	39.8	-96.7	1.326	1.32	0.309	0.42	50	475	1.6	9.0	0.42
2-pentanone	C ₅ H ₁₀ O	102.3	-76.9	0.809	4.3	0.321			35.4*	2.7	15.4	0.50
2-butanone	C ₄ H ₈ O	79.6	-86.3	0.805	25.6	0.327	0.51	200	105	2.8	18.6	0.41
1,2-dichloroethane	C ₂ H ₄ Cl ₂	83.5	-35.4	1.235	0.87	0.327			79*	1.8	10.4	0.78
benzonitrile	C ₇ H ₅ N	205	-13	0.996	0.2	0.333		10	12	4.1	26	1.27
acetone	C ₃ H ₆ O	56.2	-94.3	0.786	M	0.355	0.56	500	240	2.85	21	0.30
dimethylformamide (DMF)	C ₃ H ₇ NO	153	-61	0.944	M	0.386		10	3.5	3.8	37	0.80
<i>t</i> -butyl alcohol	C ₄ H ₁₀ O	82.2	25.5	0.786	M	0.389		100	41	1.7	12.4	3.35
aniline	C ₆ H ₇ N	184.4	-6.0	1.022	3.4	0.420		2	0.4	1.6	6.8	3.8
dimethylsulfoxide (DMSO)	C ₂ H ₆ OS	189	18.4	1.092	M	0.444	0.75		0.61*	3.9	46.7	2.00
acetonitrile	C ₂ H ₃ N	81.6	-46	0.786	M	0.460	0.65	20	97	3.5	37.5	0.34
3-pentanol	C ₅ H ₁₂ O	115.3	-8	0.821	5.1	0.463			8.8*	1.7	13.3	
2-pentanol	C ₅ H ₁₂ O	119.0	-50	0.810	4.5	0.488			6.1*	1.7	13.7	3.5

2-butanol	C ₄ H ₁₀ O	99.5	-114.7	0.808	18.1	0.506		100	18.3*	1.7	17.3	3.1
cyclohexanol	C ₆ H ₁₂ O	161.1	25.2	0.962	4.2	0.509		50	1.2	1.9	15	
1-octanol	C ₈ H ₁₈ O	194.4	-15	0.827	0.096	0.537				1.7	10.3	7.4
2-propanol	C ₃ H ₈ O	82.4	-88.5	0.785	M	0.546	0.82	400	44	1.66	19	2.07
1-heptanol	C ₇ H ₁₆ O	176.4	-35	0.819	0.17	0.549				1.7	12	6.0
<i>i</i> -butanol	C ₄ H ₁₀ O	107.9	-108.2	0.803	8.5	0.552				1.8	17.9	6.68
1-hexanol	C ₆ H ₁₄ O	158	-46.7	0.814	0.59	0.559			0.22*		12.5	4.6
1-pentanol	C ₅ H ₁₂ O	138.0	-78.2	0.814	2.2	0.568			2.2*	5.7	14	3.5
acetyl acetone	C ₅ H ₈ O ₂	140.4	-23	0.975	16	0.571			3	3.0	23	
ethyl acetoacetate	C ₆ H ₁₀ O ₃	180.4	-80	1.028	2.9	0.577			0.78*			
1-butanol	C ₄ H ₁₀ O	117.6	-89.5	0.81	7.7	0.586		20	6.3	1.7	17.5	2.59
benzyl alcohol	C ₇ H ₈ O	205.4	-15.3	1.042	3.5	0.608			0.094*	1.7	13	5.47
1-propanol	C ₃ H ₈ O	97	-126	0.803	M	0.617	0.82		21*	1.68	22	1.95
acetic acid	C ₂ H ₄ O ₂	118	16.6	1.049	M	0.648	>1	10	15.3	1.68	6.2	1.12
2-aminoethanol	C ₂ H ₇ NO	170.9	10.5	1.018	M	0.651		3	0.53	2.3-2.6	37.7	20.8
ethanol	C ₂ H ₆ O	78.5	-114.1	0.789	M	0.654	0.88	1000	59	1.7	24	1.08
diethylene glycol	C ₄ H ₁₀ O ₃	245	-10	1.118	M	0.713			0.027	2.3	31.8	30.2
methanol	CH ₄ O	64.6	-98	0.791	M	0.762	0.95	200	128	1.6	33	0.54
ethylene glycol	C ₂ H ₆ O ₂	197	-13	1.115	M	0.790	1.11			2.3	37.7	16.1
glycerin	C ₃ H ₈ O ₃	290	17.8	1.261	M	0.812				2.7	42.5	934
water, heavy	D ₂ O	101.3	4	1.107	M	0.991			15	1.84	78.3	1.10
water	H ₂ O	100.00	0.00	0.998	M	1.000	>>1		17.5	1.85	80.1	0.89

1 M = miscible.

2 The values for relative polarity are normalized from measurements of solvent shifts of absorption spectra and were extracted from Christian Reichardt, *Solvents and Solvent Effects in Organic Chemistry*, Wiley-VCH Publishers, 3rd ed., 2003.

3 Snyder's empirical eluant strength parameter for alumina. Extracted from Reichardt, page 495.

4 Threshold limits for exposure. Extracted from Reichardt, pages 501-502.