ORGANIC LIQUIDS (continued)

	Molecular Weight	Melting Point (°F)	Boiling Point (°F-atmos.)	Specific Gravity (at romm temp.)	Specific Heat (at room temp)	Latent Heat (in BTU/#-atmos.)*	K (Thermal Conductivity)**	Viscosity 4.44°C/40°F	Viscosity 26.7°C/80°F	Viscosity 48.9°C/ 120°F	Viscosity 71.1°C/ 160°F	Vapor Pressure- Temperature 29.6" VAC. 10mm	Vapor Pressure- Temperature 28.0" VAC. 50mm,	Vapor Pressure- Temperature 26.0" VAC. 100mm	Vapor Pressure- Temperature 18.2" VAC. 300mm
Methyl Acetate	74	-146	139	.924	0.468	178	----	.48	.38	.30	----	-21	6.6	48	91
Methyl Alcohol	32	-142	148	.786	0.60	476	.114	.78	.56	.42	----	3.5	47	70	109
Methyl Ethyl Ketone	72	-123	175	.80	0.55	192	----	.52	.4	.33	.26	----	----	79	126
Naphthalene	128	180	424	1.145	0.402	135	.08	----	----	----	----	186	257	293	359
Nitro Benzene	123	21.5	410	1.2	0.34	143	.09	----	1.9	1.3	.9	185	252	286	347
Methyl Ethyl Ketone	72	-123	175	.80	0.55	192	----	.52	.4	.33	.26	----	----	79	126
Nitromethane	61	-19.3	215	1.138	.42	244	.12	----	----	----	----	----	----	116	166
Nitrotoluene-o	137	3	432	1.163	----	----	----	3.3	2.2	1.5	1.05	194	266	305	370
Octane	114	-70	258	.703	0.58	128	.081	.69	.52	.42	.34	66	123	151	203
Pentane-n	72	-201	97	.630	----	150	.08	.28	.23	----	----	----	----	10	52
Phenol	94	105.6	360	1.07	0.56	----	----	----	----	3.9	2.1	162	221	251	306
Phthalic Anhydride	148	267	544	1.527	----	----	----	----	----	----	----	----	356	395	471
Propane	44	-304	-44	.585	0.576	160	.08	----	----	----	----	----	----	----	----
Propyl Alcohol-n	69	-197	208	.804	0.590	296	----	3.6	2.10	1.3	.8	57	103	126	167
Pyridine	79	-43.5	240	.978	0.44	194	----	----	.87	----	----	52	108	136	189
Tetrachlorethane	168	-33	295	1.60	0.268	99	----	2.3	1.6	1.2	.85	96	153	183	237
Tetrachlorethylene	166	-2	249	1.624	0.215	90	----	1.1	.85	.70	.55	55	110	139	191
Tetranitromethane	196	55	258	1.65	----	----	----	----	----	----	----	73	127	155	205
Toluene	92	139	231	.862	0.42	157	.084	.75	.57	.45	.36	41	97	125	178
Toluidine-o	107	3	301	.99	0.510	171	----	----	----	----	----	174	238	270	331
Trichlorethylene	131.5	-99	188	1.456	0.23	104	.08	.72	.58	.49	.41	12.5	63	89	138
Xylene-o	106	-16.6	289	.874	0.42	150	.09	1.0	.78	.61	.48	68	138	172	----

* increase 10%-20% for high vacuum
**in BTU/hr/sq.ft./°F/ft. at room temperature

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Physical Properties of Chemicals & Gases

WATER SOLUTIONS

	Specific Gravity (at room temperature)	Specific Heat (at room temperature)	K (Thermal Conductivity) BTU/hr/sq.ft./ F/ft. (room temperature)	Viscosity (Cp) 12.2°C 10°F	Viscosity (Cp) 4.44°C 40°F	Viscosity (Cp) 26.7°C 80°F	Viscosity (Cp) 48.9°C 120°F	Viscosity (Cp) 71.1°C 160°F
Acetic Acid 70%	1.07	.7	.14	----	3.9	2.4	1.5	1.0
Ammonia 26%	.905	1.0	.26	----	1.8	1.2	----	----
Brine- 25% $CaCl_2$	1.23	.7	.33	8.0	4.5	2.1	----	----
Brine- 25% NaCl	1.19	.8	.34	4.8	3.3	2.1	----	----
Ethyl Alcohol 95%	.81	.6	.11	3.0	2.0	1.3	.8	.53
Ethyl Alcohol 40%	.94	.95	.22	9.6	5.2	2.5	1.23	.65
Ethylene Glycol 60%	1.080	0.74	.22	21	9.0	4.1	2.4	----
Ethylene Glycol 40%	1.055	0.84	.26	10.5	4.9	2.4	----	----
Hydrochloric Acid 31.5%	1.15	.6	----	----	2.5	1.85	1.42	1.1
Glycerine 50%	1.13	.8	.23	----	11.0	5.4	2.8	1.5
Methyl Alcohol 90%	.82	.65	.13	1.3	1.0	.73	.53	.43
Methyl Alcohol 40%	.94	.92	.23	5.5	3.4	1.8	1.0	.57
Nitric Acid 95%	1.503	----	----	1.9	1.5	1.1	.83	.65
Nitric Acid 60%	1.375	----	----	4.7	3.4	2.2	1.5	1.05
Sodium Hydroxide 50%	1.53	.78	----	----	----	60	19	8
Sodium Hydroxide 30%	1.33	.84	----	----	----	9.6	4.5	2.5
Sucrose (cane sugar) 60%	1.29	----	----	----	----	41	14	7
Sucrose 40%	1.18	----	----	----	12	5	2.5	1.6
Sucrose 20%	1.08	----	----	----	3.2	1.6	.98	.68
Sulfuric Acid 98%	1.84	.35	.15	----	46	23	11.5	6.4
Sulfuric Acid 60%	1.50	.58	.24	----	9.5	6.0	3.9	2.7
Water	1.00	1.00	.34	----	1.55	0.861	0.56	0.40

GASES

	Molecular Weight	Density (measured in lbs. per cubic ft. @ 760 mm and 32°F)	SPECIFIC HEAT (BTU/lb./°F)			K (Thermal Conductivity in BTU/hr/sq.ft./°F/ft.)		VISCOSITY (Cp)		
			0°C 32°F	100°C 212°F	500°C 932°F	0°C 32°F	100°C 212°F	0°C 32°F	100°C 212°F	500°C 932°F
Acetic Acid	60	----	----	1.5*	----	----	----	----	.01	.023
Acetone	58	----	----	.35*	----	.0057	.0099	----	.0095	.019
Acetylene	26	.0732	.4	.45	.58	.011	.017	.0095	.0123	.0225
Air	29	.0808	.241	.242	.246	.014	.018	.017	.0213	.035
Ammonia	17	.0482	.52	.54	.71	.0128	.0185	.0094	.013	.027
Benzene	78	----	----	.325*	----	.0052	.0103	----	.0095	.0197
Butane	58	.1623	.375	.455	----	.0078	.0135	.008	.011	.02
Carbon Dioxide	44	.1235	.20	.21	.26	.0085	.0133	.0137	.0178	.0335
Carbon Disulphide	76	----	----	.16*	----	.004	----	----	.0127	.0278
Carbon Monoxide	28	.0781	.25	.255	.27	.0135	----	.0171	.0215	.0352
Chlorine	71	.2011	.114	.118	.124	.0043	----	.0128	.017	.034
Chloroform	119.4	----	----	.145*	----	.0038	.0058	----	.0128	.0252
Cyclohexane	84	----	----	.41*	----	----	.0095	----	.0087	.017
Ethane	30	.0848	.4	.5	.84	.0106	.0175	.0085	.0113	.0222
Ethylene	28	.0783	.36	.45	.72	.0101	.0161	.0095	.0123	.0232
Ethylene Chloride	64.5	.1798	----	.28	----	.0055	.0095	.0218	.0295	----
Freon- 12	121	----	.14	.16	----	.0048	.008	.0118	.0145	----
Hydrogen	2	.0056	3.5	3.5	3.5	.1	.129	.0084	.0104	.0170
Hydrogen Chloride	36.5	.1024	.19	.192	.202	----	----	.0128	.0172	.035
Hydrogen Fluoride	20	.0576	.34	.345	.362	----	----	----	----	----
Hydrogen Sulfide	34	.0961	.24	.25	.3	.0076	----	.0118	.016	.0334
Methane	16	.0448	.53	.6	.92	.0175	----	.0102	.0132	.024
Methyl Chloride	50.5	.1406	.185	.217	----	.0053	.0094	.0235	.0331	----
Nitric Oxide	30	.0837	.232	.236	.258	.0138	----	.0179	.0223	.0369
Nitrogen	28	.0782	.250	.253	.27	.014	.018	.0167	.0210	.036
Oxygen	32	.0892	.22	.225	.257	.0142	.0185	.0192	.0240	.0394
Propane	44	.1252	.38	.46	----	.0087	.0151	.0077	.010	.0185
Sulfur Dioxide	64	.1828	.151	.162	.194	.005	.0069	.0115	.0150	.028
Water (steam)	18	----	----	.453	.507	----	.0137	----	.0125	.028

*Note: Specific Heat for saturated vapor at atmospheric B.P.

References

1. Chemical Engineer's Handbook- Perry
2. Handbook of Chemistry- Lange
3. Heat Transmission- McAdams
4. Applied Heat Transmission- Stoever
5. "Rubber" Handbook of Chemistry
6. Personal Communications- W.M. Berell

ORGANIC LIQUIDS

	Molecular Weight	Melting Point (°F)	Boiling Point (°F-atmos.)	Specific Gravity (at romm temp.)	Specific Heat (at room temp)	Latent Heat (In BTU/#-atmos.)*	K (Thermal Conductivity)**	Viscosity				Vapor Pressure - Temperature			
								4.44°C 40°F	26.7°C 0°F	48.9°C 120°F	71.1°C 160°F	29.6" VAC .10mm	28.0" VAC. 50mm	26.0" VAC. 100mm	18.2" VAC. 300mm
Water	18	32	212	1.00	1.00			1.55				52.4	100.8		
Acetaldehyde	44	-191	71.6	.783								----	----		
Acetic Acid				1.05	0.48				1.18						
Acetone	58	-137	133	.789	0.514				0.32	.26			21.5		
Allyl Alcohol	58	----	205.9	.85	0.67	293	.104	4.5	2.99	1.95	1.32	50.9	98.6	122	
Amyl Acetate	130	----	285.8	.87	0.52	----	.078	2.82	1.97	1.40	1.03	----	----	----	----
Amyl Alcohol	88	-102	280	.816	0.58	218	.095	7.2	3.8	2.05	1.15	102.5	153	178	223
Aniline	93	20.8	364	1.026	0.52	187	.100	7.0	3.8	2.2	1.3	156	218	248	306
Benzaldehyde	106	-70		1.043	0.43	156	----	----	----	----	----	144	204	234	292
Benzene	78	21.8	176	.872	0.45	170	.087	----	.62	.46	.30	9.5	54	71	127
Benzoyl Chloride	140.5	-.9	387	1.212	----	----	----	----	----	----	----	164	230	264	325
Benzyl Alcohol	108	5	401	1.04	0.52	203	----	12.0	4.8	2.7	1.7	192	254	286	344
Benzyl Chloride	126.5	-38.2	355	1.10	0.323	----	----	----	----	----	----	145	206	242	295
Butyl Acetate-n	116	-107	260	.876	0.47	133	.085	.85	.62	.45	.29	----	----	----	----
Butyl Alcohol- n	74	-130	244	.806	0.56	256	.095	4.6	2.6	1.55	.93	87.5	128	158	201
Carbon Disulphide	76	-170	115.5	1.263	0.24	152	.091	.42	.36	----	----	-49	-2	23	58
Carbon Tetrachloride	154	-9.5	170	1.584	0.21	84	.095	1.3	.95	.7	.53	-4	46	72	121
Chloracetic Acid	94.5	132	373	1.58	----	----	----	----	----	----	----	147	201	244	305
Chloral	147.5	-71	207.5	1.505	0.250	98	----	----	----	----	----	33	84	110	158
Chlorobenzene	112.5	-49	269	1.101	0.31	140	.083	1.16	.83	.62	.46	71.5	129	159	213
Chloroform	119.4	-83	142	1.48	0.24	107	.08	.68	.55	.45	----	-22	26	49	95
Chlortoluene-o	126.5	-29	319	1.082	0.315	131	----	1.3	1.0	.75	.58	109	170	201	260
Cyclohexane	84	20.5	177.5	.774	0.44	155	----	1.25	.86	.61	----	----	53	79	127
Cyclohexanone	98	-49	311	.947	0.431	----	----	----	----	----	----	----	----	----	----
Decane	142	-22	345	.73	0.43	109	.083	----	.75	----	----	133	195	227	287
Dibutyl Phthalate	278	----	644	1.045	----	----	----	----	----	----	----	399	471	----	----
Diethyl Aniline	149	-30	421	.934	0.452	140	----	----	----	----	----	198	264	298	356
Diiethyl Phthalate-o	222	----	569	1.121	----	----	----	----	----	----	----	338	399	428	----
Dimethyl Aniline	121	36.5	379	.956	0.403	144	----	----	----	----	----	165	228	261	320
Dimethyl Phthalate-o	194	----	539	1.189	----	----	----	----	----	----	----	311	381	419	----
Diphenyl	154	157	491	.992	0.450	120	.08	----	----	----	----	246	320	358	422
Dipropyl Ether	102	-76	156	.725	----	----	----	----	----	----	----	----	63	93	143
Dowtherm-A	166	54	500	.995	0.63	123	.08	----	----	----	----	240	315	355	427
Dowtherm-C	231	70 - 270	600	1.10	.35 - .65	----	.08	----	----	----	----	----	----	----	----
Ethyl Acetate	88	-119	171	.895	0.46	185	.101	.58	.45	.35	.28	6.5	54	79	124
Ethyl Alcohol	46	-174	173	.785	0.54	370	.087	1.7	1.1	.74	.51	27	73	95	134
Ethyl Benzene	106	-137	277	.867	0.41	147	.082	.92	.7	.54	.43	52	119	154	211
Ethyl Bromide	109	-182	101	1.45	0.22	109	.07	.48	.38	----	----	-54	-10	14	57.5
Ethyl Chloride	64.5	-218	54	.921	0.38	167	.08	.32	----	----	----	----	-46	-25	14
Ethyl Ether	74	-177	94	.708	0.55	152	.08	.28	.22	----	----	-56	-13	10	51.5
Ethylene Dichloride	99	-31	183	1.246	0.31	140	----	1.06	.77	.59	.46	10	59	85	133
Ethylene Glycol	62	12.5	387	1.11	0.58	346	.153	44.0	19.0	9.0	4.5	193	252	280	332
Furfural Alcohol	98	----	337	1.133	0.46	----	----	----	----	----	----	147	203	232	284
Glycerol	92	-0.4	554	1.26	0.58	340	.164	----	490	130	56.0	331	397	432	493
Heptane	100	-130	209	.684	0.52	138	.081	.5	.4	.32	.26	26.5	80	108	158
Hexane	86	-137	156	.66	0.54	144	.08	.39	.31	.26	----	-12.5	36	61	108
Isoamyl Acetate	130	-102	288	.876	0.48	125	.083	1.2	.83	.6	.44	55	135	163	216
Isoamyl Alcohol	88	-179	270	.805	0.54	217	.091	----	----	----	----	106	155	180	223
Isobutane	58	-229	14	.603	0.550	150	----	----	----	----	----	----	----	----	-36
Isobutyl Acetate	116	-146	244	.871	0.459	132	----	----	----	----	----	61	113	143	190
Isobutyl Alcohol	74	-163	226	.798	0.60	250	.091	7.2	3.6	1.9	1.0	----	----	140	185
Isopropyl Alcohol	60	-130	180	.781	0.64	288	.09	3.6	2.0	1.13	.68	37.5	81	103	142
Maleic Anhydride	98	136	395	1.5	----	----	----	----	----	----	----	176	252	291	----