

38. Tables of Physical Properties of Compounds and their Derivatives

ALCOHOLS	bp °C	n_D^{20} *25 °C	mp °C 1-NU	mp °C 3,5-DNB	mp °C PU
2-Methyl-2-butanol	102	1.405	72	117	42
3-Methyl-2-butanol	114	1.397	109	76	68
2-Pentanol	120	1.406	76	62	--
3,3-Dimethyl-2-butanol	120	1.415	101	107	78
3-Methyl-3-pentanol	123	1.411	84	96	44
2-Methyl-1-butanol	129	1.411	82	70	31
4-Methyl-2-pentanol	132	1.401	88	65	143
2-Hexanol	138	1.413	61	38	--
1-Pentanol	138	1.410	68	46	46
Cyclopentanol	141	1.453	118	115	132
2-Methyl-1-pentanol	148	1.419	76	51	--
1-Hexanol	158	1.418	62	61	42
2-Heptanol	159	1.421	54	49	--
Cyclohexanol	161	1.465*	129	113	82
1-Heptanol	177	1.424	62	47	65
2-Octanol	179	1.426	64	32	114
1-Octanol	195	1.427*	67	62	74
1-Phenylethanol	202	1.528	106	94	92
Benzyl Alcohol	206	1.540	134	113	76
2-Phenylethanol	220	1.524	119	108	80

1-NU = 1-Naphtylurethane; 3,5-DNB = 3,5-Dinitrobenzoate; PU = Phenylurethane

PHENOLS	mp °C	bp °C	mp °C 1-NU	mp °C 3,5-DNB	mp °C Bromo Derivative	mp °C PU
<i>o</i> -Chlorophenol	7	176	120	143	76 (di)	121
Phenol	42	182	132	146	95 (tri)	126
<i>o</i> -Cresol	31	192	142	138	56 (di)	143
<i>o</i> -Bromophenol	5	195	129		95	--
<i>p</i> -Cresol	36	202	146	189	49 (di)	115
<i>m</i> -Cresol	12	203	128	165	84 (tri)	125
2,4-Dimethylphenol	27	212	135	164	179 (tri)	112
<i>o</i> -Methoxyphenol	28	205	118	142	116 (tri)	136
<i>m</i> -Methoxyphenol	--	243	129	--	104 (tri)	--
<i>o</i> -Nitrophenol	45	216	113	155	117 (di)	--
<i>p</i> -Chlorophenol	45	217	166	186	90 (di)	148
<i>p</i> -Ethylphenol	47	219	128	133	--	120
1-Naphthol	94	280	152	217	105 (di)	178
<i>p</i> - <i>tert</i> -Butylphenol	100	237	110		67 (di)	148
2-Naphthol	123	286	157	210	84	156

1-NU = 1-Naphtylurethane; 3,5-DNB = 3,5-Dinitrobenzoate; PU = Phenylurethane

ALDEHYDES	bp °C	n _D ²⁰	mp °C SC	mp °C 2,4-DNP
Butanal	75	1.384	106	123
2,2-Dimethylpropanal	75	1.379	190	209
3-Methylbutanal	92	1.394	107	123
Pentanal	103	1.395	--	107
Hexanal	131	1.407	106	107
Heptanal	155	1.412	109	108
Octanal	170	1.422	101	106
Benzaldehyde	179	1.545	224	237
<i>p</i> -Methylbenzaldehyde	204	1.545	234	233
<i>p</i> -Methoxybenzaldehyde	248	1.573	209	254
trans-Cinnamaldehyde	252	1.619	215	255
	mp °C			
Phenylacetaldehyde	34	--	156	121
<i>p</i> -Chlorobenzaldehyde	47	--	232	265
2-Naphthaldehyde	60	--	245	270
<i>p</i> -Nitrobenzaldehyde	106	--	221	320

SC = Semicarbazone; DNP = 2,4-Dinitrophenylhydrazine

KETONES	bp °C	n_D²⁰	mp °C SC	mp °C 2,4-DNP
Butanone	80	1.379	115	146
3-Methyl-2-butanone	94	1.388	114	120
2-Pentanone	102	1.390	112	144
3-Pentanone	102	1.392	139	156
3,3-Dimethyl-2-butanone	106	1.396	158	125
4-Methyl-2-pentanone	117	1.396	132	95
2-Hexanone	128	1.401	125	107
Cyclopentanone	131	1.437	210	146
2-Heptanone	151	1.401	127	89
Cyclohexanone	156	1.451	167	162
2,6-Dimethyl-4-heptanone	168	1.417	122	92
Cycloheptanone	180	1.461	162	148
Acetophenone	202	1.532	199	250
Ethyl phenyl ketone	218	1.527	174	191
Propyl phenyl ketone	230	1.520	188	190
	mp °C			
Benzyl methyl ketone	27	--	198	156
Benzalacetone	42	--	186	227
Benzophenone	49	--	165	238
Benzyl phenyl ketone	60	--	148	206
Fluorenone	83	--	--	284

PRIMARY AND SECONDARY AMINES	bp °C	n_D²⁰	mp °C BSA	mp °C BA	mp °C P
Diisopropylamine	84	1.392	94	--	140
Piperidine	106	1.453	94	48	152
Morpholine	130	1.455	119	75	148
Cyclohexylamine	134	1.459	89	149	--
Aniline	183	1.586	112	163	180
Benzylamine	185	1.540	88	105	199
1-Phenylethylamine	185	1.526	--	120	--
N-Methylaniline	196	1.573	79	63	145
2-Phenylethylamine	198	1.533	69	116	167
o-Toluidine	200	1.569	124	144	213
N-Ethylaniline	205	1.556	--	60	138
Dibenzylamine	300	1.575	68	112	--
	mp °C				
p-Toluidine	45	--	120	158	181
4-Methoxyaniline	58	--	96	154	--

BSA = Benzenesulfonamide; BA = Benzamide; P = Picrate

TERTIARY AMINES	bp °C	n_D²⁰	mp °C P	mp °C M
Tripropylamine	156	1.418	117	208
<i>N,N</i> -Dimethylbenzylamine	184	1.501	93	179
Tributylamine	212	1.428	106	186
<i>N,N</i> -Dimethylaniline	193	1.588	164	228
<i>N</i> -Ethyl- <i>N</i> -methylaniline	201	1.547	134	125
<i>N,N</i> -Dimethyl- <i>p</i> -toluidine	211	1.536	130	220
<i>N,N</i> -Diethylaniline	218	1.542	142	102
	mp °C			
<i>N,N</i> -Dibenzylaniline	70		132	135

P = Picrate; M = Methiodide

CARBOXYLIC ACIDS	bp °C	n_D²⁰	mp °C Amide	mp °C Anilide	mp °C PNBE
Propanoic	141	1.387	79	106	31
2-Methylpropanoic	154	1.392	129	105	--
Butanoic	163	1.398	115	96	35
Pentanoic	186	1.409	106	63	--
Hexanoic	205	1.416	100	95	--
	mp °C				
Cyclohexanecarboxylic	31		186	144	--
2,2-Dimethylpropanoic	35		154	133	--
Phenylacetic	76		157	118	65
Phenoxyacetic	99		101	101	--
Glutaric	98		175	224	69
Oxalic•2H ₂ O	101		419d	246	204
<i>o</i> -Toluic	105		143	125	91
<i>m</i> -Toluic	111		95	126	87
Benzoic	121		129	162	89
Cinnamic	133		147	153	117
Decanedioic (sebacic)	133		209	202	73
Maleic	135		181	187	89
Malonic	135d		170	225	86
Octanedioic (suberic)	142		217	187	85
Diphenylacetic	148		168	180	--
Hexanedioic (adipic)	152		220	239	106
1-Naphthoic	162		202	163	--
<i>p</i> -Toluic	178		159	146	104
<i>p</i> -Methoxybenzoic	184		162	169	132
2-Naphthoic	185		192	170	--
Butanedioic (succinic)	185		260	230	88

PNBE = *p*-Nitrobenzyl ester