

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES

I. Acyl Fluorides (Listed in order of increasing b.p.)*

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	<i>p</i> -Toluidide	2-Naphthyl amide	Miscellaneous
						B p, °C	M p, °C					
1	Acetyl fluoride	20-1			1.002 ¹⁵	118		82	114	147	134	
2	Propionyl fluoride	44.6				141		81	106	126		
3	Fluoroacetyl fluoride	50.5-51				167.9	31-2	108				
4	Trichloroacetyl fluoride	66.8				197	57.8	141	97	113		
5	<i>n</i> -Butyryl fluoride	67				162.5		115	96	75	125	
6	Chloroacetyl fluoride	73.5					63	120	137	162	117.8	
7	Phthaloyl difluoride	224.6	42-3				206	220(<i>dt</i>)	253(<i>dt</i>)	201(<i>dt</i>)		
8	Phenylacetyl fluoride	88-9 ¹⁷	.				76	156	118	136	159	

* Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES
II. Acyl Chlorides a) Liquids 1) (Listed in order of increasing atmospheric b.p.)*

No	Name	Boiling point, °C	Melting point °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthyl amide	Miscellaneous
						B p., °C	M p., °C					
1	Acetyl chloride	51-2		1 3897 ²⁰	1 105 ²⁰ ₄	118		82	114	147	134	
2	Oxalyl chloride	64	-12	1 434 ¹³	1 488 ¹³ ₄		101 (dihyd)	419d	246	268		
3	Fluoroacetyl chloride	72-3				167 9	31-2	108				
4	Acrylyl chloride	76		1 4343 ²⁰	1 114 ²⁰ ₄	140		85	105	141		
5	Propionyl chloride	80		1 4051 ²⁰	1 065 ²⁰	141		81	106	126		
6	Isobutyryl chloride	92		1 4079 ²⁰	1 017 ²⁰ ₄	154 5		128	105	107		
7	Methacrylyl chloride	95-6		1 4435		160 5	15-6	102-6				
8	Vinylacetyl chloride	98				163		72-3	58			
9	n-Butyryl chloride	101-2		1 4121 ²⁰	1 028 ²⁰ ₄	162 5		115	96	75		
10	Pivalyl chloride	105-6					35	154	129	120		
11	Dichloroacetyl chloride	108				194		98	118	153		
12	Chloroacetyl chloride	108-10		1 454 ²⁰	1 3997 ¹⁸ ₄	189	63	120	137	162		
13	DL-α-Chloropropionyl chloride	110-11		1 440 ²⁰	1 285 ²⁰ ₄	185-6		80	92	124		
14	Methoxyacetyl chloride	113				204		97	58			
15	DL-Ethylmethacetyl chloride	115-6				176		112	110	93		
16	Isovaleryl chloride	115		1 4136 ²⁴ ₃	0 985 ²⁴ ₄	176		135	109 10	107	138 5	
17	Acetylglycyl chloride	115-8					206	137				Hydrazide 115 Me ester 58 9
18	Trichloroacetyl chloride	118		1 470 ²⁰	1 620 ²⁰ ₄	197	57 8	141	97	113		
19	Cyclopropane carbonyl chloride	120			1 152 ²⁰ ₀	186	18	125				
20	Ethoxyacetyl chloride	123-4				207		80 2				
21	trans-Crotonyl chloride	126		1 46 ¹⁸	1 08 ²⁰ ₄		72	161	118	132		
22	n-Pentanoyl chloride (n-Valeryl chloride)	126		1 420 ²⁰	1 0004 ²⁰ ₀	186		106	63	74	112	
23	Allylacetyl chloride	128			1 074 ¹⁶	188 9		94				
24	Bromoacetyl chloride	133-5			1 908 ⁰	208	50	91	131		134	
25	Cyclobutane carbonyl chloride	137 142 3				195		153				
26	β-Methoxypropionyl chloride	138		1 424		107 ¹⁰		50 5				
27	Diethylacetyl chloride	140		1 4234		190		107				
28	β-Chloropropionyl chloride	144		1 455	1 331 ¹³		42		119	121		
29	Isocaproyl chloride (4-Methylpentanoyl chloride)	147			0 9725 ²⁰ ₄	199		121	112	63		
30	α-Acetoxypionyl chloride (O-Acetyl lactoyl chloride)	150 part d		1 4241 ¹⁷	1 192		57 60, 40					
31	DL-α-Bromobutyryl chloride	150-2				217d	-4	112	98	92		
32	n-Hexanoyl chloride (n-Caproyl chloride)	153		1 426 ²⁰	0 975 ²⁰ ₄	205		100	95	75	107	
34	Furoyl chloride	173 4					133-4	142-3	124	107		
35	n-Heptanoyl chloride (Enanthoyl chloride)	175		1 4345 ¹⁵	0 963 ²⁰ ₀	223		96	70 (65)	81	101	
36	Hexahydrobenzoyl chloride (Cyclohexane carboxylic acid chloride)	183 4		1 4766 ¹⁵ 1 4711 ²⁰	1 096 ¹⁵ ₄		29 30	185	143 4			
37	3-Fluorobenzoyl chloride	189, 204					124	130				
38	Succinyl dichloride	190d	20	1 473 ¹⁵	1 395 ¹⁵ ₄		186	260 (di)	230 (di)	255 (di)		
39	4-Fluorobenzoyl chloride	193	9				183	154 5				

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES
II. Acyl Chlorides a) Liquids 1) (Listed in order of increasing atmospheric b.p.)* (Continued)

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthyl amide	Miscellaneous
						B p, °C	M p, °C					
40	<i>n</i> -Octanoyl chloride (<i>n</i> -Capryloyl chloride)	196			0.949 ²⁰	239	16	110, 106	57	70	103	
41	Benzoyl chloride	197	-1	1.558 ¹⁵	1.212 ²⁰		122	130	163	158		
42	Diethyl malonyl dichloride	197		1.5537 ²⁰	1.2187 ¹⁵		125	224 (<i>di</i>)				
43	2-Fluorobenzoyl chloride	206	4				126.5	116				
44	Phenylacetyl chloride	210		1.533 ²⁰	1.1685 ²⁰		76	156	118	136	159	
45	<i>n</i> -Nonanoyl chloride (Pelargonyl chloride)	215			0.946 ¹⁵	255	12	99	57	84	103	
46	Glutaryl dichloride	218		1.473 ²⁰	1.324 ²⁰	302	97.8	175.6 (<i>di</i>)	224			
47	4-Chlorobenzoyl chloride	222	16	1.579 ²⁰	1.362 ²⁰		240	179, 170	194			
48	Hydrocinnamoyl chloride (β -Phenylpropionyl chloride)	225 d			1.135 ²¹		48	105	98, pet eth	135		
49	3-Chlorobenzoyl chloride	225					158	134	122			
50	Phenoxyacetyl chloride	225-6					98-9	101.5	101			
51	4-Methylbenzoyl chloride (4-Toluyyl chloride)	225.6	-3.9	1.545 ²⁰	1.1686 ²⁰		179-80	160	145	160		
52	<i>n</i> -Decanoyl chloride	232				268.70	31	108.98	70	78	104	
53	2-Chlorobenzoyl chloride	233					142	142	118	131		
54	3-Methoxybenzoyl chloride	242.4					110, 105					Benzylamine salt of acid, 112 Hydrazide, 151
55	3-Bromobenzoyl chloride	243, 239					155	155	136			
56	2-Bromobenzoyl chloride	245	11				150	155.6	141			Hydrazide, 153
57	2-Methoxybenzoyl chloride	254						129	131			Phenyl ester, 59
58	4-Methoxybenzoyl chloride (Anisoyl chloride)	262.3 sl d	22	1.58 ²⁰	1.261 ²⁰		184	162.3	169, 163	186		Aniside, 202
59	Phthaloyl dichloride	276	15.6	1.569 ²⁰	1.406 ²⁰		200.6	220 (<i>di</i>)	253.5 (<i>di</i>)	201 (<i>di</i>)		
60	3-Nitrobenzoyl chloride	278	35				140	143	154	162		
61	1-Naphthoyl chloride	297.5	20				161	202				Piperide, 85.7

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES

II. Acyl Chlorides a) Liquids

2) (Reduced pressure b.p. only) (Listed in order of increasing m.p. of the corresponding amides)*

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthyl amide	Miscellaneous
						B p °C	M p, °C					
1	<i>β</i> -Ethoxypropionyl chloride	78 ⁵²				120 ¹⁷		51				
2	Azidoacetyl chloride	50 ²⁰					16	58				
3	Oleyl chloride	163 ²					16	75.6	41	42.5		
4	<i>γ</i> -Phenoxybutyryl chloride	155 ²⁰					64-5	80				
5	<i>γ</i> -Phenylbutyryl chloride	140-2 ¹²				290	60	84.5				
6	<i>ω</i> -Undecenoyl chloride (<i>ω</i> -Undecenoyl chloride, <i>ω</i> -Hendecenoyl chloride)	128 ¹⁴				275	52	87				
7	Benzoylformyl chloride	125 ⁹					64-6	91				2,4-Dinitrophenyl-hydrazone of acid, 196.7, yel
8	Iodoacetyl chloride	49-52 ¹⁵			2.25 ²⁵		83	95	143-4			
9	<i>β</i> -Iodopropionyl chloride	81 ¹⁵					82, 85	101, 142				
10	Palmitoyl chloride	194 ¹⁷	11-2				63	106-7	90	98	109	
11	Myristoyl chloride	174 ¹⁶	1-3				54, 58	107	84	93	108	
12	Phenylpropionyl chloride	115-6 ¹⁷					136-7	108-9, 99, 100	126	142		
13	Dodecanoyl chloride (Lauroyl chloride)	145 ¹⁸	-17	1.446 ²⁰		299	44	110, 102	78	87	106	
14	<i>α</i> -Phenoxybutyryl chloride	128-31 ³⁸				258	82.3	111, 123	93-4			Phenyl ester, 48-9
15	Cyanoacetyl chloride	57 ^{0.5}					99	119, 20	198-9			
16	Nicotinyl chloride	90 ¹⁵					66	122	85			
17	Dibenzylacetyl chloride	202 ¹⁸					235	129	155			
18	<i>α</i> -Phenoxypropionyl chloride	115 ²⁰					89	129	117	115	117	
19	DL- <i>α</i> -Bromoisovaleryl chloride	59 ¹⁵					115.6	132	117			
20	3-Ethoxybenzoyl chloride	135-40 ¹⁶	27.8				112.3	133	116	124	145	
21	<i>α</i> -Bromoisobutyryl chloride	52 ³⁰		1.475 ²³			44	133	116	124	145	
22	4-Isopropylbenzoyl chloride	121 ¹⁰					137	139				
23	Benzilic acid chloride (<i>α</i> -Hydroxydiphenylacetyl chloride)	193.5 ²⁷					137	139				
24	1-Naphthoxyacetyl chloride	194 ¹⁰					48.9	148	83	92.5	135	
25	Hexahydrophenylacetyl chloride (Cyclohexylacetyl chloride)	98, 100 ²³				244-6	256-8	153				
26	Azelayl dichloride	166 ¹⁴ , 140 ¹⁴					150	154.5	175	190		Me ester 74-5
27	2-Nitrobenzoyl chloride	148 ⁹	20				190	155	144			4-Phenetidine, 145.6
28	Mesaconyl dichloride (Methylfumaryl di-chloride)	64-5 ¹⁴					190	155	144			
29	1-Naphthylacetyl chloride	188 ²³					244-6	33	171-2			
30	2,4,6-Trimethylbenzoyl chloride	155-6 ¹⁸		1.5263 ²⁵	1.0967 ²⁵		106.5	175 (dt)	186-7 (dt)	191 (dt)		
31	3-Formylbenzoyl chloride	130 ²⁰					146	176	155			
32	4-Ethoxybenzoyl chloride	160 ²⁰					240.5	177 (dt)	186 (dt)	212		
33	Sebacoyl dichloride	182 ¹⁶		1.4684	1.1212 ²⁰		131	180.1				
							154	188				
							175	190				Me ester, 53, Semicarbazone of acid, 265
							198	202	170			
							134.5	210 (dt)	198 (dt)			

* Derivative data given in order m.p., crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES

H. Acyl Chlorides a) Liquids

2) (Reduced pressure b.p. only) (Listed in order of increasing m.p. of the corresponding amides)* (Continued)

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthyl amide	Miscellaneous
						B p., °C	M p., °C					
34	Adipyl dichloride	130-2 ¹⁸					153	220 (di)	240-1	241		Di-N-methyl-amide, 152-3
35	Benzylmalonyl dichloride	141 ¹⁵					117d	225 (di)	217 (di)			Di-Me ester, 51
36	Phenylmalonyl dichloride	122 ¹⁵					152-3	233				
37	trans-Aconityl trichloride (1,2,3-Propylenetricarboxylic acid trichloride)	155-7 ²⁰					194-5	260 (tri) (sinters)				
38	Fumaryl dichloride	63 ¹³		1 5004 ¹⁸	1 408 ²⁰		300-2	266 (di)	314 (di)			

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES
III. Acyl Bromides a) Liquids 1) (Listed in order of increasing atmospheric b.p.)*

No	Name	Boiling point °C	Melting point °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthylamide	Miscellaneous
						B p, °C	M p °C					
1	Oxalyl dibromide	64					101 (hyd)	419d (dt)	254 (dt)	268 (dt)		
2	Acetyl bromide	81		1.4538 ¹⁸	1.6625 ¹⁶	118		82	114	147	132	
3	Propionyl bromide	103				141		81	106	126		
4	Chloroacetyl bromide	127					63	120	137	162	117-8	
5	n-Butyryl bromide	128				162.5		115	96	75	125	
6	Isovaleryl bromide	138-40				176		135		107	138.5	
7	Trichloroacetyl bromide	143			1.901 ¹⁸	197	57-8	162.5	95-7	113		4-Nitroanilide, 146-7
8	Bromoacetyl bromide	150			2.425	208	50	91	131		134	
9	DL-α-Bromopropionyl bromide	154-5			2.061 ¹⁶	204	25.7	123	99, 110			
10	α-Bromoisobutyryl bromide	162-4				198-200	48.9	148	83	92.5	135	
11	DL-α-Bromobutyryl bromide	172.4				127 ²⁵	-4	112, 108				
12	n-Hexanoyl bromide (n-Caproyl bromide)	175-6				205		100	95	75	107	
13	DL-α-Bromoisovaleryl bromide	184-94					44	133	116	124	145	
14	Benzoyl bromide	218-9			1.570 ¹⁵		122	130	163	158		

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES

III. Acyl Bromides a) Liquids

2) (Reduced pressure b.p. only) (Listed in order of increasing m.p. of the corresponding amides)*

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	p-Toluidide	2-Naphthyl amide	Miscellaneous
						B p, °C	M p, °C					
1	3-Methylbenzoyl bromide	137 ⁵²					111	94 97	126	118		
2	n-Pentanoyl bromide (n-Valeryl bromide)	64 ⁶⁶				186 5		106	63	74		
3	3-Chlorobenzoyl bromide	145 ⁴⁰					158, 155	134	122			
4	2-Chlorobenzoyl bromide	144 ³⁷					140	142	114, 118	131		
5	2-Methylbenzoyl bromide	135 ³⁷					104 5	143	125	144		
6	2-Bromobenzoyl bromide	167 ¹⁸					150	155	141			
7	Phenylacetyl bromide	150-5 ⁵⁰					76	156	117-8	135-6	159	
8	4-Methylbenzoyl bromide	147 ⁴²					179-80	160	145 148	160, 165		
9	4-Methoxybenzoyl bromide	185 ²⁷					184-6	167, 163	169-71	186		
10	4-Chlorobenzoyl bromide	142 ²⁷					240	179, 170	194			
11	4-Bromobenzoyl bromide	136 ¹⁸					251	189	197			
12	Succinyl dibromide	105-6 ¹³					186	260 (dt)	230 (dt)	255 (dt)		

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES
IV. Acyl Iodides. Liquids 1) (Listed in order of increasing atmospheric b.p.)*

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	<i>p</i> -Toluidide	2-Naphthyl amide	Miscellaneous
						B p, °C	M p, °C					
1	Acetyl iodide	108			1.98 ¹⁷	118		82	114	147	134	
2	Propionyl iodide	127				141		81	106 103	126		
3	<i>n</i> -Butyryl iodide	146-8				162.5		115	96	75	125	

*Derivative data given in order m p, crystal color, solvent from which crystallized

TABLE XIII. ORGANIC DERIVATIVES OF ACYL HALIDES

IV. Acyl Iodides. Liquids

2) (Reduced pressure b.p. only) (Listed in order of increasing m.p. of the corresponding amides)*

No	Name	Boiling point, °C	Melting point, °C	n _D	Density g/ml	Acid		Amide	Anilide	<i>p</i> -Toluidide	2-Naphthyl amide	Miscellaneous
						B p, °C	M p, °C					
1	Dichloroacetyl iodide	55 ¹⁵		1.5754		194		98	118	153		
2	Chloroacetyl iodide	37 ⁴		1.5903			63	120	137, 134	162	117-8	
3	Benzoyl iodide	109 ¹⁰					122	130	163	158		
4	Trichloroacetyl iodide	74 ³⁰		1.5711		197	57-8	141	97-94	113		

*Derivative data given in order m p, crystal color, solvent from which crystallized