

TABLE 1 - Petroleum Distillation Fractions

Fraction	Distillation Temperature, C	Carbon Number
Gas	Below 20	C₁-C₄
Petroleum ether	20-60	C₅-C₆
Ligroin (light naphtha)	60-100	C₆-C₇
Natural gasoline	40-205	C₅-C₁₀, and cycloalkanes
Kerosene	175-325	C₁₂-C₁₈, and aromatics
Gas oil	Above 275	C₁₂ and higher
Lubricating oils	Non-volatile liquids	Long chains attached to cyclic structures
Asphalt or petroleum coke	Non-volatile liquids	Polycyclic structures

TABLE 2 - Common Alkane Hydrocarbons

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methane	CH ₄	-183	-162	Gas	5	15	Asphyxiant
Ethane	CH ₃ CH ₃	-172	-88.5	Gas	3	12.5	Asphyxiant
Propane	CH ₃ CH ₂ CH ₃	-187	-42	-148	2.1	9.5	PEL 1000
n-Butane	CH ₃ (CH ₂) ₂ CH ₃	-138	0	-76	1.6	8.4	PEL 800
n-Pentane	CH ₃ (CH ₂) ₃ CH ₃	-130	36	-40	1.5	7.8	PEL 600
n-Hexane	CH ₃ (CH ₂) ₄ CH ₃	-95	69	-7	1.1	7.5	PEL 50
n-Heptane	CH ₃ (CH ₂) ₅ CH ₃	-90.5	98	25	1	6.7	PEL 400
n-Octane	CH ₃ (CH ₂) ₆ CH ₃	-57	126	56	1	5.6	PEL 300
n-Nonane	CH ₃ (CH ₂) ₇ CH ₃	-54	151	88	0.9	2.9	PEL 200

TABLE 3 - Common Alkane Isomers

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
n-Butane	C_4H_{10}	-138	0	-76	1.6	8.4	PEL 800
Isobutane	C_4H_{10}	-159	-12		1.8	8.4	
Pentane	C_5H_{12}	-130	36	-40	1.5	7.8	PEL 600
2-methyl butane	C_5H_{12}	-160	28	-60	1.4	8.3	
2,2-dimethylpropane	C_5H_{12}	-17	9.5		1.4	7.5	
Hexane	C_6H_{14}	-95	69	-7	1.1	7.5	PEL 50
2-methylpentane	C_6H_{14}	-154	60	20	1	7	TWA 500
3-Methylpentane	C_6H_{14}	-118	63	19	1.2	7	TWA 500
2,2-Dimethylbutane	C_6H_{14}	-98	50	-54	1.2	7	TWA 500
2,3-Dimethylbutane	C_6H_{14}	-129	58	-20	1.2	7	TWA 500

TABLE 4 - Common Alkene Hydrocarbons

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Ethylene	$\text{CH}_2=\text{CH}_2$	-169	-102	Gas	2.7	36	Asphyxiant
Propylene	$\text{CH}_2=\text{CHCH}_3$	-185	-48	-162	2	11.1	Asphyxiant
1-Butene	$\text{CH}_2=\text{CHCH}_2\text{CH}_3$	-185	-6.5	-112	1.6	10	Asphyxiant
1-Pentene	$\text{CH}_2=\text{CH}(\text{CH}_2)_2\text{CH}_3$		30	0	1.5	8.7	
1-Hexene	$\text{CH}_2=\text{CH}(\text{CH}_2)_3\text{CH}_3$	-138	64	20	1.2	6.9	
cis-2-Butene	$\text{CH}_3\text{CH}=\text{CHCH}_3$	-139	4	-100	1.7	9	
trans-2-Butene	$\text{CH}_3\text{CH}=\text{CHCH}_3$	-106	1	-100	1.8	9.7	
Isobutylene	$\text{CH}_2=\text{C}(\text{CH}_3)_2$	-141	-7		1.8	9.6	
2,3-Dimethyl-2-butene	$(\text{CH}_3)_2\text{C}=\text{CH}(\text{CH}_3)_2$	-74	73	-4			

Table 5 - Common Alkynes and Dienes

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Acetylene	$\text{HC}\equiv\text{CH}$	-82	-75	0	2.5	82	TLV 5000
Propyne	$\text{HC}\equiv\text{CCH}_3$	-101	-23		1.7		
1-Butyne	$\text{HC}\equiv\text{CCH}_2\text{CH}_3$	-122	9	30			
2-Butyne	$\text{CH}_3\text{C}\equiv\text{CCH}_3$	-24	27	-4	1.4		
1-Pentyne	$\text{HC}\equiv\text{C}(\text{CH}_2)_2\text{CH}_3$	-98	40	-4	1.4		
2-Pentyne	$\text{CH}_3\text{C}\equiv\text{CC}_2\text{CH}_3$	-101	55				
1,3-Butadiene	$\text{CH}_2=\text{CHCH}=\text{CH}_2$	-113	-4.5	-105	2	11.5	TLV 10 (C)
Isoprene	$\text{CH}_2=\text{C}(\text{CH}_3)\text{CH}=\text{CH}_2$	-146	34	-65	1.5	8.9	

(C) = Carcinogen

TABLE 6 - Common Cyclic Hydrocarbons

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Cyclopentane	C ₅ H ₁₀	-94	49	-20	1.1	8.7	TLV 600
Cyclopentene	C ₅ H ₈	-93	46	-20			
Cyclohexane	C ₆ H ₁₂	6.5	81	-4	1.3	8	TLV 300
Cyclohexene	C ₆ H ₁₀	-104	83	<21	1.1		TLV 300
Methylcyclopentane	C ₆ H ₁₂	-142	72	<20	1	8.3	
cis-1,2-Dimethylcyclohexane	C ₈ H ₁₆	-50	124	61	1		
trans-1,2-Dimethylcyclohexane	C ₈ H ₁₆	-88	119	51	1		
1,3-Cyclopentadiene	C ₅ H ₆	-85	42	77			
1,3-Cyclohexadiene	C ₆ H ₈	-98	80.5	73			

TABLE 7 - Common Aromatic Hydrocarbons

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Benzene	C_6H_6	5.5	80	12	1.2	7.8	TLV 10 (C)
Toluene	$C_6H_5CH_3$	-95	111	40	1.1	7.1	TLV 100
o-Xylene	$1,2-C_6H_4(CH_3)_2$	-25	144	90	.9	6.7	TLV 100
m-Xylene	$1,3-C_6H_4(CH_3)_2$	-48	139	81	1.1	7	TLV 100
p-Xylene	$1,4-C_6H_4(CH_3)_2$	13	138	81	1.1	7	TLV 100
Mesitylene	$1,3,5-C_6H_3(CH_3)_3$	-45	165	122			TLV 25
Ethylbenzene	$C_6H_5CH_2CH_3$	-95	136	70	.8	6.7	TLV 100
Cumene	$C_6H_5CH(CH_3)_2$	-96	152	96	.9	6.5	TLV 50
p-Cymene	$CH_3C_6H_4CH(CH_3)_2$	-70	177	117	.7	5.6	
Biphenyl	$C_6H_5-C_6H_5$	70	255	235	.6	5.8	TLV 0.2
Naphthalene	$C_{10}H_8$	80	218	190	.9	5.9	TLV 10
Styrene vinylbenzene	$C_6H_5CH=CH_2$	-31	145	88	.9	6.8	TLV 50 (C)
Phenylacetylene	$C_6H_5C\equiv CH$	-45	142				

TABLE 8 - Common Halogenated Hydrocarbons

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methylchloride	CH ₃ Cl	-97	-24	Gas	7	19	TLV 50
Methylbromide	CH ₃ Br	-94	4	None	10	16	TLV 5 (C)
n-Propylchloride	CH ₃ CH ₂ CH ₂ Cl	-123	46	65	2.6	11	
n-Propylbromide	CH ₃ CH ₂ CH ₂ Br	-110	71	78	4.6		
Methylenechloride	CH ₂ Cl ₂	-97	40	None	14	22	TLV 50 (C)
Dibromomethane	CH ₂ Br ₂	-52	97	None			
Chloroform	CHCl ₃	-63	61	None			TLV 10 (C)
Bromoform	CHBr ₃	8.3	150	None			TLV 0.5
Carbon tetrachloride	CCl ₄	-23	77	None			TLV 5
Carbon tetrabromide	CBr ₄	89	190	None			TLV 0.1
Fluorobenzene	C ₆ H ₅ F	-42	85	9			
Chlorobenzene	C ₆ H ₅ Cl	-45	132	75	1.3	7.1	TLV 10
Bromobenzene	C ₆ H ₅ Br	-31	156	124	6	36.5	

TABLE 9 - Common Alcohols

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methyl alcohol	CH ₃ OH	-97	65	52	6	36	TLV 200
Ethyl alcohol	CH ₃ CH ₂ OH	-115	78	48	3.3	25	TLV 1000
n-Propyl alcohol	CH ₃ CH ₂ CH ₂ OH	-126	97	59	2.1	13.7	TLV 200
n-Butyl alcohol	CH ₃ (CH ₂) ₂ CH ₂ OH	-90	118	95	1.4	11.2	TLV 50
n-Pentyl alcohol	CH ₃ (CH ₂) ₃ CH ₂ OH	-78.5	138	120	1.1	10	
Isopropyl alcohol	CH ₃ CHOHCH ₃	-86	83	60	2.5	12	TLV 400
Ethylene glycol	HOCH ₂ CH ₂ OH	-13	197	>230	3.2	15.3	TLV 50
Cyclohexanol	C ₆ H ₁₁ OH	24	161	154	1.2	12.3	TLV 50
Allyl alcohol	CH ₂ =CHCH ₂ OH	-129	97	72	2.5	18	TLV 2
Benzyl alcohol	C ₆ H ₅ CH ₂ OH	-15	205	213			

TABLE 10 - Common Ethers

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methyl ether	CH_3OCH_3	-141	-24	Gas	3.4	27	
Ethyl ether	$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$	-116	35	-40	1.8	48	TLV 400
n-Propyl ether	$\text{CH}_3(\text{CH}_2)_2\text{O}(\text{CH}_2)_2\text{CH}_3$	-123	89	40	1.3	7	
Butyl methyl ether	$\text{CH}_3(\text{CH}_2)_3\text{OCH}_3$	-115	70	14			
Isopropyl ether	$(\text{CH}_3)_2\text{CHOCH}(\text{CH}_3)_2$	-85	69	9	1	21	TLV 250
1,4-dioxane	$\text{C}_4\text{H}_8\text{O}_2$	11.8	101	54	2	22	TLV 25 (C)
Furan	$\text{C}_4\text{H}_4\text{O}$		32	-32	2.3	14.3	
Tetrahydrofuran	$\text{C}_4\text{H}_8\text{O}$	-108	67	1	1.8	11.8	TLV 200
Anisol	$\text{C}_6\text{H}_5\text{OCH}_3$		154	125			
Phenyl ether	$\text{C}_6\text{H}_5\text{OC}_6\text{H}_5$	28	259	>230	.8	1.5	TLV 1

TABLE 11 - Common Aldehydes and Ketones

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Formaldehyde	H ₂ CO		-3	GAS	7	70	TLV 0.3 (C)
Acetaldehyde	CH ₃ CHO	-125	21	-40	4	60	TLV 100 (C)
Propionaldehyde	CH ₃ CH ₂ CHO	-81	48	-16	2.6	17	
Butyraldehyde	CH ₃ (CH ₂) ₂ CHO	-96	75	12	1.4	12.5	
Acrolein	CH ₂ =CHCHO	-87	53	-2	2.8	31	TLV 0.1
Benzaldehyde	C ₆ H ₅ CHO	-10	195	188			
Acetone	CH ₃ COCH ₃	-94	56	1	2	13	TLV 750
Methyl ethyl ketone	CH ₃ COCH ₂ CH ₃	-87	80	26	1.8	10.1	TLV 200
Methyl isobutyl ketone	CH ₃ COCH ₂ CH(CH ₃) ₂	-80	117	56	1.2	8	TLV 50
Cyclohexanone	C ₆ H ₁₀ O	-47	155	116	1.1	9.4	TLV 25
Acetophenone	C ₆ H ₅ COCH ₃	19	202	180			

TABLE 12 - Common Carboxylic Acids

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Formic acid	HCO_2H	8	100	156	18	57	TLV 5
Acetic acid	$\text{CH}_3\text{CO}_2\text{H}$	16	117	104	4	19.9	TLV 10
Propionic acid	$\text{CH}_3\text{CH}_2\text{CO}_2\text{H}$	-23	141	125	2.9	12.1	TLV 10
Butyric acid	$\text{CH}_3(\text{CH}_2)_2\text{CO}_2\text{H}$	-6	162	170	2	10	
Acrylic acid	$\text{CH}_2=\text{CHCO}_2\text{H}$	13	139	130	2	13.7	TLV 2
Methacrylic acid	$\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}_2\text{H}$	16	163	170			TLV 20
Glycolic acid	$\text{HOCH}_2\text{CO}_2\text{H}$	75					
Benzoic acid	$\text{C}_6\text{H}_5\text{CO}_2\text{H}$	122	249	250			

TABLE 13 - Common Carboxylic Acid Derivatives

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Acetyl chloride	CH ₃ CO ₂ Cl	-112	52	40	7.3	19	
Benzoyl chloride	C ₆ H ₅ CO ₂ Cl	-1	198	156	1.2	4.9	
Acetic anhydride	(CH ₃ CO) ₂ O	-73	139	130	2.7	10.3	PEL 5
Methylformamide	HCONHCH ₃		180	210			
Dimethylformamide	HCON(CH ₃) ₂	-61	153	136	2.2	15.2	TLV 10
Dimethylacetamide	CH ₃ CON(CH ₃) ₂	-20	165	158	1.8	11.5	TLV 10
Methyl acetate	CH ₃ CO ₂ CH ₃	-98	57.5	15	3.1	16	TLV 200
Ethyl acetate	CH ₃ CO ₂ CH ₂ CH ₃	-84	77	26	2.2	11.5	TLV 400
Vinyl acetate	CH ₃ CO ₂ CH=CH ₂	-93	72	20	2.6	13.4	TLV 10
Methyl acrylate	CH ₂ =CHCO ₂ CH ₃	-75	80	44	2.1	14.5	TLV 10
Methyl methacrylate	CH ₂ =C(CH ₃)CO ₂ CH ₃	-48	100	50	2.1	12.5	TLV 100
Benzyl acetate	CH ₃ CO ₂ CH ₂ C ₆ H ₅	-51	206	216			
Ethyl benzoate	C ₆ H ₅ CO ₂ CH ₂ CH ₃	-34	212	184			
Ethyl chloroformate	ClCO ₂ CH ₂ CH ₃	-81	93	36			AEL 0.5

TABLE 14 - Common Amines

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methylamine	CH_3NH_2	-93		Gas	4.9	20.8	TLV 10
Dimethylamine	$(\text{CH}_3)_2\text{NH}$	-93	7	Gas	2.8	14.4	TLV 10
Trimethylamine	$(\text{CH}_3)_3\text{N}$	-117	2.9	20	2	11.6	TLV 10
Ethylamine	$\text{CH}_3\text{CH}_2\text{NH}_2$	-81	16	Gas	2.5	14	TLV 10
n-Propylamine	$\text{CH}_3(\text{CH}_2)_2\text{NH}_2$	-83	48	-35	2	10.4	
Isopropylamine	$(\text{CH}_3)_2\text{CHNH}_2$	-101	33	-26	2	10	TLV 5
n-Butylamine	$\text{CH}_3(\text{CH}_2)_3\text{NH}_2$	-49	78	6	1.7	9.8	TLV 5
Cyclohexylamine	$\text{C}_6\text{H}_{11}\text{NH}_2$	-17	134	90			TLV 10 (C)
Benzylamine	$\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$	10	184	140			
Hexamethylene diamine	$\text{NH}_2(\text{CH}_2)_6\text{NH}_2$	42	204	178	.7	6.3	
Aniline	$\text{C}_6\text{H}_5\text{NH}_2$	-6	184	158	1.3	11	TLV 2 (C)
Methylaniline	$\text{C}_6\text{H}_5\text{NHCH}_3$	-57	196	174			TLV 0.5
Dimethylaniline	$\text{C}_6\text{H}_5\text{NH}(\text{CH}_3)_2$	1	193	145	1	7	TLV 5
o-Phenylenediamine	$\text{NH}_2\text{C}_6\text{H}_4\text{NH}_2$	103	256				TLV 0.1 mg/m^3

TABLE 15 - Common Nitrogen Containing Materials

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Acetonitrile	CH ₃ CN	-48	82	42	4.4	16	TLV 40
Acrylonitrile	CH ₂ =CHCN	-83	77	32	3	17	TLV 2 (C)
Acetone cyanohydrine	CH ₃ COH(CN)CH ₃	-19		147	2.3	11	
Nitromethane	CH ₃ NO ₂	-29	100	95	7.3		TLV 100
Nitrobenzene	C ₆ H ₅ NO ₂	5	210	190	1.8	40	TLV 1

TABLE 16 - Common Phenols

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Phenol	C_6H_6O	41	182	175	1.7	8.6	TLV 5
o-Cresol	$C_6H_6O_2$	33	191	178	1.4		TLV 5
m-Cresol	$C_6H_6O_2$	10	203	187	1	1.4	TLV 5
p-Cresol	$C_6H_6O_2$	33	202	193	1	1.1	TLV 5
2-Chlorophenol	C_6H_5OCl	8	175	147			

TABLE 17 - Common Sulfur Containing Materials

Name	Formula	Melting Point C	Boiling Point C	Flash Point F	LEL %	UEL %	Toxicity
Methyl mercaptan Methanethiol	CH ₃ SH	-120	6	gas	3.9	21.8	TLV 0.5
Ethyl mercaptan Ethanethiol	CH ₃ CH ₂ SH	-147	32.6	-0.4	2.8	18.2	TLV 0.5
Dimethyl sulfide 2 thiopropane	CH ₃ SCH ₃	-83.2	38	<0	2.2	19	
Dimethyl disulfide	CH ₃ S-SCH ₃	-85	109	59	1.1	16	
Diethyl disulfide	CH ₃ CH ₂ S-SCH ₂ CH ₃	-101	154				

The following table demonstrates the properties and toxicity characteristics of the two carbon derivatives (The ETHYL group).

Name	BP(F)	TLV	LD ₅₀	IDLH	Odor	Other
Ethane	-86				899	Asphyxiant
Ethylene	-103					Asphyxiant
Acetylene	84	5000				Asphyxiant
Ethyl benzene	136	100	3500	2000	140	Teratogen
Ethyl chloride	12	1000	14600	20000		
Vinyl chloride	14	5	3463		260	Carcinogen
Ethyl bromide	38	200	1350			Carcinogen
Ethylendichloride	84	10	670	1000	100	Carcinogen
Ethylendibromide	131	20	108	400		Carcinogen
Trichloroethane	74	350	836	1000	100	Carcinogen
Ethyl alcohol	78	1000	7060		10	Teratogen
Ethylene glycol	198	50	4700			Kidney
Ethyl ether	35	400	1215	19000	0.8	
Acetic acid	118	10	3310	1000	1	
Trichloroacetic acid	198	1	400			
Acetyl chloride	51	5	3310	100	1	
Acetamide	221		7000			Carcinogen
Dimethylacetamide	166	10	4300	47	400	Liver
Ethyl acetate	77	400	5620	10000	1	
Vinyl Acetate	73	10	2920		0.12	Carcinogen
Ethyl acrylate	100	5	800	2000	0.0002	Carcinogen
Acetaldehyde	21	100	661	10000	0.21	Carcinogen
Ethylamine	17	10	400	4000		
Diethylamine	56	10	540	2000	0.14	
Triethylamine	90	10	460	1000		
1,2 Diaminoethane	117	10	500	2000	10	
Ethanol amine	170	3	1700			
Acetonitrile	82	40	2730	4000	40	
Nitroethane	114	100	1100	1000	163	
Diethylsulfate	210		880			Carcinogen
Ethyl mercaptan	94	0.5	682	2500	.001	
Diethylsulfide	92		5930			
Ethylene oxide	11	10	72	800	50	Carcinogen