Matrix of Combustion-Relevant Properties and Classifications of Gases, Vapors, and Selected Solids

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MATRIX OF COMBUSTION-RELEVANT PROPERTIES AND CLASSIFICATIONS OF GASES, VAPORS, AND SELECTED SOLIDS

Report of the

COMMITTEE ON EVALUATION OF INDUSTRIAL HAZARDS

NATIONAL MATERIALS ADVISORY BOARD
Commission on Sociotechnical Systems
National Research Council

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NOTICE

The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard to appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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PREFACE

The Occupational Safety and Health Administration (OSHA) requested that the National Research Council's Committee on Evaluation of Industrial Hazards classify in accordance with the classification groups in Article 500 of the National Electrical Code certain chemicals of interest to OSHA. These chemicals include materials from an earlier Coast Guard sponsored study and those listed by OSHA in the Federal Register of June 27, 1974, pages 23541-23543.

The matrix presented in the body of this report contains physical and flammability data for these chemicals along with their classification groups.

This report is the first in a series of three reports, the following two being directed toward the classification of and the methodology for testing dusts.

The chairman expresses his sincere thanks to each member, liaison representative, and technical advisor of the committee and to Stanley Barkin, National Materials Advisory Board, for collecting data and for their deliberations in assigning classifications--work which was often tedious and difficult. Appreciation is also extended to Chia Chen (OSHA) for his contribution to the assignments of families and to Michael Persh, George Washington University, Harry A. Wray, Harry A. Wray Associates, Rhonda Kaatz, Northern Virginia Community College, and Evelyn Childs, Naval Research Laboratory, for many hours of assistance in preparation of the manuscript.

Homer W. Carhart, Chairman
Committee on Evaluation of
Industrial Hazards

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ERRATA SHEET

MATRIX OF COMBUSTION-RELEVANT PROPERTIES AND CLASSIFICATIONS OF GASES, VAPORS, AND SELECTED SOLIDS

The page numbers for the Register of Family Groups (Page 7) and the Cross Index (Pages 75-86) for locating individual chemicals are incorrect. Addition of 7 to these numbers will serve to locate the proper pages or in lieu of this procedure use the family and chemical compound numbers which as listed are correct.

National Materials Advisory Board
Commission on Sociotechnical Systems
National Research Council

INTRODUCTION

The Committee on Evaluation of Industrial Hazards of the National Materials Advisory Board was charged with assigning classifications to certain chemicals of interest to OSHA according to the classification groups given in the National Electrical Code, Article 500 (NEC 500). To aid in this task the committee also collected physical and flammability properties of these chemicals and compiled them into a matrix. This work is an extension of earlier work done by the NRC Committee on Hazardous Materials in which flammability properties of chemicals of interest to the U.S. Coast Guard (USCG) were also studied and classified according to NEC 500. This current Matrix of Combustion-Relevant Properties and Classifications of Gases, Vapors, and Selected Solids includes materials in the earlier study* and the list of chemicals submitted by OSHA as published in the Federal Register, Vol. 39, No. 125, pp. 23541-3 of 27 June 1974, in order to make the Matrix more encompassing and, therefore, more useful. It includes classifications assigned by the committee to materials not previously classified, classifications by the earlier committee (which have been reviewed and updated), and classifications by the NEC 500 and/or proposed classifications by Underwriters Laboratories, Inc.

Names of chemicals as used in this Matrix are taken from the earlier USCG list and from the list proposed by OSHA as printed in the Federal Register and are not necessarily the nomenclature consistent with that recommended by The International Union of Pure and Applied Chemistry (IUPAC).

Since it has become apparent to the committee that classifications are closely linked to chemical structure, the Matrix is presented and cataloged by chemical families. This should make it easier to classify new materials not now in the Matrix which become of importance or of interest and to include them in future matrices. Accordingly, a summary of tentative classifications by families is also

included.

The rationale and modus operandi for classifications of the new chemicals were very similar to those used by the Panel on Electrical Hazards of the earlier committee, and the reader is referred to their report for details**.

The Matrix does not represent an exhaustive coverage of the literature, but it is believed that reliable references were used in assembling the data. It must be recognized that the data presented are for pure materials, and some properties (such as flash point) may differ significantly from materials of commerce because of differences in purity.

Although a few solids are included in the present matrix, the classification of dusts in general is the subject of a separate study and will be reported in a publication to follow this one.

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* Matrix of Electrical and Fire Hazard Properties and Classifications of Chemicals. A report prepared for the Committee on Hazardous Materials of the National Research Council by the Electrical Hazards Panel, Homer W. Carhart, Chairman. National Academy of Sciences, Washington, DC, 1975. NTIS No. AD/A027181/WK.

** Fire Hazard Classification of Chemical Vapors Relative to Explosion-Proof Electrical Equipment, Report IV. A supplementary report prepared by the Electrical Hazards Panel of the Committee on Hazardous Materials of the National Research Council, Homer W. Carhart, Panel Chairman, Robert B. Beckman, Chairman. National Academy of Sciences, Washington, DC, 1975. NTIS No. AD/PC026215/LG.

TENTATIVE CLASSIFICATION OF GASES AND VAPORS BY CHEMICAL FAMILIES

(Compounds listed have already been classified by NEC/UL)

D Group

Aliphatic hydrocarbons: methane, ethane, propane, butane, n-pentane, iso-pentane, iso-hexane, n-heptane, octane
Alicyclic hydrocarbons with larger rings: (cf. cyclopentadiene - 1,3 -- B (D), and cyclopropane -- C†)
Higher olefins: propylene, isoprene, diisobutylene (cf. butadiene -- B (D), and dicyclopentadiene -- C†)
Aromatic hydrocarbons: benzene, toluene, xylenes, styrene
Alcohols: methyl, ethyl, propyl, butyls, amyls (cf. allyl -- C)
Phenols
Ketones: acetone, butanone, methyl isobutyl ketone, mesityl oxide (cf. ketene -- C†)
Organic acids and anhydrides: acetic acid
Esters: ethyl acetate, isobutyl acetate, vinyl acetate, ethyl acrylate (cf. propiolactone -- C*)
Ethers not containing α-CH_2 or α-CH_3: isopropyl ether
Glycols and their esters
Chlorinated hydrocarbons: ethylene dichloride
Primary amines: ethyl amine, ethylenediamine
Alkanol amines
Aromatic hydrazines
Aromatic nitro compounds: (cf. dinitrotoluene -- C)
Cyanides, nitriles, isocyanates: acrylonitrile
Aromatic heterocyclic nitrogen compounds: pyridine
Amides
Organo phosphates
Organo sulfates and sulfones

C Group

Higher acetylenes: methyl acetylene (cf. acetylene -- A)
Small unsaturated alcohols: allyl
Aldehydes; acetaldehyde, n-butyraldehyde, (cf. formaldehyde -- B*†, and acrolein -- B (C))
Ethers containing α-CH_2 or α-CH_3: ethyl ether
Glycol ethers
Cyclic ethers larger than 3-membered ring (but including epichlorohydrin -- C)
Secondary and tertiary amines: diethylamine, triethylamine
Aliphatic nitro compounds: 2-nitropropane
Aliphatic heterocyclic nitrogen compounds: ethylene imine
Organo lead compounds
Mercaptans and sulfides; hydrogen sulfide (cf. carbon bisulfide -- A)

B (C) Group:

Ethers, 3-membered ring: ethylene oxide, propylene oxide

NOTE: Groups A, B, and B (D) are not included because no chemical families for these groups could be established.

KEY TO MATRIX ABBREVIATIONS

NAS CLASS COLUMN		NAS CLASS COLUMN	
A	NEC 500 Group A	E	NEC 500 Group E
B	NEC 500 Group B	G	NEC 500 Groups F and G
C	NEC 500 Group C	U	No NEC Group assigned
D	NEC 500 Group D		

_	:	An underline means classified by NEC/UL
*	:	An asterisk indicates a difference of opinion among the panelists. The classification given is the more stringent one.
†	:	A dagger indicates the classification was given in the absence of complete data and represents the best judgment of the panelists.
[ ]	:	Brackets indicate the material has a low vapor pressure at room temperature. Ordinarily, no special equipment is required. However, where the liquid is heated close to its flash point, or a mist is present, or a possibility exists that the equipment may be wetted by the material, electrical equipment of the group designated should be used. It should be noted that the panel has suggested a value of 150°F as the cut-off point.

X(Y) : A double letter, the second in parentheses, indicates the material "pressure piles". This means unusual pressures are generated in pipes or conduits attached to the equipment and containing flammable vapors. If attached conduits are unsealed, the first group is applicable; if attached conduits are sealed, the second group applies.

AIT : Autoignition or autogenous ignition temperature is the minimum temperature to which the substance in air must be heated in order to initiate, or cause, self-sustained combustion independently of the heating or heated element.*

LFL/UFL : The limits of flammability are the extreme concentration limits of a combustible in an oxidant through which a flame, once initiated, will continue to propagate at the specified temperature and pressure. The smaller value is the lower (lean) flammability limit (LFL) and the larger value is the upper (rich) flammability limit (UFL).*

FLASH POINT: This value corresponds roughly to the lowest temperature at which the vapor pressure of the liquid is just sufficient to produce a flammable mixture at the lower limit of flammability.*

REMARKS COLUMN		REMARKS COLUMN	
N	Non-flammable material	P	Pyrophoric
S	Solid	O	Oxidizer

* Fire Protection Handbook, Fourteenth Edition, National Fire Protection Association, Boston, MA, 1976, ed. Gordon P. McKinnon.

REGISTER OF
FAMILY GROUPS

NUMBER	PAGE	FAMILY
100		Organic Compounds
110.10	1	Aliphatic Hydrocarbons
115.10.	2	Alicyclic Hydrocarbons
120.10.	3	Olefins and Acetylenes
125.10	6	Aromatic Hydrocarbons
130.10.	9	Hydrocarbon Mixtures
135.10.	10	Alcohols
140.10.	13	Phenol and Phenolic Compounds
145.10.	14	Aldehydes
150.10	16	Ketones
155.10.	18	Organic Acids and Anhydrides
160.10	19	Esters
165.00.		Ethers, Glycols and Derivatives
165.10	22	Ethers and Formals
165.20.	23	Glycols and Derivatives
165.30.	26	Cyclic Ethers
170.00.		Halogens and their Compounds
170.10	28	Halogens
170.20.	29	Hydrogen Halides
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170.40.	31	Chlorinated Hydrocarbons
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170.60.	34	Cyclic Halogenated Compounds
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175.00.		Nitrogen-containing Hydrocarbons
175.10.	37	Aliphatic Amines
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175.30.	41	Diazomethane and Hydrazines
175.40.	42	Aliphatic Nitro Compounds
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175.60.	44	Nitrates
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180.10.	48	Organo Metallic Compounds
185.10.	49	Organo Phosphates (excluding pesticides)
190.10.	50	Organo Sulfur Compounds
200		Pesticides
210.10.	51	Chlorinated Hydrocarbon Pesticides
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230.10.	54	Miscellaneous Pesticides
300		Inorganic Compounds
310.10.	56	The Metals and their Compounds
320.10.	60	The Non-metals and their Compounds
330.10.	64	Inorganic Acids
340.10.	65	Hydrogen and the Hydrides
400		Dusts
410.10.	66	Dusts
900		Miscellaneous Compounds
910.10.	67	Miscellaneous Compounds

110.10 Aliphatic Hydrocarbons

110.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
001	Methane CH_4	D	Gas	540(1004)	5.0	15.0	-162(-260)		
002	Ethane C_2H_6	D	Gas	515(959)	3.0	12.5	-89(-128)		
003	Propane (Commercial) C_3H_8	D	Gas	450(842)	2.2	9.5	-42 (-44)		
004	Butane (Commercial) C_4H_9	D	Gas	405(761)	1.9	8.5	-1 (30)		
005	n-Pentane $CH_3(CH_2)_3CH_3$	D	-49(-56)	260(500)	1.5	7.8	36(97)		
006	iso-Pentane $(CH_3)_2CHCH_2CH_3$	D	-57(-71)	420(788)	1.4	7.6	28(82)		
007	n-Hexane $CH_3(CH_2)_4CH_3$	D	-22(-7)	225(437)	1.1	7.5	69(156)		
008	iso-Hexane $(CH_3)_2CH(CH_2)_2CH_3$	D	-29(-20)	306(583)	1.0	7.0	60(140)		
009	n-Heptane $CH_3(CH_2)_5CH_3$	D	-4(25)	215(419)	1.05	6.7	98(208)		
010	Octane C_8H_{18}	D	13(56)	220(428)	1.0	6.5	126(259)		
011	Nonane C_9H_{20}	D	31(88)	205(401)	0.8	2.9	151(304)		

115.10 Alicyclic Hydrocarbons

115.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
012	Cyclopropane $CH_2CH_2CH_2$	C	Gas	500(932)	2.4	10.4	-34(-29)		MESG > gasoline but ignition energy value exceedingly low
013	Cyclohexane C_6H_{12}	D	-20(-4)	260(500)	1.3	8.4	81(178)	7(45)	
014	Cyclohexene $CH_2CH_2CH=CHCH_2CH_2$	D	-12(11)	310(590)	1.2		83(181)		
015	Cyclopentadiene - 1,3 C_5H_6	B(D)†					43(109)	-85(-119)	
016	Methylcyclohexane $CH_3C_6H_{11}$	D	-5 (23)	285(543)	1.2	6.7	101(214)	-126(-195	
017	Turpentine $C_{10}H_{16}$	D	35(95)	253(488)	0.8		153-175 (307-347)		

20.10 Olefins and Acetylenes

120.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
018	Ethylene $CH_2=CH_2$	C	Gas	450 (914)	2.7	36.0	-104 (-155)		
019	Propylene C_3H_6	D	Gas	460(860)	2.0	11.1	-48 (-54)		
020	Butylene C_4H_8	D	Gas	385(725)	1.6	10.0	-6 (21)		
021	Butadiene (Inhibited) $CH_2=CHCH=CH_2$	B(D)	Gas	420 (788)	2.0	11.5	-4 (25)		
022	1-Pentene $CH_3(CH_2)_2CH=CH_2$	D	-18(0)	275(527)	1.5	8.7	30 (86)		
023	Isoprene $CH_2=C(CH_3)CH=CH_2$	D	-54(-65)	220(428)	2.0	9.0	34 (93)		
024	Hexene C_6H_{12}	D	-7(20)	265(509)	1.2	6.9	63(145)		
025	Heptene (Mixed) C_7H_{14}	D	-1(30)	260(500)			94 (201)		
026	Octene C_8H_{16}	D	21(70)	250(482)			121(250)	-102(-152)	
027	Diisobutylene C_8H_{16}	D	-7(20)	391(736)	0.8	4.8	101(214)	-94(-137)	
028	Nonene C_9H_{18}	D	24 (75)				150(302)	-81(-114)	

120.10 Olefins and Acetylenes (Cont.)

120.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
029	Tripropylene C_9H_{18}	D	24(75)				133-142 (271-282)		
030	Decene $C_{10}H_{20}$	D	44(111)	235(455)			172 (342)	-66(-87)	
031	Turpentine Oil $C_{10}H_{16}$	D	35(95)	253(488)	0.8		153-175 (307-347)		
032	Dipentene (Limonene) $C_{10}H_{16}$	D	45(113)	237(458)	0.7 @ 150 (302)	6.1 @ 150 (302)	178(352)	-97(-143)	
033	Undecene $C_{11}H_{22}$	D	63(145)				193(379)	-49(-56)	
034	Dodecene $C_{12}H_{24}$	[D]	76(169)	255(491)			213(415)	-35(-31)	
035	Tetrapropylene $C_{12}H_{24}$	D					183-218 (361-424)		
036	Tridecene $C_{13}H_{26}$	[D]	92(198)				233(451)	-23(-9)	
037	Tetradecene $C_{14}H_{28}$	[D]	110(230)	235(455)			251(484)	-12(10)	
038	Dicyclopentadiene $\underbrace{CH=CHCH=CHCH}-\underbrace{CHCH=CHCH=CH}$	C†	32(90)				170 (338)	33(91)	
039	Acetylene $CH \equiv CH$	A	Gas	305(581)	2.5	100.0	-84(-119)		SUBLIMES

120.10 Olefins and Acetylenes (Cont.)

120.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
040	Methyl Acetylene $CH_3C \equiv CH$	C	Gas		1.7		-23(-9)	-105(-159)	

125.10 Aromatic Hydrocarbons

125.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
041	Benzene C_6H_6	D	-11(12)	560(1040)	1.3	7.1	80 (176)	6(43)	
042	Toluene $C_6H_5.CH_3$	D	4(40)	480(896)	1.2	7.1	110(231)	-95(-139)	
043	Ethyl Benzene $C_6H_5.C_2H_5$	D	15(59)	432(810)	1.0	6.7	136(276)	-95(-139)	
044	Cumene $C_6H_5.CH(CH_3)_2$	D	44(111)	425(797)	0.9	6.5	152(306)	-96(-143)	
045	Decyl Benzene $C_6H_5.C_{10}H_{21}$	[D]	107(225)				250-280 (483-536)	-50(-58)	
046	Undecyl Benzene $C_6H_5.C_{11}H_{23}$	[D]							
047	Dodecyl Benzene $C_6H_5.C_{12}H_{25}$	[D]	141(285)				143-210 (290-410)		
048	Tridecyl Benzene $C_6H_5.C_{13}H_{27}$	[D]					346(655)	10(50)	
049	Tetradecyl Benzene $C_6H_5.C_{14}H_{29}$	[D]							
050	o-Xylene $C_6H_4(CH_3)_2$	D	32(90)	465(869)	1.0	6.0	144(292)	-25(-13)	

125.10 Aromatic Hydrocarbons (Cont.)

125.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
051	m-Xylene $C_6H_4(CH_3)_2$	D	29(84)	530(986)	1.1	7.0	138(282)	-48(-53)	
052	p-Xylene $C_6H_4(CH_3)_2$	D	27(81)	530(986)	1.1	7.0	139(281)	13(55)	
053	p-Cymene $CH_3C_6H_4CH(CH_3)_2$	D	47(117)	436(817)	0.7 @100 (212)	5.6	177(349)	-68(-90)	
054	tert-Butyltoluene $C_4H_9C_6H_4CH_3$	D	60(140)				193(379)	-53(-63)	
055	Diethylbenzene $C_6H_4(C_2H_5)_2$	D	56(133)	396(745)	0.8 @100 (212)		184(363)	-43(-45)	
056	Triethyl Benzene $C_6H_3.(C_2H_5)_3$	[D]	83(181)				218(424)	-70(-94)	
057	Styrene (Inhibited) $C_6H_5.CH=CH_2$	D	32(90)	490(914)	1.1	6.1	146(295)	-31(-24)	
058	a-Methyl Styrene $C_6H_5C(CH_3)=CH_2$	D	54 (129)	574 (1065)	1.9	6.1	166(331)	-23(-9)	
059	Vinyl Toluene $CH_2=CHC_6H_4CH_3$	D	60 (140)	494(921)	0.9	11.0	170(338)	-83(-117)	
060	Naphthalene (Molten) $C_{10}H_8$	[D]	79(174)	526(979)	0.9	5.9	218(424)	80 (176)	S
061	Tetrahydronaphthalene $C_{10}H_{12}$	[D]	77(171)	385(725)	0.8 @100 (212)	5.0 @100 (212)	207(405)	-30(-22)	

125.10 Aromatic Hydrocarbons (Cont.)

125.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
062	Diphenyl (biphenyl) $C_6H_5C_6H_5$	[D]	113(235)	538 (1000)	0.6 @110 (230)	5.8 @166 (331)	255(493)	70 (158)	S

130.10 Hydrocarbon Mixtures

130.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
063	Coal Tar Pitch Volatiles	D							
064	Diphenyl / Diphenyl Oxide (Mixture) $C_{12}H_{10}/C_{12}H_{10}O$	[D]	113(237)				255(493)	70(158)	
065	Liquified Petroleum Gas (LPG) C_3H_5/C_4H_6	D	Gas	437 (820)	5.0	14.0			
066	Methyl Acetylene - Propadiene $CH_3C{\equiv}CH$ $CH_2{=}C{=}CH_2$ (MAPP Gas)	C	Gas		1.7		-23(-9)		
067	Naphtha, Coal Tar	D	41(106)	277(532)			149-216 (300-421)		AROMATICS
068	Petroleum Distillates (Petroleum Naphtha)	D	<-46(<-50)	247-288 (475-550)	1.1	5.9	35-60 (95-140)		
069	Stoddard Solvent	D	38-43 (100-110)	232(450)	1.1	6.0	220-300 (428-572)		
070	Xylene (mixed isomers) $C_6H_4(CH_3)_2$	D	28(83)	482-621 (900-1150)	1.1	7.0	139(282)		
071	o-Terphenyl $C_6H_4(C_6H_5)_2$	[D]	163(325)				332(630)	58(136)	
072	m-Terphenyl $C_6H_4(C_6H_5)_2$	[D]	191(375)				363(687)	86(187)	
073	p-Terphenyl $C_6H_4(C_6H_5)_2$	[D]	208(405)	535 (995)			405(763)	213(415)	

135.10 Alcohols

135.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
074	Methyl Alcohol CH_3OH	D	11(52)	385(727)	6.7	36.5	64(147)	-97(-144)	
075	Ethyl Alcohol C_2H_5OH	D	13(55)	365(689)	3.3	19.0	78.3(172)	-117(-179)	
076	Propyl Alcohol $CH_3CH_2CH_2OH$	D	25(77)	440(824)	2.1	13.5	97(207)	-127(-197)	
077	Isopropyl Alcohol $(CH_3)_2CHOH$	D	12(54)	399(750)	2.0	12.0	82(180)	-89(-127)	
078	n-Butyl Alcohol $CH_3(CH_2)_2CH_2OH$	D	29(84)	365(689)	1.4	11.2	118(243)	-90(-130)	
079	Sec-Butyl Alcohol $CH_3CH_2CHOHCH_3$	D	24(75)	405(761)	1.7 @100 (212)	9.8 @100 (212)	100(212)	-115(-175)	
080	Isobutyl Alcohol $(CH_3)_2CHCH_2OH$	D	27(81)	427(801)	1.2 @100 (212)	10.9 @100 (212)	108(226)	-108(-162)	
081	tert-Butyl Alcohol $(CH_3)_3COH$	D	11(52)	480(896)	2.4	8.0	83(181)	25(77)	
082	n-Amyl Alcohol $CH_3(CH_2)_3CH_2OH$	D	33(91)	300(572)	1.2	10.0 @100 (212)	138(280)	-79(-110)	
083	Isoamyl Alcohol $(CH_3)_2CHCH_2CH_2OH$	D	43(109)	350(662)	1.2	9.0 @100 (212)	132(270)	-117(-179)	
084	Hexanol $C_6H_{13}OH$	D	63(145)	290(554)	1.2 @100 (212)		157(315)	-52(-62)	

135.10 Alcohols (Cont.)

135.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
085	Methylamyl Alcohol $C_6H_{13}OH$	D	41(106)		1.0	5.5	132(270)		
086	Ethyl Butanol $C_6H_{13}OH$	D	57(135)				149(301)		
087	n-Octyl Alcohol $CH_3(CH_2)_6CH_2OH$	[D]	81(178)				194(381)	-17(1)	
088	Isooctyl Alcohol $C_8H_{17}OH$	[D]	81(178)				182-195 (360-383)		
089	2-Ethyl Hexanol $CH_3(CH_2)_3CH(C_2H_5)CH_2OH$	[D]	85(185)				179-185 (354-365)		
090	Nonyl Alcohol $C_9H_{19}OH$	[D]	80(176)				215(419)	-6(21)	
091	Methyl Isobutyl Carbinol $(CH_3)_2CHCH_2CH(CH_3)OH$	D	41 (106)		1.0	5.5	132(270)		
092	Diisobutyl Carbinol $[(CH_3)_2CHCH_2]_2CHOH$	[D]	74(165)		0.8 @100 (212)	6.1 @100 (212)	178(353)		
093	n-Decyl Alcohol $CH_3(CH_2)_8CH_2OH$	[D]	83(180)	285(545)			229(444)	7(45)	
094	Isodecyl Alcohol $C_{10}H_{21}OH$	[D]	104(220)				220(428)		
095	Undecanol $C_{11}H_{23}OH$	[D]	113(235)				226(437)	12(54)	

135.10 Alcohols (Cont.)

135.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
096	Dodecanol $C_{12}H_{25}OH$	[D]	127(260)	275(527)			259(498)	24(75)	
097	Tridecanol $C_{13}H_{27}OH$	[D]	121(250)				274(525)	33(91)	
098	Tetradecanol $C_{14}H_{29}OH$	[D]	141(285)				264(507)	38(100)	
099	Pentadecanol $C_{15}H_{31}OH$	[D]					270(518)	43(109)	
100	Cyclohexanol $CH_2(CH_2)_4CHOH$	[D]	68(154)	300(572)	1.0		161(322)	25(77)	
101	Methylcyclohexanol $CH_2(CH_2)_4C(CH_3)OH$	[D]	70 (158)	295(563)			173(343)	-25(-13)	
102	Allyl Alcohol $CH_2=CHCH_2OH$	C	21(70)	378(713)	2.5	18.0	97(207)	-129(-202)	
103	Diacetone Alcohol $CH_3COCH_2C(OH)(CH_3)_2$	D	64(148)	603(1118)	1.8	6.9	168(334)	-50(-58)	
104	Propargyl Alcohol $HC\equiv CCH_2OH$	U	36(97)		2.4		115(239)	-17(0)	

140.10 Phenol and Phenolic Compounds

140.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
105	Phenol C_6H_5OH	[D]	79(175)	715(1319)			182(358)	41(108)	
106	Nonyl Phenol $C_9H_{19}\ C_6H_4OH$	[D]	141(285)				290-301 (554-576)	-10(14)	
107	Nonyl Phenol (Ethoxylated)	[D]†							
108	Hydroquinone $C_6H_4(OH)_2$	[D]	166 (331)	516 (961)			285(545)	171(339)	S
109	Quinone (p-benzoquinone) $C_6H_4O_2$	[D]						116(241)	SUBLIMES
110	Cresol, all isomers $CH_3C_6H_4OH$	[D]	81-83 (178-181)	559-568 (1038-1195)	1.1		191-203 (376-397)	11-36 (52-97)	

145.10 Aldehydes

145.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
111	Formaldehyde (Gas) $HCHO$	B*†	Gas	430(806)	7.0	73	-19(-3)	-92(-134)	
112	Acetaldehyde CH_3CHO	C	-37(-36)	185(365)	4.0	60.0	21(70)	-124(-193)	
113	Propionaldehyde CH_3CH_2CHO	C	-8(17)	207(405)	2.9	17.0	48(118)	-81(-116)	
114	n-Butyraldehyde $CH_3(CH_2)_2CHO$	C	-7(20)	230(446)	1.9	12.5	76(169)	-100(-148)	
115	iso-Butyraldehyde $(CH_3)_2CH\ CHO$	C	-40(-40)	254(489)	1.6	10.6	64(147)	-66(-87)	
116	Valeraldehyde $CH_3(CH_2)_3CHO$	C	12(54)				103(217)	-92(-134)	
117	3-Methyl Butyraldehyde $(CH_3)_2CHCH_2CHO$	C					93(199)	-51(-60)	
118	iso-Pentyl Aldehyde $(CH_3)_2CHCH_2CHO$	C							
119	2-Ethylhexaldehyde $CH_3(CH_2)_3\ CH(C_2H_5)\ CHO$	C	52(125)	197(387)			163(325)		
120	iso-Octyl Aldehyde $(CH_3)_2CH(CH_2)_4CHO$	C	52(125)	197(387)					
121	n-Decaldehyde $CH_3(CH_2)_8CHO$	[C]	83(181)				208(406)	18(64)	

145.10 Aldehydes (Cont.)

145.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
122	Isodecaldehyde $(CH_3)_2CH(CH_2)_6CHO$	[C]	85 (185)				197 (387)	-80 (-112)	
123	Acrolein $CH_2=CHCHO$	B(C)	-26 (-15)	235 (455)	2.8	31.0	53 (126)	-88 (-126)	
124	Crotonaldehyde $CH_3CH=CHCHO$	C	13 (55)	232 (450)	2.1	15.5	104 (219)	-76 (-105)	
125	2-Ethyl-3-Propyl Acrolein $CH_3(CH_2)_2CH=C(C_2H_5)CHO$	[C]	68 (154)				175 (347)		
126	Glyoxal (Pure) OHCCHO	C					50 (122)	15 (59)	
127	Glutaraldehyde $OHC(CH_2)_3CHO$	C					187 dec. (369)	-14 (7)	
128	Chloroacetaldehyde $ClCH_2CHO$	[C†]	88 (190)				90-100 (194-212)	-16 (3)	

150.10 Ketones

150.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
129	Acetone CH_3COCH_3	D	-18(0)	465(869)	2.6	12.8	56(133)	-95(-139)	
130	2-Butanone (Methyl Ethyl Ketone) $CH_3COCH_2CH_3$	D	-6(20)	516(960)	1.8	10	80(176)	-86(-123)	
131	2-Pentanone (Methyl Propyl Ketone) $CH_3CO(CH_2)_2CH_3$	D	7(45)	506(941)	1.5	8.2	102(216)	-78(-108)	
132	2-Hexanone (Methyl Butyl Ketone) $CH_3CO(CH_2)_3CH_3$	D	23(73)	533(991)	1.2	8	127(261)	-57(-71)	
133	Methyl n-Amyl Ketone (2-Heptanone) $CH_3CO(CH_2)_4CH_3$	D	41(106)	533(991)			150 (302)	-35(-29)	
134	Methyl Isobutyl Ketone (Hexone) $(CH_3)_2CHCH_2COCH_3$	D	14(57)	460(860)	1.4	7.5	118(244)	-85(-121)	
135	Diisobutyl Ketone (2,6-dimethyl heptanone) $[(CH_3)_2CHCH_2]_2CO$	D	49 (120)		0.8 @100 (212)	6.2 @100 (212)	166(331)	-42(-44)	
136	Mesityl Oxide $(CH_3)_2C=CHCOCH_3$	D	31(87)	344(652)	1.4	7.2	131(268)	-59(-76)	
137	Ethyl Butyl Ketone (3-Heptanone) $C_2H_5COC_4H_9$	D	46(115)				148(298)	-37(-35)	
138	Ethyl sec-Amyl Ketone (5-methyl – 3-heptanone) $C_2H_5COCH_2CH(CH_3)C_2H_5$	D	59(138)				160(320)		
139	Camphor $C_{10}H_{16}O$	D Solid G	66(150)	466(871)	0.6	3.5	204(399)	174-177 (345-351)	S

150.10 Ketones (Cont.)

150.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
140	Cyclohexanone $CH_2(CH_2)_4C=O$	D	44(111)	420(788)	1.1	8.1	156(313)	-45(-49)	
141	o-Methylcyclohexanone $CH_2(CH_2)_3CH(CH_3)C=O$	D	48(118)				165(329)	-14(7)	
142	Isophorone $CH_2C(CH_3)_2CH_2C(CH_3)=CHC=O$	[D]	84(183)	460(860)	0.8	3.8	215(420)	-8(16)	
143	Ketene $CH_2=CO$	C†					-56(-69)	-151(-240)	

155.10 Organic Acids and Anhydrides

155.10	NAME AND FORMULA	NAS CLASS	FLASH PL. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
144	Formic Acid $HCOOH$	D	50(122)	430(806)	18	57	101(213)	9(48)	
145	Acetic Acid (Glacial) CH_3COOH	D	43(109)	465(869)	5.4	16 @100 (212)	118(244)	17(63)	
146	Propionic Acid CH_3CH_2COOH	D	54(130)	513(955)	3.04 @64 (148)	14.9 @118 (244)	141(286)	-22(-8)	
147	n-Butyric Acid $CH_3(CH_2)_2COOH$	[D]	72(161)	450(842)	2.0	10.0	164(325)	-8(18)	
148	Acrylic Acid (Inhibited) $CH_2=CHCOOH$	D	54(130)	429(804)			141(286)	14(57)	
149	Oxalic Acid $(COOH)_2 \cdot 2H_2O$	U					150(302)	101(214)	S
150	Acetic Anhydride $(CH_3CO)_2O$	O	54(129)	390(734)	2.9	10.3	140(284)	-73(-98)	
151	Propionic Anhydride $(CH_3CH_2CO)_2O$	[D]	74(165)	316(600)	1.48 @75 (166)	11.9 @127 (261)	167(333)	-45(-51)	
152	Maleic Anhydride $OCCH=CHCO$ with O bridge	Liq: [D]	103(217)	477(892)	1.4	7.1	202(396)	53 (127)	S
153	Phthalic Anhydride $(C_6H_5CO)_2O$	[D]	152(305)	580(1076)	1.7	10.5	285(543)	131(268)	
154	Benzoyl Peroxide $(C_6H_5CO)_2O_2$	U		80(176)			EXPLODES	103-105 (217-221)	S,O

160.10 Esters

160.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
155	Methyl Formate $HCOOCH_3$	D	-19(-2)	465(871)	5.0	23	32(87)	-99(-148)	
156	Ethyl Formate $HCOOC_2H_5$	D	-20 (-4)	454(851)	2.7	13.5	54(127)	-79(-112)	
157	Methyl Acetate CH_3COOCH_3	D	-10(14)	502(936)	3.1	16.0	58(136)	-99(-148)	
158	Ethyl Acetate $CH_3COOC_2H_5$	D	-4(24) -4(24)	427(800)	2.2	11.0	77(171)	-84(-119)	
159	n-Propyl Acetate $CH_3COO(CH_2)_2CH_3$	D	14 (58)	450(842)	2.0	8	102(215)	-93(-134)	
160	Isopropyl Acetate $CH_3COOCH(CH_3)_2$	D	4(39)	460(860)	1.8	8.0	88(191)	-73(-99)	
161	n-Butyl Acetate $CH_3COO(CH_2)_3CH_3$	D	22(72)	421(790)	1.7	7.6	126(259)	-75(-103)	
162	Isobutyl Acetate $CH_3COOCH_2CH(CH_3)_2$	D	18(64)	421(790)	2.4	10.5	118(244)	-99(-146)	
163	sec-Butyl Acetate $CH_3COOCH(CH_3)C_2H_5$	D	19(66)		1.7	8.2 @100 (212)	112(234)	-99(-146)	
164	tert-Butyl Acetate $CH_3COOC(CH_3)_3$	D	38(100)				95(203)		
165	n-Amyl Acetate $CH_3COO(CH_2)_4CH_3$	D	25(77)	360(680)	1.1	7.5	148(298)	-79(-108)	

160.10 Esters (Cont.)

160.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
166	Isoamyl Acetate $CH_3COOCH_2CH_2CH(CH_3)_2$	D	25(77)	360(680)	1.0 @100 (212)	7.5 @100 (212)	142(288)	-79(-110)	
167	sec-Amyl Acetate $CH_3COOCH(CH_3)CH_2CH_2CH_3$	D	32(89)		1.0	7.5	120(248)		
168	sec- Hexyl Acetate $CH_3COOC_2H_{13}$	D	45 (113)				146(295)	-68(-83)	
169	Vinyl Acetate (Inhibited) $CH_3COOCH=CH_2$	D	-8(18)	427(800)	2.6	13.4	73(163)	-100 (-148)	
170	Methyl Acrylate $CH_2=CHCOOCH_3$	D	4(39)		2.8	25	80(176)	-75(-105)	
171	Ethyl Acrylate $CH_2=CHCOOC_2H_5$	D	9(48)	372(702)	1.8	9.3	100(212)	-72(-98)	INHIBITED
172	n-Butyl Acrylate (Inhibited) $CH_2=CHCOOC_4H_9$	D	49(120)	293(559)	1.5	9.9	145(293)	-65(-85)	
173	Isobutyl Acrylate (Inhibited) $CH_2=CHCOOC_4H_9$	D	30(86)				132(270)	-61(-78)	
174	2-Ethylhexyl Acrylate (Inhibited) $CH_2=CHCOOC_8H_{17}$	[D]	82(180)				216(420)	-90(-130)	
175	Isodecyl Acrylate (Inhibited) $CH_2=CHCOOC_{10}H_{21}$	[D]	228(441)	246(475)	1.4	6.0			
176	Methyl Methacrylate $CH_2=C(CH_3)COOCH_3$	D	10(50)	421(792)	1.7	8.2	100(212)	-50(-58)	

160.10 Esters (Cont.)

160.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
177	Propiolactone $CH_3\text{-}\underset{\displaystyle O}{\underset{\frown}{CH}}\text{-}CH_2CO$	C*	74(165)		2.9		155(311)	-33(-29)	
178	Caprolactone $CH_3CH_2CH(CH_2)_2COO$	[D]					215(419)		
179	o- Dimethyl Phthalate $C_6H_4(COOCH_3)_2$	[D]	147 (295)	554(1032)			284(543)	0(32)	
180	o- Dibutyl Phthalate $C_6H_4(COOC_4H_9)_2$	[D]	157(315)	403(757)	0.47 @236 (456)		340(644)	-35(-37)	
181	o- Diheptyl Phthalate $C_6H_4(COOC_7H_{15})_2$	[D]							
182	Dioctyl Phthalate $C_6H_4(COOC_8H_{17})_2$	[D]	219(425)				385(726)	-30(-22)	
183	Dinonyl Phthalate $C_6H_4COOC_9H_{19})_2$	[D]	216(420)						
184	Diisodecyl Phthalate $C_6H_4(COOC_{10}H_{21})_2$	[D]	232 (450)					-50(-58)	
185	Diundecyl Phthalate $C_6H_4(COOC_{11}H_{23})_2$	[D]							
186	Butyl Benzyl Phthalate $C_4H_9OOCC_6H_4COOCH_2C_6H_5$	D	199(390)				370(698)		

165.10 Ethers and Formals

165.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
187	Ethyl Ether $(C_2H_5)_2O$	C	-45(-49)	160(320)	1.9	36.0	35(95)	-116(-177)	
188	Isopropylether $[(CH_3)_2CH]_2O$	D	-27(-17)	443(829)	1.4	7.9	68(155)	-60(-76)	
189	Dichloroethyl Ether (β,β' isomer) $(ClC_2H_4)_2O$	D	55(131)	365(689)			179(352)	-24(-11)	
190	Methyl Formal $CH_2(OCH_3)_2$	C	-18(0)	237(460)			44(111)	-105(-159)	
191	Propyl Formal $CH_2(OC_3H_7)_2$	C					141(286)	-97(-143)	
192	n-Butyl Formal $CH_2(OC_4H_9)_2$	C	60(140)				164(327)	-60(-51)	
193	Isobutyl Formal $CH_2(OC_4H_9)_2$	C							
194	Phenyl Ether $C_6H_5OC_6H_5$	D	96(205)	646(1195)	0.8	1.5	258(196)	27(81)	

165.20 Glycols and Derivatives

165.20	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
195	Ethylene Glycol $HOCH_2CH_2OH$	[D]	111(232)	410(770)	3.2		198(387)	-13(9)	
196	Propylene Glycol $CH_3CHOHCH_2OH$	[D]	99(210)	420(788)	2.6	12.5	188(370)	-59(-74)	
197	1,3-Butylene Glycol $CH_3CHOHCH_2CH_2OH$	[D]	109(228)	395(743)			208(405)		
198	Hexylene Glycol $C_6H_{12}(OH)_2$	[D]	96(205)				197(387)	-50(-58)	
199	Ethylene Glycol Monomethyl Ether $HOCH_2CH_2OCH_3$ (Methyl Cellosolve)	D	42(107)	285(545)	2.5	14.0	125(257)	-86(-123)	
200	Ethylene Glycol Monoethyl Ether $HOCH_2CH_2OC_2H_5$ (Ethyl Cellosolve)	[C]	40(104)	235(455)	1.8	14.0	135(275)	-70(-94)	
201	Ethylene Glycol Monobutyl Ether $HOCH_2CH_2OC_4H_9$ (Butyl Cellosolve)	C*	62(143)	240(464)	1.1 @93 (200)	12.7 @135 (275)	171(340)		
202	Diethylene Glycol $HO(C_2H_4O)_2H$	[C*]	124(255)	229(445)	1.67 @182 (360)		246(475)	-8(18)	
203	Diethylene Glycol Monomethyl Ether $CH_3O(C_2H_4O)_2H$	[C*]	93(199)		1.38 @135 (275)	22.7 @167 (333)	194(381)	-85(-121)	
204	Diethylene Glycol Monoethyl Ether $C_2H_5O(C_2H_4O)_2H$	[C*]	94(201)	204(400)	1.2 @135 (275)	23.5 @182 (360)	209(410)		
205	Diethylene Glycol Monobutyl Ether $C_4H_9O(C_2H_4O)_2H$	[C*]	78(172)	228(442)	0.9		231(446)	-68(-90)	

165.20 Glycols and Derivatives (Cont.)

165.20	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
206	Dipropylene Glycol $(CH_3CHOHCH_2)_2O$	[C*]	118(244)				232(449)		
207	Dipropylene Glycol Methyl Ether	C†	85(185)				189(372)	-80(-112)	
208	Triethylene Glycol $HO(C_2H_4O)_3H$	[C*]	177(350)	371(700)	0.9	9.2	291(558)		
209	Tripropylene Glycol $C_9H_{20}O_4$	[C*]	141(285)				267(514)		
210	Methoxy Triglycol $CH_3O(C_2H_4O)_3H$	[C*]	119(245)				249(480)	-44(-47)	
211	Ethoxy Triglycol $C_2H_5O(C_2H_4O)_3H$	[C*]	135(275)				255(493)	-19(-2)	
212	Tetraethylene Glycol $HO(C_2H_4O)_4H$	[C*]	174(345)				327(619)	-6(21)	
213	Ethylene Glycol Monoethyl Ether Acetate $CH_3COOCH_2CH_2OC_2H_5$	C*	54(121)	380(716)	1.7	8.2	156(313)	-62(-79)	
214	Ethylene Glycol Monobutyl Ether Acetate $CH_3COOCH_2CH_2OC_4H_9$	[C*]	82(180)				192(378)	-64(-83)	
215	Diethylene Glycol Monobutyl Ether Acetate $C_4H_9O(C_2H_4O)_2COCH_3$	[C*]	117(241)	295(563)			247(478)	-32(-26)	
216	Triethylene Glycol Di 2- Ethyl Butyrate $(C_2H_5)_2CHCOO(CH_2CH_2O)_3COCH(C_2H_5)_2$	[C*]	196(385)					-65(-87)	

165.20 Glycols and Derivatives (Cont.)

165.20	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
217	Glycol Diacetate $CH_3COOCH_2CH_2OCOCH_3$	[D]	104(219)		1.6 @135 (275)	8.4 @154 (310)	191(376)	-42(-44)	
218	2-Hydroxyethyl Acrylate $CH_2=CHCOOC_2H_4OH$	D					210(410)		
219	Glycerine $CH_2OHCHOHCH_2OH$	[D]	160(320)	370(698)	3.0 @193 (380)		290(554) DEC.	18(64)	

165.30 Cyclic Ethers

165.30	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
220	Ethylene Oxide CH_2CH_2O	B(C)	-27(-17)	443(829)	3.6	100	11(51)	-111(-168)	
221	Propylene Oxide CH_3CHCH_2O	B(C)	-37(-35)		2.1	21.5	34(93)	-104(-155)	
222	Tetrahydrofuran $OCH_2CH_2CH_2CH_2$	C	-14(6)	321(612)	2	11.8	65(149)	-65(-85)	
223	1,4-Dioxane $OCH_2CH_2OCH_2CH_2$	C	12(54)	180(356)	2	22.2	101(214)	12(54)	
224	Glycidol OCH_2CHCH_2OH	C					162(324) DEC		
225	Allyl Glycidyl Ether (AGE)	B(C)†	57(135)				154(309)	-100(-148)	
226	N-Butyl Glycidyl Ether (BGE)	B(C)†	53(128)				164(327)		
227	Diglycidyl Ether (DGE) $C_6H_{10}O_3$	C					260(500)		
228	Isopropyl Glycidyl Ether (IGE)	C	32(89)				137(279)		
229	Phenyl Glycidyl Ether (PGE)	C†					245(473)	4(39)	
230	Furfuryl Alcohol $OCH{=}CHCH{=}CCH_2OH$	[C*]	75(167)	490(916)	1.8	16.3	171(340)	-31(-24)	

165.30 Cyclic Ethers (cont.)

165.30	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
231	Furfural $OCH{=}CHCH{=}CCHO$	C	60(140)	316(601)	2.1	19.3	162(323)	-37(-34)	
232	Epichlorohydrin OCH_2CHCH_2Cl	C	34(93)	411(772)	3.8	21.0	118(243)	-57(-71)	
233	Morpholine $CH_2CH_2OCH_2CH_2NH$	C	38(100)	310(590)	2.0	11.2	129(264)	-5(23)	
234	N-Ethylmorpholine $CH_2CH_2OCH_2CH_2CH_2NCH_2CH_3$	C	32(90)				138(280)	-63(-81)	

170.10 Halogens

170.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
235	Fluorine F_2						-187(-305)	-223 (-369)	O
236	Chlorine Cl_2						-35(-33)	-101 (-152)	O
237	Bromine Br_2						59(138)	-7(19)	O
238	Iodine I_2						183 (361)	113(235)	S,O

170.20 Hydrogen Halides

170.20	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
239	Hydrogen Fluoride HF						20	-92(-134)	N
240	Hydrogen Chloride HCl						-85(-121)	-114(-174)	N
241	Hydrogen Bromide HBr						-67(-88)	-87(-125)	N

170.30 Fluorinated Hydrocarbons

170.30	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
242	Dichloromonofluoromethane (Refrigerant 21) $HCCl_2F$			552(1026)			9(48)	-135(-213)	
243	Fluorotrichloromethane (Refrigerant 11) $CFCl_3$						24(75)	-111(-168)	N
244	Dichlorodifluoromethane(Refrigerant 12) CCl_2F_2						-29(-22)	-158(-252)	N
245	Difluorodibromomethane CF_2Br_2						23(73)	-141(-224)	N
246	Trifluoromonobromomethane CF_3Br (Halon 1301)						-59(-74)	-168(-270)	N
247	1,1,2,2-Tetrachloro-1,2-Difluoroethane $CFCl_2CFCl_2$						93(199)	26(79)	N
248	1,1,1,2-Tetrachloro-2,2-Difluoroethane CCl_3CF_2Cl						92(198)	41(106)	N
249	Dichlorotetrafluoroethane (Refrigerant 114) $F_2ClCCClF_2$						4(39)	-94(-137)	N

170.40	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
250	Methyl Chloride CH_3Cl	D	Gas	632 (1170)	10.7	17.4	-24(-11)	-98(-144)	
251	Methylene Chloride CH_2Cl_2	D		615(1141)	15.5	66	40(104)	-97(-144)	
252	Chloroform $CHCl_3$			624(1155)			61(142)	-64(-83)	
253	Carbon Tetrachloride CCl_4						77(171)	-23(-9)	N
254	Ethyl Chloride C_2H_5Cl	D	-50(-58)	519(966)	3.8	15.4	12(55)	-139(-220)	
255	1,1- Dichloroethane CH_3CHCl_2	D	-14 (6)	458(856)	5.6	11.4	57(136)	-97(-144)	
256	Methyl Chloroform (1,1,1- Trichloroethane) CH_3CCl_3	D		537(1000)	8.0	10.5		-32(-26)	
257	Ethylene Dichloride (1,2-Dichloroethane) $ClCH_2CH_2Cl$	D	13(55)	413(775)	6.2	16	84(182)	-36(-33)	
258	1,1,2-Trichloroethane $CH_2ClCHCl_2$	D					114(237)	-35(-31)	
259	1,1,2,2- Tetrachloroethane $CHCl_2CHCl_2$						146(295)	-44(-47)	N
260	Hexachloroethane CCl_3CCl_3						185(365)		N

170.40 Chlorinated Hydrocarbons (Cont.)

170.40	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
261	Propylene Dichloride (1,2-Dichloropropane) $CH_3CHClCH_2Cl$		16(60)	557(1035)	3.4	14.5	88(190)	-70(-94)	
262	1,2,3-Trichloropropane $CH_2ClCHClCH_2Cl$	D	82(180)	304(579)	3.2	12.6 @150 (302)	156(313)	-15(5)	
263	Vinyl Chloride (Inhibited) $CH_2=CHCl$	D	Gas	472(882)	3.6	33.0	-13(7)		
264	1,2-Dichloroethylene cis-trans-$ClCH=CHCl$	D	2(36)	460(860)	9.7	12.8	48(118)	-50(-58)	
265	Vinylidene Chloride (Inhibited) $CH_2=CCl_2$	D	-18(0)	570(1058)	7.3	16.0	32(90)		
266	Trichloroethylene $ClHC=CCl_2$	D		420(788)	12.5*	90*	87(188)		*Sic - NFPA 325M
267	Tetrachloroethylene CCl_2CCl_2						121(250)	-23(-11)	N
268	Allyl Chloride $CH_2=CHCH_2Cl$	D	-32(-25)	485(905)	2.9	11.1	45(113)	-136(-213)	
269	1,3-Dichloropropene $ClCH=CHCH_2Cl$	D	35(95)				103-110 (217-230)		
270	Chloroprene $CH_2=CClCH=CH_2$	D	-20(-4)		4.0	20.0	59(138)		
271	Ethylene Chlorohydrin $HOCH_2CH_2Cl$	D	53(131)	425(797)	4.9	15.9	129(264)	-69(-94)	

170.50 Brominated Hydrocarbons

170.50	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
272	Methyl Bromide CH_3Br	D		537(1000)	10.0	15.0	4(39)	-93(-137)	
273	Bromoform $CHBr_3$						150(302)	8(46)	N
274	Chlorobromomethane $ClCH_2Br$						68(154)	-88(-126)	N
275	Ethyl Bromide CH_3CH_2Br	D		511(952)	6.7	11.3	38(100)	-119(-184)	
276	Ethylene Dibromide (1,2-Dibromoethane) CH_2BrCH_2Br						131(268)	9(48)	N
277	Acetylene Tetrabromide (s-Tetrabromoethane) $CHBr_2CHBr_2$		-4(25)	335(635)			DEC.	0(32)	

170.60 Cyclic Halogenated Hydrocarbons

170.60	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
278	Chlorobenzene C_6H_5Cl	[D]	29(84)	640(1184)	1.3	7.1	132(270)	-45(-49)	
279	o-Dichlorobenzene $C_6H_4Cl_2$	[D]	66(151)	648(1198)	2.2	9.2	180(356)	-18(1)	
280	p-Dichlorobenzene $C_6H_4Cl_2$	[D]	66(151)				173(343)	53(127)	S
281	1,2,4-Trichlorobenzene $C_6H_3Cl_3$	[D]	99(210)				213(415)	17(63)	
282	Chlorodiphenyl, 42% Chlorine		195(383)						
283	Chlorodiphenyl, 52% Chlorine		195(383)						
284	Trichloronaphthalene	U					133(271)		S
285	Tetrachloronaphthalene $C_{10}H_4Cl_4$	U						182(360)	S
286	Pentachloronaphthalene $C_{10}H_3Cl_5$	U							S
287	Hexachloronaphthalene $C_{10}H_2Cl_6$	U							S
288	Octachloronaphthalene $C_{10}Cl_8$	U							S

170.60 Cyclic Halogenated Hydrocarbons (Cont.)

170.60	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
289	Chlorinated Diphenyl Oxide	U							
290	Benzyl Chloride $C_6H_5CH_2Cl$	[D]	60(140)	585(1085)	1.1		179(354)	-43(-47)	
291	α-Chloroacetophenone $C_6H_5COCH_2Cl$	D	118(244)				237-247 (460-478)	56(133)	S
292	Methoxychlor $Cl_3CCH(C_6H_4OCH_3)_2$	U						89(192)	S

170.70 Other Halogenated Compounds

170.70	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
293	Chlorine Trifluoride ClF_3						11(52)	-83(-117)	O
294	Methyl Iodide CH_3I	D					42 (108)	-64(-83)	
295	1,3-Dichloro- 5,5-Dimethyl Hydantoin $C_5H_6N_2Cl_2O_2$	D						132(270)	S
296	Perchloryl Fluoride ClO_3F						-47(-54)	-146(-231)	O

175.10 Aliphatic Amines

175.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
297	Methylamine CH_3NH_2	D	-18 (0)	430 (806)	4.9	20.7	-6 (21)	-93 (-135)	
298	Ethylamine $C_2H_5NH_2$	D	<-18 (<0)	385 (725)	3.5	14.0	17 (62)	-81 (-113)	
299	Isopropylamine $(CH_3)_2CHNH_2$	D	-37 (-35)	402 (756)	2.3	16.4	32 (89)	-101 (-150)	
300	Butylamine $C_4H_9NH_2$	D	-12 (10)	312 (594)	1.7 @100 (212)	9.8	77 (171)	-50 (-58)	
301	Dimethylamine $(CH_3)_2NH$	C*	-18 (0)	400 (752)	2.8	14.4	7 (44)	-92 (-134)	
302	Diethylamine $(C_2H_5)_2NH$	C	-23 (-9)	312 (594)	1.8	10.1	56 (133)	-39 (-36)	
303	Di-n-propylamine $(CH_3CH_2CH_2)_2NH$	C*	7 (45)				105 (221)	-40 (-40)	
304	Diisopropylamine $[(CH_3)_2CH]_2NH$	C†	-7 (19)				83 (181)	-61 (-78)	
305	Triethylamine $(C_2H_5)_3N$	C	-7 (20)		1.2	8.0	89 (190)	-115 (-175)	
306	Ethylenediamine $H_2NCH_2CH_2NH_2$	D	34 (93)	385 (725)	4.2	14.4	117 (243)	9 (48)	

175.10 Aliphatic Amines (Cont.)

175.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
307	Hexamethylene Diamine Solutions $H_2N(CH_2)_6NH_2$+15%H_2O	D					205(401)	42(108)	DATA FOR PURE COMPOUND
308	Diethylenetriamine $NH_2(C_2H_4NH)_2H$	[D]	102(215)	399(750)			207(405)	-39(-40)	
309	Triethylene Tetramine $NH_2(C_2H_4NH)_3H$	[D]	135(275)	338(640)			278(532)	12(54)	
310	Tetraethylene Pentamine $NH_2(C_2H_4NH)_4H$	[D]	163(325)	345(653)		4.6	333(633)	-30(-22)	

175.15 Alkanol Amines

175.15	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
311	Monoethanolamine $HOCH_2CH_2NH_2$	[D]	85(185)				171(340)	11(52)	
312	Diethylaminoethanol $(C_2H_5)_2NCH_2CH_2OH$	C	60(140)				162(324)	-70(-94)	
313	Diethanolamine $NH(CH_2CH_2OH)_2$	[D]	152(305)	662(1224)			269(518)	28(82)	
314	Triethanolamine $(HOCH_2CH_2)_3N$	[D]	179(355)				360(680)	21(70)	
315	Monoisopropanolamine $CH_3CHOHCH_2NH_2$	[D]	77(171)				160(318)	1(34)	
316	Diisopropanolamine $(CH_3CHOHCH_2)_2NH$	[D]	127(260)				249(482)	42(108)	
317	N-Aminoethyl Ethanolamine $H_2NC_2H_4NHC_2H_4OH$	[D]	129(265)	368(694)			244(471)		

175.20 Aromatic Amines

175.20	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
318	Aniline $C_6H_5NH_2$	[D]	70(158)	615(1139)	1.3	8.3 @140 (284)	184(363)	-6(21)	
319	Monomethyl Aniline $C_6H_5NH(CH_3)$	C†	86(187)	482(900)			200(392)	-57(-72)	
320	N-Dimethylaniline $C_6H_5N(CH_3)_2$	C†	63(145)	371(700)			193(379)	3(37)	
321	o-Toluidine $CH_3C_6H_4NH_2$	[D]	85(185)	482(900)			200(390)	-16(3)	
322	Xylidine (dimethyl aminobenzene, six isomers) $(CH_3)_2C_6H_3NH_2$	[D]	97(206)				224(435)		
323	Anisidine o-Anisidine $CH_3OC_6H_4NH_2$ p-Anisidine $CH_3OC_6H_4NH_2$	[D]					225(439) 240(464)		
324	p-Phenylene Diamine $NH_2C_6H_4\ C_6H_4NH_2$	[D]	156(312)				267(514)	140(282)	

175.30 Diazomethane and Hydrazines

175.30	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
325	Diazomethane CH_2N_2								Explodes at 100 C
326	Hydrazine (anhydrous) H_2NNH_2	C	38 (100)	230-270 (446-518)	4.7	100	114(236)	1(35)	Vap . Explosive
327	Monomethylhydrazine CH_3NHNH_2	C	<27(<81)		4.0		88(190)	-21(-8)	
328	1,1-Dimethylhydrazine $(CH_3)_2NNH_2$	C	-20(5)	249(480)	2.0	95	63(145)	-58(-72)	
329	Phenylhydrazine $C_6H_5NHNH_2$	[D†]	89 (192)	174(345)			244(471)	20(68)	

175.40 Aliphatic Nitro Compounds

175.40	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
330	Nitromethane CH_3NO_2	C	35(95)	419(785)	7.3		101(214)	-29(-20)	
331	Tetranitro Methane $C(NO_2)_4$						126(257)	13(55)	EXPLOSIVE, O
332	Nitroethane $C_2H_5NO_2$	C	28(82)	414(778)	3.4		114(237)	-90(-130)	
333	1-Nitropropane $CH_3CH_2CH_2NO_2$	C	49(120)	421(789)	2.2		131(268)	-108(-162)	
334	2-Nitropropane $CH_3CH(NO_2)CH_3$	C	39(102)	428(802)	2.6	11.0	120(248)	-93(-135)	
335	Chloropicrin (nitrotrichloromethane) CCl_3NO_2						112(234)	-64(-83)	N
336	1,1-Dichloro-1-Nitroethane $CH_3CCl_2NO_2$	C†	76(168)				124(255)		
337	1-Chloro-1-Nitropropane $CH_3CH_2CH(NO_2)Cl$	C†	62(144)				140(282)		

175.50 Aromatic Nitro Compounds

175.50	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
338	Nitrobenzene $C_6H_5NO_2$	[D]	88(190)	482(900)	1.8 @93 (200)		211(412)	6(43)	
339	p-Nitrochlorobenzene $C_6H_4ClNO_2$	[D]	128(261)				237(457)	83(181)	
340	Dinitrobenzene, all isomers $C_6H_4(NO_2)_2$	U	150(302)				303(576)	118(244)	S,O
341	Nitrotoluene $NO_2C_6H_4CH_3$	[D]	107(223)				220(428)	-4(-25)	
342	Dinitrotoluene (molten) (2,4 Dinitrotoluene) $(NO_2)_2C_6H_3CH_3$	[C*]	207(404)				300(572)	70(158)	
343	Trinitrotoluene (TNT) $(NO_2)_3C_6H_2CH_3$		Explodes					81(178)	S,O; EXPLOSIVE
344	p-Nitroaniline $NO_2C_6H_4NH_2$	[D]	199(390)				337(637)	146(295)	S
345	4,6 Dinitro-o-cresol $(NO_2)_2C_6H_2(CH_3)OH$	U						86(187)	S,O
346	Picric acid (2,4,6-trinitrophenol) $(NO_2)_3C_6H_2OH$		150(302)	300(572)				122(252)	EXPLODES ABOVE 300(572)
347	Tetryl (2,4,6-trinitrophenyl methyl nitramine) $(NO_2)_3C_6H_2N(NO_2)CH_3$							130(266)	EXPLODES @ 187 (367)

175.60 Nitrates

175.60	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
348	n-Propyl Nitrate $CH_3(CH_2)_2ONO_2$	A†	20(68)	177(350)	2.0	100.0	111(232)	-108(-162)	
349	Ethylene Glycol Dinitrate and/or Nitroglycerin $C_2H_4(NO_3)_2$ $C_3H_5(NO_3)_3$			270 (518)				-20(-4)	EXPLOSIVE
350	RDX (Cyclotrimethylene Trinitramine) $C_3H_6N_6O_6$							202 (395)	EXPLOSIVE

175.70 Cyanides, Nitriles and Isocyanates

175.70	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
351	Acetonitrile CH_3CN	D	2(36)	524(975)	4.4	16.0	80 (176)	-41 (-44)	
352	Acrylonitrile $CH_2=CHCN$	D	-5(23)	481(898)	3.0	17.0	77(171)	-82(-116)	
353	Tetramethyl Succinonitrile $C_8H_{12}N_2$	D						169(336)	
354	Adiponitrile $NC(CH_2)_4CN$	[D]	93(199)				295(565)	2 (36)	
355	Ethylene Cyanohydrin $HOCH_2CH_2CN$	[D]	129(265)				228(442) DEC.	-46 (-51)	
356	Acetone Cyanohydrin $(CH_3)_2COHCN$	[D]	74(165)	688(1270)	2.2	12.0		-20 (-4)	
357	o-Chlorobenzylidene Malononitrile (OCBM)	G							S
358	Methyl Isocyanate CH_3NCO	D	-7(19)				60 (154)	-45 (-49)	
359	Toluene-2, 4-Diisocyanate $CH_3C_6H_3(NCO)_2$	D	132(270)		0.9	9.5	251(484)	20 (68)	
360	Methylene Bisphenyl Isocyanate $OCNC_6H_4CH_2C_6H_4NCO$	liq: D					196 (385)	37(97)	

175.80	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
361	Ethylene Imine CH_2CH_2NH	C	-11(12)	320(608)	3.6	46.0	56(133)	-72(-98)	
362	Propylene Imine $CH_2CH(CH_3)NH$	C					63(145)		
363	Hexamethylenimine $CH_2(CH_2)_5NH$	C					138(280)	-37(-36)	
364	Pyridine $CH=CHCH=CHCH=N$	D	20(68)	482(900)	1.8 @60 (140)	12.0 @70 (158)	116(241)	-42(-44)	
365	2-Methyl-5-Ethyl Pyridine $C(CH_3)=CHCH=C(C_2H_5)CH=N$	[D]	74(165)				178(352)	-70(-94)	
366	2-Aminopyridine $CH=CHCH=CHC(NH_2)=N$	U					211(412)	58(136)	S

175.90 Aliphatic Carboxylic Amides

175.90	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
367	Acrylamide $CH_2=CHCONH_2$	liq: D	138(280)	424(795)			125(257)	85(185)	S
368	Dimethyl Acetamide $CH_3CON(CH_3)_2$	0	77(171)	354(669)	1.8	13.8	165(329)	-20(-4)	S
369	Dimethyl Formamide $HCON(CH_3)_2$	D	58(136)	445(833)	2.2 @100 (212)	15.2 @100 (212)	153(307)	-61(-80)	

180.10 Organo Metallic Compounds

180.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
370	Aluminum Triethyl $Al(C_2H_5)_3$						194(384)	-53(-63)	IGNITES SPONTANEOUSLY IN AIR
371	tert-Butyl Chromate								
372	tetra-Ethyl Lead (as Pb) $Pb(C_2H_5)_4$	[C]	93(206)				198-202 DEC (388-396)		
373	tetra-Methyl Lead (as Pb) $Pb(CH_3)_4$	C	38(100)		1.8		110(230)	-28(-18)	
374	Organo (alkyl) Mercury								
375	Organic Tin Compounds								
376	Ethyl Silicate $(C_2H_5)_4SiO_4$	D	52(125)				166(331)	-77(-107)	

185.10 Organo Phosphates (excluding pesticides)

185.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
377	Dibutyl Phosphate $(C_4H_9O)_2PO(OH)$	D					dec>100 (212)		
378	Tributyl Phosphate $(C_4H_9O)_3PO$	[D]	146 (295)				292 (558)		
379	Triorthocresyl Phosphate $(CH_3C_6H_4O)_3PO$	[D]	225 (437)	385 (725)					
380	Triphenyl Phosphate $(C_6H_5O)_3PO$	[D]	220 (428)					49 (120)	
381	Dimethyl-1,2-Dibromo-2-2-Dichloroethyl Phosphate (Dibrom) $(CH_3O)_2PO(OCHBrCBrCl_2)$	D						270 (518)	S

190.10 Organo Sulfur Compounds

190.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
382	Methyl Mercaptan CH_3SH	C†	-18(1)		3.9	21.8	6(43)	-123(-191)	
383	Ethyl Mercaptan C_2H_5SH	C†		299(570)	2.8	18.2	36(97)	-147(-234)	
384	Perchloromethyl Mercaptan $ClSCCl_3$	C†					148(298)		
385	Butyl Mercaptan $CH_3(CH_2)_2CH_2SH$	C†	2(35)				98(208)	-116(-177)	
386	Dimethylsulfate $(CH_3)_2SO_4$	[D]	83(182)	188(370)			188(370) DEC	-31(-26)	
387	Allyl Propyl Disulfide $C_3H_5S_2C_3H_7$	C							
388	Thiram (tetramethyl thiuram disulfide) $C_6H_{12}N_2S_4$	G						70(158)	S
389	Sulfolane $CH_2(CH_2)_3SO_2$	[D]	166(330)				285(545)	27(81)	

210.10 Chlorinated Hydrocarbon Pesticides

210.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
390	Aldrin $C_{12}H_8Cl_6$	U						104(219)	S
391	Chlordane	G							S
392	Chlorinated Camphene (toxaphene) $C_{10}H_{10}Cl_8$	U						65-90 (149-194)	S
393	2, 4-D(2,4-dichlorophenoxyacetic acid) $Cl_2C_6H_3OCH_2COOH$	G						138(280)	S
394	DDT (2,2-bis (p-chlorophenyl)-1,1,1-trichlorethane) $CCl_3CH(C_6H_4Cl)_2$	G						109(228)	S
395	Dieldrin $C_{12}H_{10}OCl_6$	G						176(349)	S
396	Endrin	G							S
397	Crag Herbicide (sesone) $C_5H_{10}N_2S_2$	U						105-107 (221-225)	S
398	Heptachlor							95 (203)	S,N
399	Lindane $C_6H_6Cl_6$	G					288(550)	157(315)	S
400	Pentachlorophenol (PCP) Cl_5C_6OH	G					310(590) DEC.	191(376)	S

210.10 Chlorinated Hydrocarbon Pesticides (Cont.)

210.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
401	2.4.5-T (2,4,5-trichlorophenoxyacetic acid) $Cl_3C_6H_2OCH_2COOH$	G						151-153 (304-307)	S

220.10 Organo Phosphate Pesticides

220.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
402	Dichlorovos (DDVP) $(CH_3O)_2P(O)OCH{=}CCl_2$	D							
403	Demeton (Systox) O,O-Diethyl-O-(2-(ethylthio) ethyl) thiophosphate	G						134(273)	S
404	EPN $C_{14}H_{14}O_4NPS$ O-Ethyl-O-(p-nitrophenyl) thionobenzene phosphonate	D						36 (97)	S
405	Azinphos-Methyl (Guthion)	U						73(163)	S
406	Malathion $(CH_3O)_2P(S)SCH(COOC_2H_5)CH_2COOC_2H_5$	D						3 (37)	
407	Parathion $C_{10}H_{14}NO_5PS$	D					375(709)	6(43)	
408	Phosdrin (Melvinphos)	D							S
409	Ronnel							41(106)	
410	TEDP (Tethraethyl dithionopyrophosphate)	D†							
411	TEPP(tetraethyl pyrophosphate) $(C_2H_5)_4P_2O_7$	D†							

230.10 Miscellaneous Pesticides

230.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
412	Alpha-Naphthyl-Thiourea (ANTU)	G						198(388)	S
413	Carbaryl (Sevin (R))	G						142(288)	S
414	Ferbam $Fe[(CH_3)_2NCS_2]_3$	G							S
415	Nicotine $C_{10}H_{14}N_2$	D†		244(471)	0.7	4.0	246(475) DEC.		
416	Paraquat	G							S
417	Hydrogen Cyanide (hydrocyanic acid - 96% HCN	C*†	-18(0)	538(1000)	5.6	40	26(78)	-13(8)	
418	Calcium Arsenate $Ca_3(AsO_4)_2$								S,N
419	Lead Arsenate								N
420	Pival (pivalyl-1, 3-indandione)	D						109(228)	S
421	Pyrethrum Dust	G		440(824)					
422	Rotenone $C_{23}H_{22}O$	G						163(325)	

230.10 Miscellaneous Pesticides (Cont.)

230.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
423	Sodium Fluoroacetate FCH_2COONa								
424	Strychnine $C_{21}H_{22}N_2O_2$	G						268(514)	S
425	Thallium, Soluble Compounds								S,N
426	Warfarin $C_{19}H_{16}O_4$	G						161(322)	S

310.10 The Metals and their Compounds

310.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
427	Antimony and Compounds Sb	E							
428	Barium, Soluble Compounds Ba								S,N
429	Beryllium and Compounds Be	E							S
430	Cadmium Fume								S,N
431	Cadmium Dust	E							S
432	Chromium, Soluble Chromic and Chromous salts as Cr								S,N
433	Chromium, Metal and Insoluble Salts	E							S,N
434	Chromic Acid and Chromates								S,N,O
435	Cobalt, Metal Fume and Dust	E							S, if oxide N
436	Copper Fume								S, if oxide N
437	Copper Dusts and Mists								S,N

310.10 The Metals and their Compounds (Cont.)

310.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
438	Ferrovanadium Dust FeV	E							S
439	Hafnium and Compounds Hf	E							S
440	Iron Oxide Fume								N
441	Lead and Its Inorganic Compounds	E							S
442	Magnesium Oxide Fume MgO								S,N
443	Manganese Mn	E					1962 (3560)	1244 (2282)	S
444	Mercury Hg						357(676)	-39(-40)	N
445	Molybdenum Soluble Compounds								S,N
446	Molybdenum Insoluble Compounds								S,N
447	Nickel, Metal and Soluble Compounds (as Ni)	E							S
448	Nickel Carbonyl $Ni(CO)_4$		<-20(<-4)	277(532)	2.0		43(109)	-25(-14)	

310.10 The Metals and their Compounds (Cont.)

310.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
449	Platinum, Soluble Salts as Pt								S,N
450	Rhodium, Metal Fume and Dust Rh								S,N
451	Rhodium, Soluble Salts RhX_6								N
452	Silver Metal and Soluble Compounds Ag								S,N
453	Sodium Hydroxide NaOH						1390(2534)	318(604)	S,N
454	Tantalum Ta	E					5425(9797)	2996(5425)	S
455	Tin, Inorganic Compounds, Except Oxides								N
456	Titanium Dioxide TiO_2							1830(3326)	S,N
457	Uranium (soluble compounds) U								N
458	Uranium (insoluble compounds) U								N
459	Vanadium Dust								S,N

310.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
460	Vanadium Fume V_2O_5								S,N
461	Yttrium Y	E					2927(5301)	1490 (2714)	S
462	Zinc Chloride Fume $ZnCl_2$								N
463	Zinc Oxide Fume ZnO								N
464	Zirconium Compounds Zr								N

320.10 The Non-metals and their Compounds

320.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
465	Arsenic and Compounds As	E							S
466	Boron Oxide B_2O_3							460(860)	S,N
467	Boron Trifluoride BF_3						-100(-148)	-127(-197)	N
468	Calcium Oxide CaO						2850 (5162)	2580(4670)	S,N
469	Carbon Black C	F							S
470	Carbon Dioxide CO_2		Gas				-79(-140) SUBLIMES		N
471	Carbon Monoxide CO	C*	-140(-220)	605(1121)	12.5	74	-191(-314)	-207(-341)	
472	Phosgene $COCl_2$		Gas				8(46)	-104(-155)	N
473	Nitric Oxide NO		Gas				-152(-242)	-161(-260)	O
474	Nitrogen Dioxide NO_2		Gas				21(70)	-11(12)	O
475	Ammonia, Anhydrous NH_3	D	Gas	651(1204)	16.0	25.0	-33(-29)	-78(-108)	

320.10 The Non-metals and their Compounds (Cont.)

320.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
476	Ammonium Sulfamate $NH_4OSO_2NH_2$							125(257)	N,S
477	Nitrogen Trifluoride NF_3		Gas				-129(-200)	-209(-344)	0
478	Osmium Tetroxide OsO_4						130(266) SUBLIMES	40(104)	0
479	Ozone O_3		Gas				-112(-170)	-193(-315)	0
480	Chlorine Dioxide ClO_2		Gas				10(50)	-60(-76)	0
481	Oxygen Difluoride OF_2		Gas				-145(-229)	-224(-371)	0
482	Hydrogen Peroxide, 90% H_2O_2						107(225)		0
483	Phosphorus, Yellow P_4			30(86)			280(536)	44(111)	P
484	Phosphorus Pentachloride PCl_5						160(320) SUBLIMES		
485	Phosphorus Pentasulfide P_2S_5			287(548)			514(957)	276(529)	
486	Phosphorus Trichloride PCl_3						74(165)	-111(-167)	N

320.10 The Non-metals and their Compounds (Cont.)

320.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
487	Selenium Compounds Se								
488	Selenium Hexafluoride SeF_6		Gas				-35(-33)	-39(-40)	N
489	Sulfur (Molten) S		207(405)	232(450)			445(833)	119(246)	
490	Hydrogen Sulfide H_2S	C	Gas	260(500)	4.0	44.0	-60(-77)	-86(-122)	
491	Carbon Disulfide CS_2	A	-30(-22)	100(212)	1.3	50	46(115)	-111(-168)	More hazardous than Acetylene
492	Sulfur Dioxide SO_2		Gas				-10(14)	-76(-105)	N
493	Sulfur Hexafluoride SF_6		Gas				-64(-83)	-56(-69)	N
494	Sulfur Monochloride (sulfur chloride) S_2Cl_2		119(245)	234(453)			138(280)	-80(-112)	
495	Sulfur Pentafluoride S_2F_{10}						29(84)	-92(-134)	N†
496	Sulfuryl Fluoride SO_2F_2						-52(-62)	-120(-184)	N†
497	Tellurium Te	E					990(1814)	450(842)	S

320.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
498	Tellurium Hexafluoride TeF_6						36(97)	-36(-33)	N

330.10 Inorganic Acids

330.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
499	Sulfuric Acid H_2SO_4						330(626)	11(52)	N,O
500	Phosphoric Acid H_3PO_4							42(108)	N
501	Nitric Acid HNO_3						83(181)	-42(-44)	O

340.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
502	Arsine AsH_3	B	Gas				-55(-70)	-116(-177)	
503	Diborane B_2H_6	U	-90(-130)	145(293)	0.8	98	-93(-135)	-165(-265)	
504	Pentaborane stable B_5H_9 unstable B_5H_{11}		30(86)	35(95)	0.4		58(136)	-47(-53)	P
505	Decaborane $B_{10}H_{14}$		80(176)	149(300)	0.2		213(415)	100(212)	S
506	Hydrogen H_2	B	Gas	585(1085)	4.0	75.0	-253(-423)	-259(-434)	
507	Hydrogen Selenide H_2Se	C	Gas				-41(-43)	-64(-83)	
508	Phosphine PH_3	U	Gas	100(212)			-88(-126)	-133(-206)	
509	Stibine (antimony hydride) SbH_3		Gas				-17(3)	-88(-126)	
510	Lithium Hydride LiH	U						680(1256)	P,S

410.10 Dusts

410.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C (°F)	AIT °C (°F)	LFL %	UFL %	BOILING °C (°F)	MELTING °C (°F)	REMARKS
511	Cotton Dust, Raw	G							S
512	Silica , Crystalline (Quartz) SiO_2								S,N
513	Silica, Amorphous SiO_2						2230 (4046)	1710 (3110)	S,N
514	Graphite, Natural	F							S
515	Mica (silicates)								S,N
516	Portland Cement								S,N
517	Soapstone								S,N
518	Talc, Non-asbestos Form								S,N

910.10 Miscellaneous

910.10	NAME AND FORMULA	NAS CLASS	FLASH Pt. °C(°F)	AIT °C(°F)	LFL %	UFL %	BOILING °C(°F)	MELTING °C(°F)	REMARKS
519	Oil mist, mineral (mineral oil)	[D]	193(380)				360(680)		
520	Cyanide as CN								N

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Chlorine	236	28
Chlorine Dioxide	480	61
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Chloroacetaldehyde	128	15
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Chloropicrin (Nitrotrichloromethane)	335	42
Chloroprene	270	32
Chromic Acid and Chromates	434	56
Chromium, Metal and Insoluble Salts	433	56
Chromium, Soluble Salts	432	56
Coal Tar Pitch Volatiles	63	9
Cobalt, Metal Fume and Dust	435	56
Copper Dusts and Mists	437	56
Copper Fume	436	56
Cotton Dust, Raw	511	66
Crag Herbicide (Sesone)	397	51
Cresol, All Isomers	110	13
Crotonaldehyde	124	15
Cumene	44	6
Cyanide as CN	520	45
Cyclohexane	13	2
Cyclohexanol	100	12
Cyclohexanone	140	17
Cyclohexene	14	2
1, 3-Cyclopentadiene	15	2
Cyclopropane	12	2
p-Cymene	53	7
DDT	394	51
Decaborane	505	65
n-Decaldehyde	121	14
Decene	30	4
n-Decyl Alcohol	93	11
Decyl Benzene	45	6
Demeton	403	53
Diacetone Alcohol	103	12
Diazomethane	325	41
Diborane	503	65
Dibutyl Phosphate	377	49
o-Dibutyl Phthalate	180	21
o-Dichlorobenzene	279	34
p-Dichlorobenzene	280	34
Dichlorodifluoromethane	244	30
1, 3-Dichloro-5, 5-Dimethyl Hydantoin	295	36
1, 1-Dichloroethane	255	31
1, 2-Dichloroethylene	264	32
Dichloroethyl Ether (β, β'isomer)	189	22
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1, 1-Dichloro-1-Nitroethane	336	42

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1, 3-Dichloropropene	269	32
Dichlorotetrafluoroethane	249	30
Dichlorovos (DDVP)	402	53
Dicyclopentadiene	38	4
Dieldrin	395	51
Diethanolamine	313	39
Diethylamine	302	37
Diethylaminoethanol	312	39
Diethylbenzene	55	7
Diethylene Glycol	202	23
Diethylene Glycol Monobutyl Ether	205	23
Diethylene Glycol Monobutyl Ether Acetate	215	24
Diethylene Glycol Monoethyl Ether	204	23
Diethylene Glycol Monomethyl Ether	203	23
Diethylenetriamine	308	38
Difluorodibromomethane	245	30
Diglycidyl Ether	227	26
o-Diheptyl Phthalate	181	21
Diisobutyl Carbinol	92	11
Diisobutylene	27	3
Diisobutyl Ketone	135	16
Diisodecyl Phthalate	184	21
Diisopropanolamine	316	39
Diisopropylamine	304	37
Dimethyl Acetamide	368	47
Dimethylamine	301	37
n-Dimethylaniline	320	40
Dimethyl-1, 2-Dibromo-2, 2-Dichloroethyl Phosphate (Dibrom)	381	49
Dimethyl Formamide	369	47
1, 1-Dimethylhydrazine	328	41
o-Dimethyl Phthalate	179	21
Dimethylsulfate	386	50
Dinitrobenzene (isomers)	340	43
4, 6-Dinitro-o-Cresol	345	43
Dinitrotoluene	342	43
Dinonyl Phthalate	183	21
Dioctyl Phthalate	182	21
1, 4-Dioxane	223	26
Dipentene (Limonene)	32	4
Diphenyl (Biphenyl)	62	8
Diphenyl and Diphenyl Oxide (Mixture)	64	9
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Diundecyl Phthalate	185	21
Dodecanol	96	12
Dodecene	34	4
Dodecyl Benzene	47	6
Endrin	396	51
Epichlorohydrin	232	27
EPN	404	53
Ethane	2	1
Ethoxy Triglycol	211	24
Ethyl Acetate	158	19
Ethyl Acrylate	171	20
Ethyl Alcohol	75	10
Ethylamine	298	37
Ethyl sec-Amyl Ketone	138	16
Ethyl Benzene	43	6
Ethyl Bromide	275	33
Ethyl Butanol	86	11
Ethyl Butyl Ketone	137	16
Ethyl Chloride	254	31
Ethylene	18	3
Ethylene Chlorohydrin	271	32
Ethylene Cyanohydrin	355	45
Ethylenediamine	306	37
Ethylene Dibromide (1, 2-Dibromoethane)	276	33
Ethylene Dibromide (1, 2-Dichloroethane)	257	31
Ethyl Formate	156	19
Ethylene Glycol	195	23
Ethylene Glycol Dinitrate and/or Nitroglycerin	349	44
Ethylene Glycol Monobutyl Ether	201	23
Ethylene Glycol Monobutyl Ether Acetate	214	24
Ethylene Glycol Monoethyl Ether	200	23
Ethylene Glycol Monoethyl Ether Acetate	213	24
Ethylene Glycol Monomethyl Ether	199	23
Ethylene Imine	361	46
Ethylene Oxide	220	26
Ethyl Ether	187	22
2-Ethylhexaldehyde	119	14
2-Ethyl Hexanol	89	11
2-Ethylhexyl Acrylate (inhibited)	174	20
Ethyl Mercaptan	383	50
N-Ethyl morpholine	234	27

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Fluorine	235	28
Fluorotrichloromethane	243	30
Formaldehyde (Gas)	111	14
Formic Acid	144	18
Furfural	231	27
Furfuryl Alcohol	230	26
Glutaraldehyde	127	15
Glycerine	219	25
Glycidol	224	26
Glycol Diacetate	217	25
Glyoxal (Pure)	126	15
Graphite, Natural	514	66
Hafnium and Compounds	439	57
Heptachlor	398	51
n-Heptane	9	1
Heptene (mixed)	25	3
Hexachloroethane	260	31
Hexachloronaphthalene	287	34
Hexamethylene Diamine Solutions	307	38
Hexamethylenimine	363	46
n-Hexane	7	1
Hexanol	84	10
2-Hexanone	132	16
Hexene	24	3
sec-Hexyl Acetate	168	20
Hexylene Glycol	198	23
Hydrazine (Anhydrous)	326	41
Hydrogen	506	65
Hydrogen Bromide	241	29
Hydrogen Chloride	240	29
Hydrogen Cyanide (Hydrocyanic Acid - 96%)	417	54
Hydrogen Fluoride	239	29
Hydrogen Peroxide, 90%	482	61
Hydrogen Selenide	507	65
Hydrogen Sulfide	490	62
Hydroquinone	108	13
2-Hydroxyethyl Acrylate	218	25
Iodine	238	28
Iron Oxide Fume	440	57
Isoamyl Acetate	166	20

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Isobutyl Acetate	162	19
Isobutyl Alcohol	80	10
Isobutyl Acrylate (Inhibited)	173	20
Isobutyl Formal	193	22
Isobutyraldehyde	115	14
Isodecaldehyde	122	15
Isodecyl Acrylate (Inhibited)	175	20
Isodecyl Alcohol	94	11
Isohexane	8	1
Isooctyl Alcohol	88	11
Isooctyl Aldehyde	120	14
Isopentane	6	1
Isopentyl Aldehyde	118	14
Isophorone	142	17
Isoprene	23	3
Isopropyl Acetate	160	19
Isopropyl Alcohol	77	10
Isopropylamine	299	37
Isopropylether	188	22
Isopropyl Glycidyl Ether	228	26
Ketene	143	17
Lead Arsenate	419	54
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Lindane	399	51
Liquefied Petroleum Gas (LPG)	65	9
Lithium Hydride	510	65
Magnesium Oxide Fume	442	57
Malathion	406	53
Maleic Anhydride	152	18
Manganese	443	57
Mercury	444	57
Mesityl Oxide	136	16
Methane	1	1
Methoxychlor	292	35
Methoxy Triglycol	210	24
Methyl Acetate	157	19
Methyl Acetylene	40	5
Methyl Acetylene-Propadiene (MAPP Gas)	66	9
Methyl Acrylate	170	20
Methyl Alcohol	74	10
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3-Methyl Butyraldehyde	117	14
Methyl Chloride	250	31
Methyl Chloroform	256	31
Methylcyclohexane	16	2
Methylcyclohexanol	101	12
o-Methylcyclohexanone	141	17
Methylene Bisphenyl Isocyanate	360	45
Methylene Chloride	251	31
2-Methyl-5-Ethyl Pyridine	365	46
Methyl Formal	190	22
Methyl Formate	155	19
Methyl Iodide	294	36
Methyl Isobutyl Carbinol	91	11
Methyl Isobutyl Ketone	134	16
Methyl Isocyanate	358	45
Methyl Mercaptan	382	50
Methyl Methacrylate	176	20
α-Methyl Styrene	58	7
Mica (Silicates)	515	66
Molybdenum Insoluble Compounds	446	57
Molybdenum Soluble Compounds	445	57
Monoethanolamine	311	39
Monoisopropanolamine	315	39
Monomethyl Aniline	319	40
Monomethylhydrazine	327	41
Morpholine	233	27
Naphtha, Coal Tar	67	9
Naphthalene (molten)	60	7
α-Naphthyl-Thiourea (ANTU)	412	54
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Nitric Acid	501	64
Nitric Oxide	473	60
p-Nitroaniline	344	43
Nitrobenzene	338	43
p-Nitrochlorobenzene	339	43
Nitroethane	332	42
Nitrogen Dioxide	474	60
Nitrogen Trifluoride	477	61
Nitromethane	330	42
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Nitrotoluene	341	43
Nonane	11	1
Nonene	28	3
Nonyl Alcohol	90	11
Nonyl Phenol	106	13
Nonyl Phenol (Ethoxylated)	107	13
Octachloronaphthalene	288	34
Octane	10	1
Octene	26	3
n-Octyl Alcohol	87	11
Oil Mist, Mineral (Mineral Oil)	519	67
Organic Tin Compounds	375	48
Organo (Alkyl) Mercury	374	48
Osmium Tetroxide	478	61
Oxalic Acid	149	18
Oxygen Difluoride	481	61
Ozone	479	61
Paraquat	416	54
Parathion	407	53
Pentaborane	504	65
Pentachloronaphthalene	286	34
Pentachlorophenol (PCP)	400	51
Pentadecanol	99	12
n-Pentane	5	1
2-Pentanone	131	16
1-Pentene	22	3
Perchloromethyl Mercaptan	384	50
Perchloryl Fluoride	296	36
Petroleum Distillates	68	9
Phenol	105	13
p-Phenylene Diamine	324	40
Phenyl Ether	194	22
Phenyl Glycidyl Ether	229	26
Phenylhydrazine	329	41
Phosdrin (Melvinphos)	408	53
Phosgene	472	60
Phosphine	508	65
Phosphoric Acid	500	64
Phosphorus Pentachloride	484	61
Phosphorus Pentasulfide	485	61
Phosphorus Trichloride	486	61
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Portland Cement	516	66
Propane	3	1
Propargyl Alcohol	104	12
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Propionaldehyde	113	14
Propionic Acid	146	18
Propionic Anhydride	151	18
n-Propyl Acetate	159	19
Propyl Alcohol	76	10
Propylene	19	3
Propylene Dichloride (1, 2-Dichloropropane)	261	32
Propylene Glycol	196	23
Propylene Imine	362	46
Propylene Oxide	221	26
Propyl Formal	191	22
n-Propyl Nitrate	348	44
Pyrethrum Dust	421	54
Pyridine	364	46
Quinone (p-Benzoquinone)	109	13
RDX (Cyclotrimethylene Trinitramine)	350	44
Rhodium, Metal Fume and Dust	450	58
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Silica, Crystalline (Quartz)	512	66
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Sodium Fluoroacetate	423	55
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Tantalum	454	58
TEDP (Tetraethyl Dithionopyrophosphate)	410	53
Tellurium	497	62
Tellurium Hexafluoride	498	63
TEPP (Tetraethyl Pyrophosphate)	411	53
m-Terphenyl	72	9
o-Terphenyl	72	9
p-Terphenyl	72	9
1,1,1,2-Tetrachloro-2,2-Difluoroethane	248	30
1,1,2,2-Tetrachloro-1,2-Difluoroethane	247	30
1,1,2,2-Tetrachloroethane	259	31
Tetrachloroethylene	267	32
Tetrachloronaphthalene	285	34
Tetradecanol	98	12
Tetradecene	37	4
Tetradecyl Benzene	49	6
Tetraethylene Glycol	212	24
Tetraethylene Pentamine	310	38
Tetraethyl Lead (as Pb)	372	48
Tetrahydrofuran	222	26
Tetrahydronaphthalene	61	7
Tetramethyl Lead (as Pb)	373	48
Tetramethyl Succinonitrile	353	45
Tetranitro Methane	331	42
Tetrapropylene	35	4
Tetryl (2,4,6-Trinitrophenyl Methyl Nitramine)	347	43
Thallium, Soluble Compounds	425	55
Thiram (Tetramethyl Thiuram Disulfide)	388	50
Tin, Inorganic Compounds, Except Oxides	455	58
Titanium Dioxide	456	58
Toluene	42	6
Toluene-2,4-Diisocyanate	359	45
o-Toluidine	321	40
Tributyl Phosphate	378	49
1,2,4-Trichlorobenzene	281	34
1,1,2-Trichloroethane	258	31
Trichloroethylene	266	32
Trichloronaphthalene	284	34
2,4,5-T (2,4,5-Trichlorophenoxyacetic Acid)	401	52
1,2,3-Trichloropropane	262	32
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Triethylamine	305	37
Triethyl Benzene	56	7
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Triethylene Glycol Di 2-Ethyl Butyrate	216	24
Triethylene Tetramine	309	38
Trifluoromonobromomethane	246	30
Trinitrotoluene (TNT)	343	43
Triorthocresyl Phosphate	379	49
Triphenyl Phosphate	380	49
Tripropylene	29	4
Tripropylene Glycol	209	24
Turpentine	17	2
Turpentine Oil	31	4
Undecanol	95	11
Undecene	33	4
Undecyl Benzene	46	6
Uranium (Insoluble Compounds)	458	58
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Valeraldehyde	116	14
Vanadium Dust	459	58
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p-Xylene	52	7
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Yttrium	461	59
Zinc Chloride Fume	462	59
Zinc Oxide Fume	463	59
Zirconium Compounds	464	59

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