

NIOSH

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POCKET GUIDE TO CHEMICAL HAZARDS



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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

cdc
CENTERS FOR DISEASE CONTROL
AND PREVENTION

NIOSH POCKET GUIDE TO CHEMICAL HAZARDS

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health**

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PREFACE

The *NIOSH Pocket Guide to Chemical Hazards* presents information taken from the *NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards*, from National Institute for Occupational Safety and Health (NIOSH) criteria documents and Current Intelligence Bulletins, and from recognized references in the fields of industrial hygiene, occupational medicine, toxicology, and analytical chemistry. The information is presented in tabular form to provide a quick, convenient source of information on general industrial hygiene and medical monitoring practices. The information in the *Pocket Guide* includes chemical structures or formulas, identification codes, synonyms, exposure limits, chemical and physical properties, incompatibilities and reactivities, measurement methods, respirator selections, signs and symptoms of exposure, and procedures for emergency treatment.

The information assembled in the original 1978 printing of the *Pocket Guide* was the result of the Standards Completion Program, a joint effort by NIOSH and the Department of Labor to develop supplemental requirements for the approximately 380 workplace environmental exposure standards adopted by the Occupational Safety and Health Administration (OSHA) in 1971.

This revision of the *Pocket Guide* includes updated sampling and analytical methods, updated Department of Transportation (DOT) identification and guide numbers, current exposure limits, revised respirator selections, and revised IDLH (immediately dangerous to life or health concentration) values.

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Also, thanks are due to those individuals who reviewed and constructively commented on the *Pocket Guide* during its initial development and subsequent revisions.

Howard Ludwig (Technical Editor)

INTRODUCTION

The *NIOSH Pocket Guide to Chemical Hazards* is intended as a source of general industrial hygiene information for workers, employers, and occupational health professionals. The *Pocket Guide* presents key information and data in abbreviated tabular form for 677 chemicals or substance groupings (e.g., manganese compounds, tellurium compounds, inorganic tin compounds, etc.) that are found in the work environment. The industrial hygiene information found in the *Pocket Guide* should help users recognize and control occupational chemical hazards. The chemicals or substances contained in this revision include all substances for which the National Institute for Occupational Safety and Health (NIOSH) has recommended exposure limits (RELs) and those with permissible exposure limits (PELs) as found in the Occupational Safety and Health Administration (OSHA) General Industry Air Contaminants Standard (29 CFR 1910.1000).

Background

In 1974, NIOSH (which is responsible for recommending health and safety standards) joined OSHA (whose jurisdictions include promulgation and enforcement activities) in developing

a series of occupational health standards for substances with existing PELs. This joint effort was labeled the Standards Completion Program and involved the cooperative efforts of several contractors and personnel from various divisions within NIOSH and OSHA. The Standards Completion Program developed 380 substance-specific draft standards with supporting documentation that contained technical information and recommendations needed for the promulgation of new occupational health regulations. The *Pocket Guide* was developed to make the technical information in those draft standards more conveniently available to workers, employers, and occupational health professionals. The *Pocket Guide* is updated periodically to reflect new data regarding the toxicity of various substances and any changes in exposure standards or recommendations.

Data Collection and Application

The data collected for this revision were derived from a variety of sources, including NIOSH policy documents such as criteria documents and Current Intelligence Bulletins (CIBs), and recognized references in the fields of industrial hygiene, occupational medicine, toxicology, and analytical chemistry. New or revised data is indicated by boldface type.

NIOSH RECOMMENDATIONS

Acting under the authority of the Occupational Safety and Health Act of 1970 (29 USC Chapter 15) and the Federal Mine Safety and Health Act of 1977 (30 USC Chapter 22), NIOSH develops and periodically revises recommended exposure limits (RELs) for hazardous substances or conditions in the workplace. NIOSH also recommends appropriate preventive measures to reduce or eliminate the adverse health and safety effects of these hazards. To formulate these recommendations, NIOSH evaluates all known and available medical, biological, engineering, chemical, trade, and other information relevant to the hazard. These recommendations are then published and transmitted to OSHA and the Mine Safety and Health Administration (MSHA) for use in promulgating legal standards.

NIOSH recommendations are published in a variety of documents. Criteria documents recommend workplace exposure limits and appropriate preventive measures to reduce or eliminate adverse health effects and accidental injuries.

Current Intelligence Bulletins (CIBs) are issued to disseminate new scientific information about occupational hazards. A CIB may draw attention to a formerly unrecognized hazard, re-

port new data on a known hazard, or present information on hazard control.

Alerts, Special Hazard Reviews, Occupational Hazard Assessments, and Technical Guidelines support and complement the other standards development activities of the Institute. Their purpose is to assess the safety and health problems associated with a given agent or hazard (e.g., the potential for injury or for carcinogenic, mutagenic, or teratogenic effects) and to recommend appropriate control and surveillance methods. Although these documents are not intended to supplant the more comprehensive criteria documents, they are prepared to assist OSHA and MSHA in the formulation of regulations.

In addition to these publications, NIOSH periodically presents testimony before various Congressional committees and at OSHA and MSHA rulemaking hearings.

A complete list of occupational safety and health issues for which NIOSH has formal policies (e.g., recommendations for occupational exposure to chemical and physical hazards, engineering controls, work practices, safety considerations, etc.) can be found in *NIOSH Recommendations for Occupational Safety and Health: Compendium of Policy Documents and Statements* [DHHS (NIOSH) Publication No. 92-100].

HOW TO USE THIS POCKET GUIDE

The *Pocket Guide* has been designed to provide chemical-specific data to supplement general industrial hygiene knowledge. To maximize the amount of data provided in this limited space, abbreviations and codes have been used extensively. These abbreviations and codes, which have been designed to permit rapid comprehension by the regular user, are discussed for each column in the following subsections.

Chemical Name and Structure/Formula, CAS and RTECS Numbers, and DOT ID and Guide Numbers

Chemical Name and Structure/Formula. — The chemical name found in the OSHA General Industry Air Contaminants Standard (29 CFR* 1910.1000) is listed first. The chemical structure or formula is also provided; carbon-carbon double bonds ($-C=C-$) and carbon-carbon triple bonds ($-C\equiv C-$) have been indicated where applicable. A page index for selected synonyms and trade names is included at the back of the *Pocket Guide* to help the user locate a specific substance.

CAS and RTECS Numbers. — Below the chemical structure/formula is the Chemical Abstracts Service (CAS) registry number. This number, in the format xxx-xx-x, is unique for each chemical and allows efficient searching on computerized data

*Code of Federal Regulations

bases. A page index for all CAS registry numbers listed is included at the back of the *Pocket Guide* to help the user locate a specific substance.

Immediately below the CAS number is the *NIOSH Registry of Toxic Effects of Chemical Substances* (RTECS) number, in the format ABxxxxxxx. RTECS may be useful for obtaining additional toxicologic information on a specific substance.

DOT ID and GUIDE Number. — Under the RTECS number are the U.S. Department of Transportation (DOT) identification number and the corresponding guide number. Their format is xxxx xx. The Identification number (xxxx) indicates that the chemical is regulated by DOT. The Guide number (xx) refers to actions to be taken to stabilize an emergency situation; this information can be found in the DOT 1990 *Emergency Response Guidebook*, DOT P 5800.5 (Office of Hazardous Materials Transportation [DHM-51], Research and Special Programs Administration, U.S. Department of Transportation, 400 Seventh Street S.W., Washington, D.C. 20590-0001). A page index for all DOT ID numbers listed is included at the back of the *Pocket Guide* to help the user locate a specific substance; please note however, that many DOT numbers are NOT unique for specific substances.

Synonyms, Trade Names, and Conversion Factors

Common synonyms and trade names are listed alphabetically for each chemical. Factors for the conversion of ppm (parts

of vapor or gas per million parts of contaminated air by volume) to mg/m³ (milligrams of vapor or gas per cubic meter of contaminated air) at 68°F and 1 atmosphere are listed for all liquids and gases, and for some solids with appreciable vapor pressures.

Exposure Limits

X The NIOSH recommended exposure limits (RELs) are listed first in this column. Unless noted otherwise, RELs are time-weighted average (TWA) concentrations for up to a 10-hour workday during a 40-hour workweek. A short-term exposure limit (STEL) is designated by "ST" preceding the value; unless noted otherwise, the STEL is a 15-minute TWA exposure that should not be exceeded at any time during a workday. A ceiling REL is designated by "C" preceding the value; unless noted otherwise, the ceiling value should not be exceeded at any time. Any substance that NIOSH considers to be a potential occupational carcinogen is designated by the notation "Ca" (see Appendix A, which contains a brief discussion of potential occupational carcinogens).

The OSHA permissible exposure limits (PELs), as found in Tables Z-1, Z-2, and Z-3 of the OSHA General Industry Air Contaminants Standard (29 CFR 1910.1000), that were effective on July 1, 1993* and which are currently enforced by OSHA are listed next. [*Note: In July 1992, the 11th Circuit Court of Ap-

peals in its decision in *AFL-CIO v. OSHA*, 965 F.2d 962 (11th Cir., 1992) vacated more protective PELs set by OSHA in 1989 for 212 substances, moving them back to PELs established in 1971. The appeals court also vacated new PELs for 164 substances that were not previously regulated. Although OSHA is currently enforcing exposure limits in Tables Z-1, Z-2, and Z-3 of 29 CFR 1910.1000 which were in effect before 1989, violations of the "general duty clause" as contained in Section 5(a)(1) of the Occupational Safety and Health Act may be considered when worker exposures exceed the 1989 PELs for the 164 substances that were not previously regulated. The substances for which OSHA PELs were vacated on June 30, 1993 are indicated by the symbol "+" following OSHA in this column and previous values are listed in Appendix G.] Unless noted otherwise, PELs are TWA concentrations that must not be exceeded during any 8-hour work shift of a 40-hour workweek. A STEL is designated by "ST" preceding the value and is measured over a 15-minute period unless noted otherwise. OSHA ceiling concentrations (designated by "C" preceding the value) must not be exceeded during any part of the workday; if instantaneous monitoring is not feasible, the ceiling must be assessed as a 15-minute TWA exposure. In addition, there are a number of substances from Table Z-2 (e.g., beryllium, ethylene dibromide, and methylene chloride) that have PEL ceiling values that must not be exceeded except for a maximum peak over a specified

period (e.g., a 5-minute maximum peak in any 2 hours). Appendix B contains a brief discussion of substances regulated as carcinogens by OSHA.

Concentrations are given in ppm, mg/m³, mppcf (millions of particles per cubic foot of air as determined from counting an impinger sample), or fibers/cm³ (fibers per cubic centimeter). The "[skin]" designation indicates the potential for dermal absorption; skin exposure should be prevented as necessary through the use of good work practices and gloves, coveralls, goggles, and other appropriate equipment. The "(total)" designation indicates that the REL or PEL listed is for "total particulate" versus the "(resp)" designation which refers to the "respirable fraction" of the airborne particulate. Appendix C contains more detailed discussions of the specific exposure limits for certain low-molecular-weight aldehydes, asbestos, various dyes (benzidine-, o-tolidine-, and o-dianisidine-based), carbon black, the various chromium compounds (chromic acid and chromates, chromium(II) and chromium(III) compounds, and chromium metal), coal tar pitch volatiles, coke oven emissions, cotton dust, lead, NIAX Catalyst ESN, trichloroethylene, and tungsten carbide (cemented). Appendix D contains a brief discussion of substances included in the *Pocket Guide* with no established RELs at this time and Appendix F contains miscellaneous notes regarding the OSHA PELs. Appendix G lists the OSHA PELs that were vacated on June 30, 1993.]

IDLH

For this *Pocket Guide*, immediately dangerous to life or health concentrations (IDLHs) have been reviewed and, in many cases, have been revised and made more protective. As a consequence of the IDLH changes, many of the respirator recommendations for these substances have also been revised. The criteria utilized to determine the adequacy of existing IDLH values were a combination of those used during the Standards Completion Program and a newer methodology developed by NIOSH. These "interim" criteria form a tiered approach with acute human toxicity data being used preferentially, followed next by acute animal inhalation toxicity data, and then finally by acute animal oral toxicity data to determine an updated IDLH value. When relevant acute toxicity data were insufficient or unavailable, then the use of chronic toxicity data or an analogy to a chemically similar substance was considered. The criteria and information sources for both the original and revised IDLH values are given in *Documentation for Immediately Dangerous to Life and Health Concentrations (IDLHs)* (NTIS Publication No. PB-94-195047). NIOSH is currently assessing the various uses of IDLHs and whether the original criteria used to derive the IDLH values are valid or if other information or criteria should be utilized. Based on this assessment, NIOSH will develop a new strategy for revis-

ing the IDLH values currently listed, as well as for developing new IDLH values for the more than 300 substances listed in the *Pocket Guide* without IDLHs.

The definition of IDLH that was derived during the Standards Completion Program was based on the Mine Safety and Health Administration (MSHA) definition stipulated in 30 CFR 11.3(t). The purpose for establishing an IDLH value in the Standards Completion Program was to ensure that a worker could escape without injury or irreversible health effects from an IDLH exposure in the event of the failure of respiratory protection equipment. The IDLH was considered a maximum concentration above which only a highly reliable breathing apparatus providing maximum worker protection was permitted. In determining IDLH values, the ability of a worker to escape without loss of life or irreversible health effects was considered along with severe eye or respiratory irritation and other deleterious effects (e.g., disorientation or incoordination) that could prevent escape. As a safety margin, the Standards Completion Program IDLH values were based on the effects that might occur as a consequence of a 30-minute exposure. However, the 30-minute period was NOT meant to imply that workers should stay in the work environment any longer than necessary, in fact, **EVERY EFFORT SHOULD BE MADE TO EXIT IMMEDIATELY!**

The current NIOSH definition for an IDLH exposure condition, as stipulated in the *NIOSH Respirator Decision Logic* (DHHS

[NIOSH] Publication No. 87-108, NTIS Publication No. PB-91-151183), is a condition "that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." The purpose of establishing an IDLH exposure concentration is to "ensure that the worker can escape from a given contaminated environment in the event of failure of the respiratory protection equipment." The NIOSH Respirator Decision Logic uses these IDLH values as one of several respirator selection criteria. Under the NIOSH Respirator Decision Logic, the most protective respirators (e.g., a self-contained breathing apparatus equipped with a full facepiece and operated in a pressure-demand or other positive-pressure mode) would be selected for firefighting, exposure to carcinogens, entry into oxygen-deficient atmospheres, in emergency situations, during entry into an atmosphere that contains a substance at a concentration greater than 2,000 times the NIOSH REL or OSHA PEL, and for entry into IDLH atmospheres.

IDLH values are listed for over 380 substances. The notation "Ca" appears in this column for all substances that NIOSH considers to be potential occupational carcinogens (NIOSH recommends the most protective respirators for these substances at concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration). However, IDLH values

that were originally determined in the Standards Completion Program or were recently revised are shown in brackets following the "Ca" designations. "Unknown" indicates that because of a lack of data no IDLH could be determined. "LEL" indicates that the IDLH was based on 10% of the lower explosive limit for safety considerations even though the relevant toxicological data indicated that irreversible health effects or impairment of escape existed only at higher concentrations. "N.D." indicates that an IDLH has not as yet been determined.

Physical Description

This column provides a brief description of the appearance and odor of each substance. Notations are made as to whether a substance can be shipped as a liquefied compressed gas or whether it has major use as a pesticide.

Chemical and Physical Properties

The following abbreviations are used for the chemical and physical properties given for each substance. "NA" indicates that a property is not applicable, and a question mark (?) indicates that it is unknown.

MW	Molecular weight
BP	Boiling point at 1 atmosphere, °F
Sol	Solubility in water at 68°F*, % by weight (i.e., g/100 ml)

Fl.P.	Flash point (i.e., the temperature at which the liquid phase gives off enough vapor to flash when exposed to an external ignition source), closed cup (unless annotated "(oc)" for open cup), °F
IP**	Ionization potential, eV (electron volts)
VP	Vapor pressure at 68°F*, mm Hg; "approx" indicates approximately
MLT	Melting point for solids, °F
FRZ	Freezing point for liquids and gases, °F
UEL	Upper explosive (flammable) limit in air, % by volume (at room temperature*)
LEL	Lower explosive (flammable) limit in air, % by volume (at room temperature*)
MEC	Minimum explosive concentration, g/m ³ (when available)
Sp Gr	Specific gravity at 68°F* referenced to water at 39.2°F(4°C)
RGasD	Relative density of gases referenced to air = 1 (indicates how many times a gas is heavier than air at the same temperature)

*If noted after a specific entry, these properties may be reported at other temperatures.

**Ionization potentials are given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments.

When possible, the flammability/combustibility of a substance was determined and listed after the specific gravity. The following OSHA criteria (29 CFR 1910.106) were used to classify flammable or combustible liquids:

Class IA flammable liquid	F.I.P. below 73°F and BP below 100°F.
Class IB flammable liquid	F.I.P. below 73°F and BP at or above 100°F.
Class IC flammable liquid	F.I.P. at or above 73°F and below 100°F.
Class II combustible liquid	F.I.P. at or above 100°F and below 140°F.
Class IIIA combustible liquid	F.I.P. at or above 140°F and below 200°F.
Class IIIB combustible liquid	F.I.P. at or above 200°F.

Incompatibilities and Reactivities

This column lists important hazardous incompatibilities or reactivities of each substance.

Measurement Method

This column provides a brief, key word description of the suggested sampling and analysis method. Each description

comprises four components: (1) the collection method, (2) the sample work-up, (3) the analytical method, and (4) the method number. The method number is usually from the 3rd edition of the *NIOSH Manual of Analytical Methods* (DHHS [NIOSH] Publication No. 84-100) and is indicated by "III" following the sample work-up. If the 2nd edition of the *NIOSH Manual of Analytical Methods* is cited, this fact is noted along with the appropriate volume number [e.g., II(4)]. In a number of instances, the table cites the *1990 OSHA Analytical Methods Manual* and applicable method number (e.g., OSHA [#21]). When a method for a particular substance is not included in the latest NIOSH or OSHA analytical methods manuals, "None available" is listed. The codes listed are explained in Table 1. Table 2 presents ordering information for the measurement methods cited.

Personal Protection and Sanitation

This column presents a summary of recommended practices for each toxic substance. These recommendations supplement general work practices (e.g., no eating, drinking, or smoking where chemicals are used). Table 3 explains the codes used. Each category is described as follows:

SKIN: Recommends the need for personal protective clothing.

EYES: Recommends the need for eye protection.
WASH SKIN: Recommends when workers should wash the spilled chemical from the body in addition to normal washing (e.g., before eating).
REMOVE: Advises workers when to remove clothing that has accidentally become wet or significantly contaminated.
CHANGE: Recommends whether the routine changing of clothing is needed.
PROVIDE: Recommends the need for eyewash fountains and/or quick drench facilities.

Recommendations for Respirator Selection

This column provides a condensed table of allowable respirator use for those substances for which IDLH values have been determined. Each line lists in ppm or mg/m³ a maximum concentration for use (commonly referred to as MUC, maximum use concentration) or condition (i.e., emergency or planned entry into unknown concentrations or IDLH conditions [designated by the symbol §], or escape from suddenly occurring respiratory hazards) followed by a series of codes representing classes of respirators. Individual respirator codes are separated by diagonal marks (/). For each MUC, the table lists only those respirators with the minimum required protection factor and other

use restrictions based on the *NIOSH Respirator Decision Logic* (DHHS [NIOSH] Publication No. 87-108, NTIS Publication No. PB-91-151183). More protective respirators can be worn. All recommended respirators of a given class can be used at any concentration equal to or less than the MUC listed for that class.

The recommendations for respirator selection for each substance are based on the more restrictive occupational exposure limit found between the NIOSH REL and the current OSHA PEL.

As mentioned previously, NIOSH is assessing the adequacy of the criteria used for determining IDLH values. As IDLH values are developed, revised respirator selection recommendations will be incorporated into subsequent editions of the *Pocket Guide*. In the interim, however, no respirator recommendations will be made for substances without IDLH values (these will be noted by "TBAL" -- To Be Added Later).

All respirators selected must be approved by NIOSH and MSHA under the provisions of 30 CFR 11. The current listing of NIOSH/MSHA certified respirators can be found in the *NIOSH Certified Equipment List* (DHHS [NIOSH] Publication No. 94-104).

A complete respiratory protection program must be implemented and must fulfill all requirements of 29 CFR 1910.134. At a minimum, a respiratory protection program should include

regular training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and storage. Selection of a specific respirator within a given class of recommended respirators depends on the particular situation; this choice should be made only by a knowledgeable person. **REMEMBER:** air-purifying respirators will not protect users against oxygen-deficient atmospheres, and they are not to be used in IDLH conditions. The only respirators recommended for fire fighting are self-contained breathing apparatuses that have full facepieces and are operated in a pressure-demand or other positive-pressure modes. Additional information on the selection and use of respirators can be found in the *NIOSH Respirator Decision Logic* and the *NIOSH Guide to Industrial Respiratory Protection* (DHHS [NIOSH] Publication No. 87-116).

Codes for the various categories of respirators are defined in Table 4. In addition, the assigned protection factor (APF) is indicated for each respirator class.

Route of Health Hazard

This column lists the toxicologically important routes of entry for each substance and whether contact with the skin or eyes is potentially hazardous, abbreviated as follows:

Inh inhalation

Abs Skin absorption
 Ing Ingestion
 Con Skin and/or eye contact
 (liq) Liquid
 (sol) Solid
 (soln) Solution

Symptoms

This column lists the potential symptoms of exposure. Their abbreviations are defined in Table 5.

First Aid

This column lists emergency procedures for eye and skin contact, inhalation, and ingestion of the toxic substance. Abbreviations are defined in Table 6.

Target Organs

This column lists the organs that are affected by exposure to each substance. Abbreviations are defined in Table 5.

Table 1. — Codes for measurement methods

Code	Method/reagent	Code	Method/reagent
Collection method:*		Sample work-up	
Amborsorb	Amborsorb® XE-347 tube	CCl ₄	Carbon tetrachloride
Bag	Gas collection bag	CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane
Bub	Bubbler	CHCl ₃	Chloroform
Carbo-B	Carbosieve® B tube	CH ₂ Cl ₂	Methylene chloride
Char	Charcoal tube	CH ₃ CN	Acetonitrile
Char (low-Ni)	Charcoal tube (low nickel content)	CH ₃ COOH	Acetic acid
Char (pet)	Charcoal tube (petroleum-based)	CS ₂	Carbon disulfide
Chrom	Chromosorb tube	DCE	1,2-Dichloroethane
Dry tube	Drying tube	DMF	Dimethylformamide
Filter	Particulate filter	EDTA	Ethylenedinitrilo-tetraacetic acid
Florisil	Florisil® tube	FeCl ₃	Ferric chloride
G-chrom P	Gas-chrom P® tube	HCl	Hydrochloric acid
Hydrar	Hydrar® sorbent tube	HCOOH	Formic acid
Imp	Impinger	HNO ₃	Nitric acid
Mol-sieve	Molecular sieve tube	H ₂ O ₂	Hydrogen peroxide
Pad/Pre-filter	Treated pad with a pre-filter	HPLC	High-pressure liquid chromatography
Porapak	Porapak® tube	H ₃ PO ₄	Phosphoric acid
Si gel	Silica gel tube	H ₂ SO ₄	Sulfuric acid
Soda lime	Soda lime sorbent tube	KI	Potassium iodide
Tenax GC	Tenax® GC tube	KOH	Potassium hydroxide
T-Sorb	Thermosorb® tube	LTA	Low-temperature ashing
Vertical elut	Vertical elutriator	Na ₂ CO ₃	Sodium carbonate
XAD	XAD® tube		

(Continued)

In the chemical listing, an asterisk following an adsorbent tube code (e.g., Char, Si gel*, XAD-2*, etc.) indicates that a special coating must be added. The figure "2" in parentheses following a collection device (e.g., Filter(2), Imp(2), Char(2), etc.) indicates that two are used in series.

Table 1. — Codes for measurement methods (Continued)

Code	Method/reagent	Code	Method/reagent
NaHCO ₃	Sodium bicarbonate	GC/NPD	GC with nitrogen/phosphorus detection
NaOH	Sodium hydroxide	GC/PID	GC with photoionization detection
Na ₂ S ₂ O ₃	Sodium thiosulfate	GC/TCD	GC with thermal conductivity detector
NH ₄ OH	Ammonium hydroxide	GC/TEA	GC with thermal energy analyzer detection
Pho-acid	Phosphomolybdic acid	GC/TEA-EAP	GC/TEA with explosives package
Thermal desorp	Thermal desorption apparatus	Grav	Gravimetric
THF	Tetrahydrofuran	HGA	Flameless atomic absorption with a high-temperature graphite analyzer
Analytical method:		HPLC/AAS-GF	High-pressure liquid chromatography with graphite furnace AAS
AAS	Atomic absorption spectrometry	HPLC/FLD	High-pressure liquid chromatography with fluorescence detection
AAS/GF	Graphite furnace AAS	HPLC/UVD	High-pressure liquid chromatography with ultraviolet detection
DPCSP	Differential pulse cathodic stripping polarography	IC	Ion chromatography
ECA	Electrochemical analysis	ICP	Inductively coupled plasma
GC	Gas chromatography	IR	Infrared spectrometry
GC/AikFID	GC with alkaline flame ionization detection	ISE	Ion-specific electrode
GC/ECD	GC with electron capture detection	PCM	Phase contrast microscopy
GC/EConD	GC with electrolytic conductivity detection	PES	Plasma emission spectroscopy
GC/FID	GC with flame ionization detection		(Continued)
GC/FPD	GC with flame photometric detection for sulfur, nitrogen, or phosphorus		

Table 1. — Codes for measurement methods (Continued)

Code	Method/reagent	Code	Method/reagent
PLR	Polarography	Vis	Visible spectrophotometry
TEM	Transmission electron microscopy	XRF	X-ray fluorescence spectrometry
Titrate	Titration	XRD	X-ray diffraction spectrometry
UV-vis	Ultraviolet-visible spectrophotometry		

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Table 2. — Ordering information for measurement methods

Manual	Publication No.	Ordering No.	Manual	Publication No.	Ordering No.
NIOSH Manual of Analytical Methods, 2nd edition (II):			Supplement to 3rd edition	NIOSH 85-117	PB-86-116-266
Vol. 1	NIOSH 77-157-A	PB-274-845	2nd supplement to 3rd edition	NIOSH 87-117	PB-88-204-722
Vol. 2	NIOSH 77-157-B	PB-276-624	3rd supplement to 3rd edition	NIOSH 89-127	PB-90-162-470
Vol. 3	NIOSH 77-157-C	PB-276-838	4th supplement to 3rd edition	NIOSH 90-121	PB-91-152-660
Vol. 4	NIOSH 78-175	PB-83-105-437	OSHA Analytical Methods Manual, 1990 edition	---	4542*
Vol. 5	NIOSH 79-141	PB-83-105-445	NIOSH Manual of Analytical Methods (NMAM), 4th edition	NIOSH 94-113	017-011-00007-9**
Vol. 6	NIOSH 80-125	PB-82-157-728			
Vol. 7	NIOSH 82-100	PB-83-105-452			
NIOSH Manual of Analytical Methods (NMAM), 3rd edition (III)	NIOSH 84-100	PB-85-179-018			

*Denotes ordering number of the American Conference of Governmental Industrial Hygienists (ACGIH), 1330 Kemper Meadow Drive, Cincinnati, OH 45240 (513-742-2020). All other ordering numbers are for the National Technical Information Service (NTIS), Springfield, VA 22161 (703-487-4650).

**Printed copies of the NMAM are available from the U. S. Government Printing Office, Superintendent of Documents, Washington, DC 20402.

The computerized version of the NIOSH Manual of Analytical Methods (NMAM) is available on diskette from the Canadian Centre for Occupational Health and Safety, 250 Main Street East, Hamilton, Ontario CANADA L8N 1H6; Telephone 905-570-8094; Toll Free 1-800-668-4284 and WindowChem Software, Inc., 420-F Executive Court North, Fairfield, CA 94585; Telephone 707-864-0845; Toll Free 1-800-536-0404.

Table 3. — Personal protection and sanitation codes

Code	Definition	Code	Definition
SKIN		WASH SKIN	
Prevent skin contact ..	Wear appropriate personal protective clothing to prevent skin contact.	When contam	The worker should immediately wash the skin when it becomes contaminated.
Frostbite	Wear appropriate personal protective clothing to prevent the skin from becoming frozen from contact with the liquid or from contact with vessels containing the liquid.	Daily	The worker should wash daily at the end of each work shift.
N.R.	No recommendation is made specifying the need for personal protective equipment for the body.	N.R.	No recommendation is made specifying the need for washing the substance from the skin (either immediately or at the end of the work shift).
EYES		REMOVE	
Prevent eye contact ..	Wear appropriate eye protection to prevent eye contact.	When wet or contam ..	Work clothing that becomes wet or significantly contaminated should be removed and replaced.
Frostbite	Wear appropriate eye protection to prevent eye contact with the liquid that could result in burns or tissue damage from frostbite.	When wet (flamm)	Work clothing that becomes wet should be immediately removed due to its flammability hazard (i.e., for liquids with a flash point <100°F).
N.R.	No recommendation is made specifying the need for eye protection.	N.R.	No recommendation is made specifying the need for removing clothing that becomes wet or contaminated.

(Continued)

Table 3. — Personal protection and sanitation codes (Continued)

Code	Definition	Code	Definition
CHANGE			
Daily	Workers whose clothing may have become contaminated should change into uncontaminated clothing before leaving the work premises.		substance from any body areas likely to be exposed. The actual determination of what constitutes an adequate quick drench facility depends on the specific circumstances. In certain instances, a deluge shower should be readily available, whereas in others, the availability of water from a sink or hose could be considered adequate.]
N.R.	No recommendation is made specifying the need for the worker to change clothing after the workshift.	Frostbite	Quick drench facilities and/or eyewash fountains should be provided within the immediate work area for emergency use where there is any possibility of exposure to liquids that are extremely cold or rapidly evaporating.
PROVIDE		OTHER CODES	
Eyewash	Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance; this is irrespective of the recommendation involving the wearing of eye protection.	Liq.	Liquid
Quick drench	Facilities for quickly drenching the body should be provided within the immediate work area for emergency use where there is a possibility of exposure. [Note: It is intended that these facilities provide a sufficient quantity or flow of water to quickly remove the	Molt.	Molten
		N.R.	No recommendation applies in this category
		Sol.	Solid
		Soln.	Solution containing the contaminant
		Vap.	Vapor

Table 4. — Symbols, code components, and codes used for respirator selection

Item	Definition	Item	Definition
Symbol:		PAPR ...	Powered, air-purifying respirator
¥	At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration	SA	Supplied-air respirator
§	Emergency or planned entry into unknown concentrations or IDLH conditions	SCBA ...	Self-contained breathing apparatus
*	Substance reported to cause eye irritation or damage; may require eye protection	AG	Acid gas cartridge or canister
£	Substance causes eye irritation or damage; eye protection needed	CF	Continuous flow mode
^	If not present as a fume	HiE	Air-purifying respirator with a high-efficiency particulate filter (if an independent code); or a high-efficiency particulate filter
¿	Only nonoxidizable sorbents are allowed (not charcoal)	HiEF ...	Air-purifying, full-facepiece respirator with a high-efficiency particulate filter
†	End of service life indicator (ESLI) required	OV	Organic vapor cartridge or canister
APF	Assigned protection factor	PD,PP ..	Pressure-demand or other positive-pressure mode
Code component:		S	Chemical cartridge or canister providing protection against the compound of concern
CCR ...	Chemical cartridge respirator	T	Tight-fitting facepiece
D	Dust respirator (if an independent code); or a dust filter	XS	Except single-use respirator
F	Full facepiece	XSQ	Except single-use and quarter-mask respirator
Fu	Fume filter	Code:	
GMF	Air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister	CCRFAGHiE (APF = 50) ...	Any chemical cartridge respirator with a full facepiece and acid gas cartridge(s) in combination with a high-efficiency particulate filter
M	Mist filter		(Continued)

Table 4. — Symbols, code components, and codes used for respirator selection (Continued)

Item	Definition	Item	Definition
Code (continued)			
CCRFOV (APF = 50)	Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)	CCROV (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s)
CCRFOVDMFu (APF = 50)	Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a dust, mist, and fume filter	CCROVAG (APF = 10)	Any chemical cartridge respirator with organic vapor and acid gas cartridge(s)
CCRFOVHiE (APF = 50) ...	Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter	CCROVDM (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter
CCRFS (APF = 50)	Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern	CCROVDMFu (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter
CCRFSHiE (APF = 50)	Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern and having a high-efficiency particulate filter	CCROVHiE (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a high-efficiency particulate filter
		CCRS (APF = 10)	Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern
		D (APF = 5)	Any dust respirator
		DM (APF = 5)	Any dust and mist respirator

(Continued)

Table 4. — Symbols, code components, and codes used for respirator selection (Continued)

Item	Definition	Item	Definition
Code (continued)			
DMF (APF = 10)	Any dust and mist respirator with a full facepiece	GMFOV (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
DMFu (APF = 10)	Any dust, mist, and fume respirator	GMFOVAG (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister
DMXSQ (APF = 10)	Any dust and mist respirator except single-use and quarter-mask respirators	GMFOVAGHiE (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor and acid gas canister having a high efficiency particulate filter
DXSQ (APF = 10)	Any dust respirator except single-use and quarter-mask respirators	GMFOVDMFu (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister in combination with a dust, mist, and fume filter
GMFAG (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister		(Continued)
GMFAGHiE (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter		

Table 4. — Symbols, code components, and codes used for respirator selection (Continued)

Item	Definition	Item	Definition
Code (continued)		HiEF (APF = 50)	Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter
GMFOVHiE (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter	PAPRAG (APF = 25)	Any powered, air-purifying respirator with acid gas cartridge(s)
GMFS (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern	PAPRAGHiE (APF = 25) ...	Any powered, air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter
GMFSHiE (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern and having a high-efficiency particulate filter	PAPRD (APF = 25)	Any powered, air-purifying respirator with a dust filter
HiE (APF = 10)	Any air-purifying respirator with a high-efficiency particulate filter	PAPRDM (APF = 25)	Any powered, air-purifying respirator with a dust and mist filter
		PAPRDMFu (APF = 25)	Any powered, air-purifying respirator with a dust, mist, and fume filter
		PAPRHiE (APF = 25)	Any powered, air-purifying respirator with a high-efficiency particulate filter
		PAPROV (APF = 25)	Any powered, air-purifying respirator with organic vapor cartridge(s)

(Continued)

Table 4. — Symbols, code components, and codes used for respirator selection (Continued)

Item	Definition	Item	Definition
Code (continued)			
PAPROVAG (APF = 25)	Any powered, air-purifying respirator with organic vapor and acid gas cartridge(s)	PAPRTOVHIE (APF = 50) .	Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter
PAPROVDM (APF = 25) ...	Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter	PAPRTS (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern
PAPROVDMFu (APF = 25)	Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter	SA (APF = 10)	Any supplied-air respirator
PAPRS (APF = 25)	Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern	SA:CF (APF = 25)	Any supplied-air respirator operated in a continuous-flow mode
PAPRTHIE (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter	SAF (APF = 50)	Any supplied-air respirator with a full facepiece
PAPRTOV (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)	SAF:PD,PP (APF = 2000) .	Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode (Continued)

Table 4. — Symbols, code components, and codes used for respirator selection (Continued)

Item	Definition	Item	Definition
Code (continued)			
SAF:PD,PP:ASCBA (APF = 10,000)	Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode	SAT CF (APF = 50)	Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
		SCBAE	Any appropriate escape-type, self-contained breathing apparatus
		SCBAF (APF = 50)	Any self-contained breathing apparatus with a full facepiece
SA:PD,PP (APF = 1000) ...	Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode	SCBAF:PD,PP (APF = 10,000)	Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode

Table 5. — Abbreviations for symptoms of exposure and target organs

Abbreviation	Symptom/organ	Abbreviation	Symptom/organ
abdom	Abdominal	constip	Constipation
abnor	Abnormal/Abnormalities	convuls	Convulsions
album	Albuminuria	corn	Corneal
anes	Anesthesia	CVS	Cardiovascular system
anor	Anorexia	cyan	Cyanosis
anos	Anosmia (loss of the sense of smell)	decr	Decreased
appre	Apprehension	depres	Depressant/Depression
arrhy	Arrhythmias	derm	Dermatitis
aspir	Aspiration	diarr	Diarrhea
asphy	Asphyxia	dist	Disturbance
BP	Blood pressure	dizz	Dizziness
breath	Breathing	drow	Drowsiness
bron	Bronchitis	dysfunc	Dysfunction
broncopneu	Bronchopneumonia	dysp	Dyspnea (breathing difficulty)
bronspas	Bronchospasm	emphy	Emphysema
BUN	Blood urea nitrogen	eosin	Eosinophilia
[carc]	Potential occupational carcinogen	epilep	Epileptiform
card	Cardiac	epis	Epistaxis (nosebleed)
chol	Cholinesterase	equi	Equilibrium
cirr	Cirrhosis	eryt	Erythema (skin redness)
CNS	Central nervous system	euph	Euphoria
conc	Concentration	fail	Failure
conf	Confusion	fasc	Fasciculation
conj	Conjunctivitis		

(Continued)

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Table 5. — Abbreviations for symptoms of exposure and target organs (Continued)

Abbreviation	Symptom/organ	Abbreviation	Symptom/organ
FEV	Forced expiratory volume	jaun	Jaundice
fib	Fibrosis	kera	Keratitis (inflammation of the cornea)
fibr	Fibrillation	lac	Lacrimation (discharge of tears)
ftg	Fatigue	lar	Laryngeal
func	Function	lass	Lassitude (weakness, exhaustion)
GI	Gastrointestinal	leth	Lethargy (drowsiness or indifference)
gidd	Giddiness	leucyt	Leukocytosis (increased blood leukocytes)
halu	Hallucinations	leupen	Leukopenia (reduced blood leukocytes)
head	Headache	li-head	Lightheadedness
hema	Hematuria (blood in the urine)	liq	Liquid
hemato	Hematopoietic	local	Localized
nemog	Hemoglobinuria	low-wgt	Weight loss
hemorr	Hemorrhage	mal	Malaise (vague feeling of discomfort)
hyperpig	Hyperpigmentation	malnut	Malnutrition
hypox	Hypoxemia (reduced oxygen in the blood)	methemo	Methemoglobinemia
inco	Incoordination	monocy	Monocytosis (increased blood monocytes)
incr	Increase(d)	molt	Molten
inebri	Inebriation	muc memb	Mucous membrane
inflamm	Inflammation	usc	Muscle
inj	Injury	narco	Narcosis
insom	Insomnia	nau	Nausea
irreg	Irregular/irregularities		
irrit	Irritation		
irrity	Irritability		

(Continued)

Table 5. — Abbreviations for symptoms of exposure and target organs (Continued)

Abbreviation	Symptom/organ	Abbreviation	Symptom/organ
ne:	Necrosis	retster	Retrosternal (occurring behind the sternum)
neph	Nephritis	rhin	Rhino:rhea (discharge of thin nasal mucus)
ner	Nervousness	salv	Salivation
numb	Numbness	sens	Sensitization
opac	Opacity	sez	Seizure
palp	Palpitations	short	Shortness
para	Paralysis	sneez	Sneezing
pares	Paresthesia	sol	Solid
perf	Perforation	soln	Solution
peri neur	Peripheral neuropathy	som	Somnolence (sleepiness, unnatural drowsiness)
periorb	Periorbital (situated around the eye)	subs	Substernal (occurring beneath the sternum)
phar	Pharyngeal	sweat	Sweating
photo	Photophobia (abnormal visual intolerance to light)	swell	Swelling
pneu	Pneumonia	sys	System
pneuitis	Pneumonitis	tacar	Tachycardia
PNS	Peripheral nervous system	tend	Tenderness
polyneur	Polyneuropathy	terato	Teratogenic
prot	Proteinuria	throb	Throbbing
pulm	Pulmonary	tight	Tightness
RBC	Red blood cell		
repro	Reproductive		
resp	Respiratory		
restless	Restlessness		

(Continued)

Table 5. — Abbreviations for symptoms of exposure and target organs (Continued)

Abbreviation	Symptom/organ	Abbreviation	Symptom/organ
trachbronc	Tracheobronchitis	verti	Vertigo (an illusion of movement)
twitch	Twitching	vesic	Vesiculation
uncon	Unconsciousness	vis dist	Visual disturbance
vap	Vapor	vomit	Vomiting
venfib	Ventricular fibrillation	weak	Weakness
		wheez	Wheezing

Table 6. — Codes for first aid data

Code	Definition	Code	Definition
Eye:			
Irr immed.	If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.	Medical attention	soon as possible. Self-explanatory
Irr prompt	If this chemical contacts the eyes, promptly wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention if any discomfort continues. Contact lenses should not be worn when working with this chemical.	Skin:	
		Blot/brush away	If irritation occurs, gently blot or brush away excess.
		Dust off solid; water flush.	If this solid chemical contacts the skin, dust it off immediately and then flush the contaminated skin with water. If this chemical or liquids containing this chemical penetrate the clothing, promptly remove the clothing and flush the skin with water. Get medical attention immediately.
Frostbite	If eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for at least 15 minutes, occasionally lifting the lower and upper eyelids. If irritation, pain, swelling, lacrimation, or photophobia persist, get medical attention as	Frostbite	If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If frostbite

(Continued)

Table 6. — Codes for first aid data (Continued)

Code	Definition	Code	Definition
Skin (continued)	has NOT occurred, immediately and thoroughly wash contaminated skin with soap and water.		immediately remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention.
Molten flush immed/sol-liq soap wash prompt	If this molten chemical contacts the skin, immediately flush the skin with large amounts of water. Get medical attention immediately. If this chemical (or liquids containing this chemical) contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical or liquids containing this chemical penetrate the clothing, immediately remove the clothing and wash the skin with soap and water. If irritation persists after washing, get medical attention.	Soap flush prompt ..	If this chemical contacts the skin, promptly flush the contaminated skin with soap and water. If this chemical penetrates the clothing, promptly remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention.
Soap flush immed...	If this chemical contacts the skin, immediately flush the contaminated skin with soap and water. If this chemical penetrates the clothing,	Soap prompt/ molten flush immed	If this solid chemical or a liquid containing this chemical contacts the skin, promptly wash the contaminated skin with soap and water. If irritation persists after washing, get medical attention. If this molten chemical contacts the skin or nonimpervious clothing, immediately flush the affected area with large amounts of water to remove heat. Get medical attention immediately.

Table 6. — Codes for first aid data (Continued)

Code	Definition	Code	Definition
Skin (continued)			immediately flush the contaminated skin with water. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water. Get medical attention promptly.
Soap wash	If this chemical contacts the skin, wash the contaminated skin with soap and water.	Water flush prompt .	If this chemical contacts the skin, flush the contaminated skin with water promptly. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water promptly. If irritation persists after washing, get medical attention.
Soap wash immed ..	If this chemical contacts the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing, wash the skin with soap and water, and get medical attention promptly.	Water wash	If this chemical contacts the skin, wash the contaminated skin with water.
Soap wash prompt .	If this chemical contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly.	Water wash immed .	If this chemical contacts the skin, immediately wash the contaminated skin with water. If this chemical penetrates the clothing, immediately remove the clothing and wash the skin with water. If symptoms occur
Water flush	If this chemical contacts the skin, flush the contaminated skin with water. Where there is evidence of skin irritation, get medical attention.		(Continued)
Water flush immed .	If this chemical contacts the skin,		

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Table 6. — Codes for first aid data (Continued)

Code	Definition	Code	Definition
Skin (continued)		Fresh air	If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. Other measures are usually unnecessary.
Water wash prompt	after washing, get medical attention immediately. If this chemical contacts the skin, promptly wash the contaminated skin with water. If this chemical penetrates the clothing, promptly remove the clothing and wash the skin with water. If irritation persists after washing, get medical attention.	Fresh air; 100% O ₂	If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. When breathing is difficult, properly trained personnel may assist the affected person by administering 100% oxygen. Keep the affected person warm and at rest. Get medical attention as soon as possible.
Breath:		Swallow:	
Resp support	If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible.	Medical attention immed	If this chemical has been swallowed, get medical attention immediately.

CHEMICAL LISTING

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Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Acetaldehyde <chem>CH3CHO</chem> 75-07-0 AB1925000 1089 26	Acetic aldehyde. Ethanal. Ethyl aldehyde 1 ppm = 1.83 mg/m ³	NIOSH Ca See Appendix A See Appendix C (Aldehydes) OSHA† 200 ppm (360 mg/m ³)	Ca [2000 ppm]	Colorless liquid or gas (above 69°F) with a pungent, fruity odor Sp.Gr. 0.79 Class IA Flammable Liquid	MW 44.1 BP 69°F Sol. Miscible Fl.P. -36°F IP 10.22 eV	VP 740 mm FRZ -190°F UEL 60% LEL 4.0%	Strong oxidizers, acids, bases, alcohols, ammonia & amines, phenols, ketones, HCN, H ₂ S [Note: Prolonged contact with air may cause formation of peroxides that may explode and burst con- tainers, easily undergoes polymerization.]	XAD-2*, Toluene, GC/FID, III [#2538]
Acetic acid <chem>CH3COOH</chem> 64-19-7 AF1225000 2790 60 (10-80% acid) 2789 29 (>80% acid)	Acetic acid (aqueous), Ethanoic acid, Glacial acetic acid (pure compound), Methanecarboxylic acid [Note: Can be found in concentrations of 3-8% in vinegar.] 1 ppm = 2.50 mg/m ³	NIOSH 10 ppm (25 mg/m ³) Si: 15 ppm (37 mg/m ³) OSHA 10 ppm (25 mg/m ³)	50 ppm	Colorless liquid or crystals with a sour, vinegar- like odor. [Note: Pure com- pound is a solid below 62°F. Often used in an aqueous solution.]	MW 60.1 BP 244°F Sol. Miscible Fl.P. 103°F IP 10.66 eV Sp.Gr. 1.05 Class II Combustible Liquid	VP 11 mm FRZ 62°F UEL (200°F) 199% LEL 4.0%	Strong oxidizers (especially chromic acid, sodium peroxide & nitric acid), strong caustics [Note: Corrosive to metals.]	Char. HCOOH, GC/FID, III [#1603]
Acetic anhydride <chem>(CH3CO)2O</chem> 108-24-7 AK1925000 1715 39	Acetic acid anhydride, Acetic oxide, Acetyl oxide, Ethanoic anhydride 1 ppm = 4.24 mg/m ³	NIOSH C 5 ppm (20 mg/m ³) OSHA† 5 ppm (20 mg/m ³)	200 ppm	Colorless liquid with a strong, pungent, vinegar- like odor.	MW 102.1 BP 282°F Sol. 12% Fl.P. 120°F IP 10.00 eV Sp.Gr. 1.08 Class II Combustible Liquid	VP 4 mm FRZ -99°F UEL 10.3% LEL 2.7%	Water, alcohols, strong oxidizers (especially chromic acid), amines, strong caustics [Note: Corrosive to iron, steel & other metals. Reacts with water to form acetic acid.]	Bub. Reagent, Vis. III [#3506]
Acetone <chem>(CH3)2CO</chem> 67-64-1 AL3150000 1090 26	Dimethyl ketone, Ketone propane, 2-Propanone 1 ppm = 2.42 mg/m ³	NIOSH 250 ppm (590 mg/m ³) OSHA† 1000 ppm (2400 mg/m ³)	2500 ppm [LEL]	Colorless liquid with a fragrant, mint-like odor.	MW 58.1 BP 133°F Sol. Miscible Fl.P. 0°F IP 9.65 eV Sp.Gr. 0.79 Class IB Flammable Liquid	VP 180 mm FRZ -140°F UEL 12.8% LEL 2.5%	Oxidizers, acids	Char. CS, GC/FID, III [#1300, Ketones I]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Irrimed	Eyes, skin,
Eyes:	Prevent eye contact	✖ SCBAF PD, PP/SAF PD, PP ASCBA	Ing	eye, skin burns, derm,	Skin	Water flush prompt	resp sys, kidneys,
Wash skin:	When contam	Escape GMFOV/SCBAE	Con	conj, cough, CNS depres,	Breath	Resp support	CNS, repro sys
Remove:	When wet (flamm)			delayed pulm edema,	Swallow	Medical attention	[in animals:
Change:	N.R.			in animals: kidney, repro,		imed	nasal cancer]
Provide:	Eyewash, Quick drench			terato effects; [carc]			
[Acetaldehyde]							
Skin:	Prevent skin contact (>10%)	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	50 ppm: SA: CF ¹ /PAPROV ¹ /CCRFOV/	Con	throat, eye, skin burns,	Skin	Water flush immed	teeth
Wash skin:	When contam (>10%)	GMFOV/SCBAF/SAF		skin sens, dental	Breath	Resp support	
Remove:	When wet or contam (>10%)	§ SCBAF PD, PP/SAF PD, PP ASCBA		erosion, black skin,	Swallow	Medical attention	
Change:	N.R.	Escape GMFOV/SCBAE		hyperkeratosis, conj, lac,		imed	
Provide:	Eyewash (>5%), Quick drench (>50%)			phar edema, chronic bron			
[Acetic acid]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Conj, lac, corn edema,	Eye	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	125 ppm: SA: CF ¹ /PAPROV ¹	Ing	opac, photo, nasal, phar	Skin	Water flush immed	
Wash skin:	When contam	200 ppm: CCRFOV/GMFOV/PAPRTOV ¹ /	Con	irrit, cough, dysp, bron,	Breath	Resp support	
Remove:	When wet or contam	SCBAF/SAF		skin burns, vesic, sens	Swallow	Medical attention	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA		derm		imed	
Provide:	Eyewash, Quick drench	Escape GMFOV/SCBAE					
[Acetic anhydride]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	2500 ppm: CCROV ¹ /PAPRROV ¹ /GMFOV/	Ing	head, dizz, CNS depres;	Skin	Soap wash immed	CNS
Wash skin:	When contam	SA ¹ /SCBAF	Con	derm	Breath	Resp support	
Remove:	When wet (flamm)	§ SCBAF PD, PP/SAF PD, PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape GMFOV/SCBAE				imed	
[Acetone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Acetone cyanohydrin <chem>CH3C(OH)CNCH3</chem> 75-86-5 OD9275000	Cyanohydrin-2-propanone, 2-Cyano-2-propanol, α -Hydroxyisobutyronitrile, 2-Hydroxy-2-methyl- propionitrile, 2-Methylacetonitrile	NIOSH C1 ppm (4 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with a faint odor of bitter almond. [Note: Forms cyanide in the body.]	MW: 85.1 BP: 203°F Sol: Miscible Fl.P: 165°F IP: ?	VP: 0.8 mm FRZ: -4°F UEL: 12.0% LEL: 2.2%	Sulfuric acid, caustics [Note: Slowly decomposes to acetone & HCN at room temperatures; rate is accelerated by an increase in pH, water content, or temperature.]	Porapak; Ethyl acetate; GC/NPD; II [#2506]
154155	1 ppm = 3.54 mg/m ³				Sp.Gr(77°F): 0.93 Class IIIA Combustible Liquid			
Acetonitrile <chem>CH3CN</chem> 75-05-8 AL770000	Cyanomethane, Ethyl nitrile, Methyl cyanide	NIOSH 20 ppm (34 mg/m ³) OSHA† 40 ppm (70 mg/m ³)	500 ppm	Colorless liquid with an aromatic odor. [Note: Forms cyanide in the body.]	MW 41.1 BP: 179°F Sol: Miscible Fl.P(oc): 42°F IP: 12-20 eV	VP: 73 mm FRZ: -49°F UEL: 16.0% LEL: 3.0%	Strong oxidizers	Char. Benzene, GC/FID, III [#1606]
1648 28	1 ppm = 1.71 mg/m ³				Sp.Gr: 0.78 Class IB Flammable Liquid			
2-Acetylaminofluorene <chem>C12H9NO</chem> 53-96-3 AB9450000	AAF, 2-AAF, 2-Acetylaminofluorene, N-Acetyl-2-aminofluorene, FAA, 2-FAA, 2-Fluorenylacetamide	NIOSH Ca See Appendix A OSHA[1910.1014] See Appendix B	Ca [N.D.]	Tan, crystalline powder.	MW: 223.3 BP: ? Sol: Insoluble Fl.P: ? IP: ?	VP: ? MLT: 381°F UEL: ? LEL: ?	None reported	None available
					Sp.Gr: ? Combustible Solid			
Acetylene <chem>HC≡CH</chem> 74-86-2 AO9600000	Ethine, Ethyne [Note: A compressed gas used in the welding and cutting of metals.]	NIOSH C 2500 pp.m (2562 mg/l ±) OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Commercial grade has a garlic-like odor. Shipped under pressure dissolved in acetone.]	MW: 26.0 BP: Sublimes Sol: 2% Fl.P: NA (Gas) IP: 11.40 eV	VP: 44.2 atm FRZ: -119°F (Sublimes) UEL: 100% LEL: 2.5%	Zinc; oxygen & other oxidizing agents such as halogens [Note: Forms explosive acetylide compounds with copper, mercury, silver & brasses (containing more than 66% copper).]	Bag; none; GC/FID; NIOSH Acetylene Crit. Doc.
100117	1 ppm = 1.08 mg/m ³				RGasD: 0.91 Flammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	10 ppm: SA	Abs	dizz, weak, head, conf,	Skin:	CNS, CVS, liver,
Wash skin:	When contam	25 ppm: SA:CF	Ing	convuls; liver, kidney inj;	Breath:	kidneys, GI tract
Remove:	When wet or contam	50 ppm: SCBAF/SAF	Con	pulm edema, asphy	Swallow:	
Change:	N.R.	250 ppm: SAF:PD,PP			Irrimed	
Provide:	Eyewash, Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Water flush immed	
		Escape: GMFOV/SCBAE			Resp support	
					Medical attention	
					immed	
[Acetone cyanohydrin]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit nose, throat; asphy	Eye	Resp sys, CVS, CNS,
Eyes:	Prevent eye contact	200 ppm: CCROV/SA	Abs	nau, vomit, chest pain,	Skin:	liver, kidneys
Wash skin:	When contam	500 ppm: SA:CF/PAPROV/CCRFOV/	Ing	weak, stupor, convuls,	Breath	
Remove:	When wet (flamm)	GMFOV/SCBAF/SAF	Con	in animals: liver, kidney	Swallow	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		damage		
Provide:	Quick drench	Escape: GMFOV/SCBAE			Irrimed	
					Water flush immed	
					Resp support	
					Medical attention	
					immed	
[Acetonitrile]						
Skin:	Prevent skin contact	NIOSH	Inh	Reduced function of	Eye	Liver, bladder,
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	liver, kidneys, bladder,	Skin	kidneys, lungs,
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Ing	pancreas, [carc]	Breath	pancreas, skin
Remove:	When wet or contam		Con		Swallow	[in animals:
Change:	Daily					tumors of the
Provide:	Eyewash, Quick drench					liver, bladder,
						lungs, skin &
						pancreas]
[2-Acetylaminofluorene]						
Skin:	Frostbite	TBAL	Inh	Head, dizz; asphy;	Eye:	CNS, resp sys
Eyes:	Frostbite		Con	liq: frostbite	Skin:	
Wash skin:	N.R.		(liq)		Breath:	
Remove:	When wet (flamm)					
Change:	N.R.				Frostbite	
Provide:	Frostbite				Frostbite	
					Fresh air	
[Acetylene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Acetylene tetrabromide <chem>CHBr2CHBr2</chem> 79-27-6 K18225000	Symmetrical tetrabromoethane; TBE; Tetrabromoacetylene; Tetrabromoethane; 1,1,2,2-Tetrabromoethane	NIOSH See Appendix D OSHA 1 ppm (14 mg/m ³)	8 ppm	Pale-yellow liquid with a pungent odor similar to camphor or iodoform [Note: A solid below 32°F]	MW: 345.7 BP: 474°F (Decomposes) Sp: 0.07% Fl.P: NA IP: ?	VP: 0.02 mm FRZ: 32°F UEL: NA LEL: NA	Strong caustics; hot iron; reducing metals such as aluminum, magnesium & zinc	Si gel, THF, GC/FID, III [#2003]
2504 58	1 ppm = 14.37 mg/m ³				Sp Gr: 2.97 Noncombustible Liquid			
Acetylsalicylic acid <chem>CH3COOC6H4COOH</chem> 50-78-2 V00700000	Acetal, o-Acetoxybenzoic acid, 2-Acetoxybenzoic acid, Aspirin	NIOSH 5 mg/m ³ OSHA† none	N.D.	Odorless, colorless to white, crystalline powder. [aspirin] [Note: Develops the vinegar-like odor of acetic acid on contact with moisture.]	MW: 180.2 BP: 284°F (Decomposes) Sol(77°F): 0.3% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 275°F UEL: NA LEL: NA MEC: 40 g/m ³	Solutions of alkali hydroxides or carbonates, strong oxidizers, moisture [Note: Slowly hydrolyzes in moist air to salicylic & acetic acids.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Acrolein <chem>CH2=CHCHO</chem> 107-02-8 AS1050000	Acrolein; Acrylaldehyde; Acrylic aldehyde; Allyl aldehyde; Propenal; 2-Propenal	NIOSH 0.1 ppm (0.25 mg/m ³) ST 0.3 ppm (0.8 mg/m ³) See Appendix C (Aldehydes) OSHA† 0.1 ppm (0.25 mg/m ³)	2 ppm	Colorless or yellow liquid with a piercing, disagreeable odor.	MW: 56.1 BP: 127°F Sol: 40% Fl.P: -15°F IP: 10-13 eV	VP: 210 mm FRZ: -126°F UEL: 31% LEL: 2.8%	Oxidizers, acids, alkalis, ammonia, amines [Note: Polymerizes readily unless inhibited—usually with hydroquinone. May form shock-sensitive peroxides over time.]	XAD-2*, Toluene, GC/NPD, III [#2501]
1092 30 (inhibited)	1 ppm = 2.33 mg/m ³				Sp Gr: 0.84 Class IB Flammable Liquid			
Acrylamide <chem>CH2=CHCONH2</chem> 79-06-1 AS3325000	Acrylamide monomer; Acrylic amide; Propenamide; 2-Propenamide	NIOSH Ca 0.03 mg/m ³ [skin] See Appendix A OSHA† 0.3 mg/m ³ [skin]	Ca [60 mg/m ³]	White crystalline, odorless solid.	MW: 71.1 BP: 347-572°F (Decomposes) Sol(86°F): 216% Fl.P: 280°F IP: 9.50 eV Sp Gr: 1.12	VP: 0.007 mm MLT: 184°F UEL: ? LEL: ?	Strong oxidizers [Note: May polymerize violently upon melting.]	Filter/ Si gel, Methanol, GC/NPD, OSHA [#21]
2074 55					Combustible Solid (may also be dissolved in flammable liquids)			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	OSHA	Inh	Irrit eyes, nose, anor	Eye:	Eyes, resp sys.
Eyes:	Prevent eye contact	8 ppm: SA/SCBAF	Ing	nau; severe head, abdom	Skin:	liver, CNS
Wash skin:	When contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	pain; jaun; monoc; CNS	Breath:	
Remove:	When wet or contam	Escape: GMFOV/SCBAE		depres	Swallow:	
Change:	N.R.					
[Acetylene tetrabromide]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper resp	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact		Ing	sys; incr blood clotting	Skin:	blood, liver, kidney
Wash skin:	When contam		Con	time; nau, vomit; liver,	Breath:	
Remove:	N.R.			kidney inj]	Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Acetylsalicylic acid]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	2 ppm: SA:CF*/PAPROV*/CCRFOV/	Ing	memb; decr pulm func,	Skin:	heart
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	delayed pulm edema;	Breath:	
Remove:	When wet (flamm)	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		chronic resp disease	Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE				
Provide:	Eyewash, Quick drench					
[Acrolein]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin; ataxia,	Eye:	Eyes, skin, CNS, PNS
Eyes:	Prevent eye contact	¼: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	numb limbs, pares; musc	Skin:	repro sys
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	Ing	weak; absent deep tendon	Breath:	[in animals:
Remove:	When wet or contam		Con	reflex; hand sweat; fig,	Swallow:	tumors of the
Change:	Daily			leth; repro effects; [carc]		lungs, testes,
Provide:	Eyewash, Quick drench					thyroid & adrenal glands]
[Acrylamide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Acrylic acid $\text{CH}_2=\text{CHCOOH}$ 79-10-7 AS4375000	Acroleic acid, Aqueous acrylic acid (technical grade is 94%), Ethylencarboxylic acid, Glacial acrylic acid (98% in aqueous solution), 2-Propenoic acid	NIOSH 2 ppm (6 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 55°F) with a distinctive, acid odor. [Note: Shipped with an inhibitor (e.g., hydro- quinone) since it readily polymerizes.]	MW: 72.1 BP: 286°F Sol: Miscible Fl.P: 121°F IP: ? Sp.Gr: 1.05 Class II Combustible Liquid	VP: 3 mm FRZ: 55°F UEL: 8.02% LEL: 2.4%	Oxidizers, amines, alkalis, ammonium hydroxide, chloro- sulfonic acid, oleum, ethylene diamine, ethylenimine, 2-aminoethanol [Note: Corrosive to many metals.]	XAD(2); Methanol/ water; HPLC/UV; OSHA [#28]
2218 29	1 ppm = 3.00 mg/m ³							
Acrylonitrile $\text{CH}_2=\text{CHCN}$ 107-13-1 AT5250000	Acrylonitrile monomer, AN, Cyanoethylene, Propenenitrile, 2-Propenenitrile, VCN, Vinyl cyanide	NIOSH Ca 1 ppm C 10 ppm [15-min] [skin] See Appendix A OSHA [1910 1045] 2 ppm C 10 ppm [15-min] [skin]	Ca [85 ppm]	Colorless to pale- yellow liquid with an unpleasant odor. [Note: Odor can only be detected above the PEL.]	MW 53.1 BP 171°F Sol: 7% Fl.P 30°F IP 10.91 eV Sp Gr 0.81 Class IB Flammable Liquid	VP: 83 mm FRZ: -115°F UEL 17% LEL 3.0%	Strong oxidizers, acids & alkalis; bromine, amines [Note: Unless inhib- ited (usually with methylhydroquinone), it may polymerize spontaneously or when heated or in presence of strong alkali. Attacks copper.]	Char; Acetone/ CS; GC/FID; III [#1604] may polymerize spontaneously or when heated or in presence of strong alkali. Attacks copper.]
1093 30 (inhibited)	1 ppm = 2.21 mg/m ³							
Adiponitrile $\text{NC}(\text{CH}_2)_4\text{CN}$ 111-69-3 AV2625000	1,4-Dicyanobutane; Hexanedinitrile; Tetramethylene cyanide	NIOSH 4 ppm (19 mg/m ³) OSHA none	N.D.	Water-white, practically odorless, oily liquid. [Note: A solid below 34°F. Forms cyanide in the body.]	MW: 108.2 BP: 563°F Sol: 4.5% Fl.P (o.c.): 199°F IP: ? Sp.Gr: 0.97 Class IIIA Combustible Liquid	VP: 0.002 mm FRZ: 34°F UEL: 5.0% LEL: 1.7%	Oxidizers (e.g., perchlorates, nitrates), strong acids (e.g., sulfuric acid) [Note: Decomposes above 194°F, forming hydrogen cyanide.]	Char; Toluene; GC/FID; NIOSH Nitriles Crit. Doc.
2205 55	1 ppm = 4.50 mg/m ³							
Aldrin $\text{C}_{12}\text{H}_{11}\text{Cl}_6$ 309-00-2 IO2100000	1,2,3,4,10,10-Hexachloro- 1,4,4a,5,8,8a-hexahydro- endo-1,4-exo-5,8- dimethanonaphthalene; HHDN, Octalene	NIOSH Ca 0.25 mg/m ³ [skin] See Appendix A OSHA 0.25 mg/m ³ [skin]	Ca [25 mg/m ³]	Colorless to dark- brown crystalline solid with a mild chemical odor. [Note: Formerly used as an insecticide.]	MW 364.9 BP: Decomposes Sol 0.003% Fl.P NA IP ? Sp Gr 1.60 Noncombustible Solid, but may be dissolved in flammable liquids	VP: 0.00008 mm MLT: 219°F UEL: NA LEL: NA	Concentrated mineral acids, active metals, acid catalysts, acid oxidizing agents, phenol	Filter/Bub; Isocotane; GC/EConD; III [#5502]
2761 55								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Route	Symptoms (See Table 5)	Health hazards		Target organs (See Table 5)
					First aid (See Table 6)		
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	eye, skin burns; skin sens;	Skin:	Water flush immed	
Wash skin:	When contam		Ing	in animals: lung, liver,	Breath:	Resp support	
Remove:	When wet or contam		Con	kidney inj	Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Acrylic acid]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, asphy.	Eye:	Irrimed	Eyes, skin, CVS,
Eyes:	Prevent eye contact	✕ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	head, sneez; nau, vomit,	Skin:	Water wash immed	liver, kidneys, CNS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	weak, li-head, skin vesic;	Breath:	Resp support	[brain tumors,
Remove:	When wet (flamm)		Con	scaling derm. [carc]	Swallow:	Medical attention immed	lung & bowel cancer]
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Acrylonitrile]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	40 ppm: SA	Abs	head, dizz, weak, gidd, conf,	Skin:	Soap wash immed	CNS, CVS
Wash skin:	When contam	100 ppm: SA, CF	Ing	convuls; blurred vision;	Breath:	Resp support	
Remove:	When wet or contam	200 ppm: SCBAF/SAF	Con	dysp; abdom pain, nau, vomit	Swallow:	Medical attention immed	
Change:	Daily	250 ppm: SAF, PD, PP					
		✕ SCBAF PD, PP/SAF PD, PP ASCBA					
		Escape: GMFOV/SCBAE					
[Adiponitrile]							
Skin:	Prevent skin contact	NIOSH	Inh	Head, dizz, nau, vomit,	Eye:	Irrimed	Cancer, CNS,
Eyes:	Prevent eye contact	✕ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	mal. myoclonic jerks of	Skin:	Soap wash immed	liver, kidneys,
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	Ing	limbs, clonic, tonic	Breath:	Resp support	skin
Remove:	When wet or cor. lam		Con	convuls, coma, hema,	Swallow:	Medical attention immed	[in animals: tumors of the lungs, liver, thyroid & adrenal glands]
Change:	Daily			anemia, [carc]			
Provide:	Eyewash, Quick drench						
[Aldrin]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Allyl alcohol $\text{CH}_2=\text{CHCH}_2\text{OH}$ 107-18-6 BA5075000	AA, Allylic alcohol, Propenol, 1-Propen-3-ol, 2-Propenol, Vinyl carbinal	NIOSH 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³) [skin] OSHA† 2 ppm (5 mg/m ³)	20 ppm	Colorless liquid with a pungent, mustard-like odor	MW 58.1 BP 205°F Sol. Miscible Fl.P. 70°F IP 9.63 eV	VP 17 mm FRZ: -200°F UEL 18.0% LEL 2.5%	Strong oxidizers, acids, carbon tetrachloride [Note: Polymerization may be caused by elevated tempera- tures, oxidizers, or peroxides.]	Char. 2-Propanol/ CS; GC/FID, III [#1402, Alcohols III]
1098 57	1 ppm = 2.42 mg/m ³				Sp.Gr. 0.85 Class IB Flammable Liquid			
Allyl chloride $\text{CH}_2=\text{CHCH}_2\text{Cl}$ 107-05-1 UC7350000	3-Chloropropene, 1-Chloro-2-propene, 3-Chloropropylene	NIOSH 1 ppm (3 mg/m ³) ST 2 ppm (6 mg/m ³) OSHA† 1 ppm (3 mg/m ³)	250 ppm	Colorless, brown, yellow, or purple liquid with a pungent, unpleasant odor.	MW 76.5 BP 113°F Sol. 0.4% Fl.P. -25°F IP 10.05 eV	VP 295 mm MLT: -210°F UEL 11.1% LEL 2.9%	Strong oxidizers, acids, amines, iron & aluminum chlorides, magnesium, zinc	Char. Benzene, GC/FID, III [#1000]
1100 57	1 ppm = 3.18 mg/m ³				Sp.Gr. 0.94 Class IB Flammable Liquid			
Allyl glycidyl ether $\text{C}_6\text{H}_{10}\text{O}_2$ 106-92-3 RR0875000	AGE, 1-Allyloxy-2,3-epoxypropane; Glycidyl allyl ether; [(2-Propenyloxy)methyl] oxirane	NIOSH 5 ppm (22 mg/m ³) ST 10 ppm (44 mg/m ³) [skin] OSHA† C10 ppm (45 mg/m ³)	50 ppm	Colorless liquid with a pleasant odor	MW 114.2 BP 309°F Sol. 14% Fl.P. 135°F IP ?	VP 2 mm FRZ: -148°F [forms glass] UEL ? LEL ?	Strong oxidizers	Tenax GC; Diethyl ether; GC/FID, III [#S346]
2219 29	1 ppm = 4.75 mg/m ³				Sp.Gr. 0.97 Class II Combustible Liquid			
Allyl propyl disulfide $\text{H}_2\text{C}=\text{CHCH}_2\text{S}_2\text{CH}_2\text{CH}_2\text{CH}_3$ 2179-59-1 J00350000	4,5-Dithia-1-octene; Onion oil; 2-Propenyl propyl disulfide; Propyl allyl disulfide	NIOSH 2 ppm (12 mg/m ³) ST 3 ppm (18 mg/m ³) OSHA† 2 ppm (12 mg/m ³)	N.D.	Pale-yellow liquid with a strong & irritating onion-like odor. [Note: The chief volatile component of onion oil.]	MW: 148.3 BP: ? Sol: Insoluble Fl.P: ? IP: ?	VP: ? FRZ: 5°F UEL: ? LEL: ?	Oxidizers	None available
	1 ppm = 6.16 mg/m ³				Sp.Gr(59°F): 0.93 Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Eye irrit, tissue damage.	Eye	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	20 ppm: SA:CF*/PAPROV*/CCRFOV/	Abs	irrit upper resp sys.	Skin	Water flush immed	
Wash skin:	When contam	GMFOV/SCBAF/SAF	Ing	skin, pulm edema	Breath	Resp support	
Remove:	When wet (flam)	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con		Swallow	Medical attention immed	
Change:	N.R.	Escape: GMFOV/SCBAE					
Provide:	Quick drench						
[Allyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Irr immed	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	25 ppm: SA:CF*	Abs	muc memb; pulm edema,	Skin	Soap wash immed	liver, kidneys
Wash skin:	When contam	50 ppm: SCBAF/SAF	Ing	in animals liver, kidney inj	Breath	Resp support	
Remove:	When wet (flam)	250 ppm: SAF PD, PP	Con		Swallow	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Provide:	Quick drench	Escape: GMFOV/SCBAE					
[Allyl chloride]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye	Irr immed	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	50 ppm: CCROV/PAPROV/GMFOV/	Abs	resp sys, derm, pulm edema,	Skin	Water flush prompt	blood, repro sys
Wash skin:	When contam	SA/SCBAF	Ing	narco, possible hemato,	Breath	Resp support	
Remove:	When wet or contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con	repro effects	Swallow	Medical attention immed	
Change:	N.R.	Escape: GMFOV/SCBAE					
Provide:	Eyewash						
[Allyl glycidyl ether]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, nose, resp sys; lac	Eye:	Irr immed	Eyes, resp sys
Eyes:	Prevent eye contact		Ing		Skin:	Soap wash immed	
Wash skin:	N.R.		Con		Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
[Allyl propyl disulfide]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
α -Alumina Al_2O_3 1344-28-1 BD1200000	Alumina, Aluminum oxide, Aluminum trioxide [Note: α -Alumina is the main component of tech- nical grade alumina. Corundum is natural Al_2O_3 . Emery is an impure crystalline variety of Al_2O_3 .]	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White, odorless, crystalline powder.	MW: 101.9 BP: 5396°F Sol: Insoluble Fl.P.: NA IP: NA Sp.Gr: 4.0 Noncombustible solid, but dusts may form explosive mixtures in air.	VP: 0 mm (approx) MLT: 3632°F UEL: NA LEL: NA	Chlorine trifluoride, hot chlorinated rubber, acids, oxidizers [Note: Hydrogen gas may be formed when finely divided iron contacts moisture during crushing & milling operations.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Aluminum Al 7429-90-5 BD0330000	Aluminum, Aluminum metal, Aluminum powder, Elemental aluminum	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Silvery-white, malleable, ductile, odorless metal.	MW: 27.0 BP: 4221°F Sol: Insoluble Fl.P.: NA IP: NA Sp.Gr: 2.70 Combustible Solid, finely divided dust is easily ignited; may cause explosions.	VP: 0 mm (approx) MLT: 1220°F UEL: NA LEL: NA	Strong oxidizers & acids, halogenated hydrocarbons [Note: Corrodes in contact with acids & other metals. Ignition may occur if powders are mixed with halogens, carbon disulfide, or methyl chloride.]	Filter; HNO ₃ ; AAS; III [#7013]
Aluminum (pyro powders and welding fumes, as Al)	Synonyms vary depending upon the specific aluminum compound.	NIOSH 5 mg/m ³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific aluminum compound.	Properties vary depending upon the specific aluminum compound.		Varies	Filter; HNO ₃ ; AAS; III [#7013, Aluminum]
Aluminum (soluble salts and alkyls, as Al)	Synonyms vary depending upon the specific aluminum compound.	NIOSH 2 mg/m ³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific aluminum compound.	Properties vary depending upon the specific aluminum compound.		Varies	Filter; HNO ₃ ; AAS; III [#7013, Aluminum]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.				Skin:	Blot/brush away	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.				Swallow:	Medical attention	
Change:	N.R.					irrigated	
[α-Alumina]							
Skin:	N.R.	TBAL	Inh Con	Irrit eyes, skin, resp sys	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.				Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Aluminum]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit skin, resp sys; pulm fib	Eye:	Irrigated	Skin, resp sys
Eyes:	N.R.				Skin:	Water flush irrigated	
Wash skin:	N.R.				Breath:	Resp support	
Remove:	N.P.				Swallow:	Medical attention	
Change:	N.R.					irrigated	
[Aluminum (pyro powders and welding fumes, as Al)]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit skin, resp sys; skin burns	Eye:	Irrigated	Skin, resp sys
Eyes:	Prevent eye contact				Skin:	Water flush irrigated	
Wash skin:	When contam				Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention	
Change:	Daily					irrigated	
[Aluminum (soluble salts and alkyls, as Al)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
4-Aminodiphenyl $C_6H_4C_6H_4NH_2$ 92-67-1 DU8925000	4-Aminobiphenyl; p-Aminobiphenyl; p-Aminodiphenyl; 4-Phenylaniline	NIOSH Ca See Appendix A OSHA(1910.1011) See Appendix B	Ca [N.D.]	Colorless crystals with a floral odor [Note: Turns purple on contact with air]	MW 169.2 BP 576°F Sol: Slight Fl.P ? IP ? Sp Gr 1.16 Combustible Solid, but must be preheated before ignition possible	VP(227°F) 1 mm MLT 127°F UEL ? LEL ?	Oxidized by air	Filter/ Si gel, 2-Propanol, GC/FID, II(4) [P&CAM #269]
2-Aminopyridine $NH_2C_5H_4N$ 504-29-0 US1575000	α -Aminopyridine, α -Pyridylamine	NIOSH/OSHA 0.5 ppm (2 mg/m ³)	5 ppm	White powder, leaflets, or crystals with a characteristic odor	MW 94.1 BP 411°F Sol >100% Fl.P 154°F IP 8.00 eV	VP(77°F): 0.8 mm MLT 137°F UEL ? LEL ?	Strong oxidizers	Tenax GC(2), Thermal desorp., GC/FID, III [S158]
2671 55	1 ppm = 3.91 mg/m ³				Sp Gr ? Combustible Solid			
Amitrole $C_7H_8N_2$ 61-82-5 XZ3850000	Aminotriazole; 3-Aminotriazole; 2-Amino-1,3,4-triazole; 3-Amino-1,2,4-triazole	NIOSH Ca 0.2 mg/m ³ See Appendix A OSHA† none	Ca [N.D.]	Colorless to white, crystalline powder, [herbicide] [Note: Odorless when pure.]	MW: 84.1 BP: ? Sol(77°F): 28% Fl.P: NA IP: ? Sp.Gr: 1.14 Noncombustible Solid, but may be dissolved in flammable liquids.	VP: <0.000008 mm MLT: 318°F UEL: NA LEL: NA	Light (decomposes), strong oxidizers [Note: Corrosive to iron, aluminum & copper.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Ammonia NH_3 7664-41-7 BO0875000 1005 15 (anhydrous) 2672 60 (12-44% soln.) 2073 15 (>44% soln.)	Anhydrous ammonia, Aqua ammonia, Aqueous ammonia [Note: Often used in an aqueous solution]	NIOSH 25 ppm (19 mg/m ³) ST 35 ppm (27 mg/m ³) OSHA† ST 50 ppm (35 mg/m ³)	300 ppm	Colorless gas with a pungent, suffo- cating odor. [Note: Shipped as a liquefied compressed gas. Easily liquefied under pressure.]	MW 17.0 BP -28°F Sol 34% Fl.P: NA (Gas) IP 10.18 eV RGasD: 0.60 [Note: Although NH_3 does not meet the DOT definition of a Flammable Gas (for labeling purposes), it should be treated as one.]	VP 8.5 atm FRZ -108°F UEL 28% LEL 15%	Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces]	Passive sampler, none, IC, III [#6701]
	1 ppm = 0.71 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH 4 SCBAF PD, PP/SAF PD, PP ASCBA Escape: H, EF/SCBAE	Inh Abs Ing Con	Head, dizz, leth, dysp, ataxia, weak, methemo, urinary burning, acute hemorrhagic cystitis, [carc]	Eye Skin Breath Swallow Irr, immed Soap wash, immed Resp support Medical attention immed	Bladder, skin [bladder cancer]
[4-Aminodiphenyl]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	NIOSH/OSHA 5 ppm: SA*/SCBAF 5 SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOVH/E/SCBAE	Inh Abs Ing Con	Irr, ite eyes, nose, throat; head, dizz, excitement, nausea, high BP, resp distress, weak, convuls, stupor	Eye Skin Breath Swallow Irr, immed Water flush, immed Resp support Medical attention immed	CNS, resp sys
[2-Aminopyridine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily Eyewash, Quick drench	NIOSH 4 SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOVH/E/SCBAE	Inh Ing Con	Irr, ite eyes, skin; dysp, muscle spasms, ataxia, anor, saliv, incr body temperature; lass, skin dryness, depres (thyroid func suppression)	Eye: Skin: Breath: Swallow: Irr, immed Water wash, immed Resp support Medical attention immed	Eyes, skin, thyroid [in animals: liver, thyroid & pituitary gland tumors]
[Amitrole]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam (soln) When wet or contam (soln) N.R. Eyewash (>10%), Quick drench (>10%)	NIOSH 250 ppm: CCRS*/SA* 300 ppm: SA:CF*/PAPRS*/CCRFS/ GMFS/SCBAF/SAF 5 SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Ing (soln) Con (soln/ liq)	Irr, ite eyes, nose, throat, dysp, bronspas, chest pain, pulm edema, pink frothy sputum, skin burns, vesic, liq; frostbite	Eye Skin Breath Swallow Irr, immed (soln/liq) Water flush, immed (soln/liq) Resp support Medical attention immed (soln)	Eyes, skin, resp sys
[Ammonia]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ammonium chloride fume <chem>NH4Cl</chem> 12125-02-9 BP4550000	Ammonium chloride, Ammonium muriate fume, Sal ammoniac fume	NIOSH 10 mg/m ³ ST 20 mg/m ³ OSHA† none	N.D.	Finely divided, odorless, white particulate dispersed in air.	MW: 53.5 BP: Sublimes Sol: 37% Fl.P: NA IP: NA Sp.Gr: 1.53 Noncombustible Solid	VP(321°F): 1 mm MLT: 662°F (Sublimes) UEL: NA LEL: NA	Alkalis & their carbonates, lead & silver salts, strong oxidizers, ammonium nitrate, potassium chlorate, bromine trifluoride [Note: Corrodes most metals at high (i.e., fire) temperatures.]	Filter; Water; IC; OSHA [#188]
Ammonium sulfate <chem>NH4OSO3NH2</chem> 7773-06-0 WO6125000 9188 31	Ammate® herbicide, Ammonium amidosulfonate, AMS, Monoammonium salt of sulfamic acid, Sulfamate	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	1500 mg/m ³	Colorless to white crystalline, odorless solid [herbicide]	MW 114.1 BP 320°F (Decomposes) Sol 200% Fl.P. NA IP ? Sp Gr: 1.77 Noncombustible Solid	VP: 0 mm (approx) MLT 268°F UEL NA LEL NA	Acids, hot water [Note: Elevated temperatures cause a highly exothermic reaction with water]	Filter, Water, IC, II(5) [#5348]
n-Amyl acetate <chem>CH3COO(CH2)4CH3</chem> 628-63-7 AJ1925000 1104 26	Amyl acetic ester, Amyl acetic ether, 1-Pentanol acetate, Pentyl ester of acetic acid, Primary amyl acetate	NIOSH/OSHA 100 ppm (525 mg/m ³)	1000 ppm	Colorless liquid with a persistent, banana-like odor	MW 130.2 BP 301°F Sol 0.2% Fl.P 77°F IP ? Sp Gr: 0.88 Class IC Flammable Liquid	VP 4 mm FRZ -95°F UEL 7.5% LEL 1.1%	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1450 Esters I]
sec-Amyl acetate <chem>CH3COOCH(CH3)(CH2)3H</chem> 626-38-0 AJ2100000 1104 26	1-Methylbutyl acetate, 2-Pentanol acetate, 2-Pentyl ester of acetic acid	NIOSH/OSHA 125 ppm (650 mg/m ³)	1000 ppm	Colorless liquid with a mild odor	MW 130.2 BP 249°F Sol Slight Fl.P 89°F IP ? Sp Gr: 0.87 Class IC Flammable Liquid	VP 7 mm FRZ -109°F UEL 7.5% LEL 1%	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1450, Esters I]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con	cough, dysp, pulm sens	Skin:	
Wash skin:	When contam				Breath:	
Remove:	When wet or contam				Irritated	
Change:	Daily				Soap wash	
Provide:	Eyewash, Quick drench				Resp support	
[Ammonium chloride fume]						
Skin:	N.R.	NIOSH	Inh	Irrit eyes, nose, throat	Eye:	Eyes, resp sys
Eyes:	N.R.	50 mg/m ³ DM	Con	cough, dysp	Skin:	
Wash skin:	N.R.	100 mg/m ³ DMXSO/SA			Breath:	
Remove:	N.R.	250 mg/m ³ SA CF/PAPR/DM			Swallow	
Change:	N.R.	500 mg/m ³ SA:CF/PAPRTHIE/HIEF/SCBAF/SAF				
		1500 mg/m ³ SA:PD,PP				
		§ SCBAF PD,PP/SAF PD,PP ASCBA				
		Escape: HIEF/SCBAE				
[Ammonium sulfate]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, nose, derm,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: CCROV*/GMFOV/PAPROV*/SA*/SCBAF	Ing	possible CNS depres,	Skin:	CNS
Wash skin:	When contam	§ SCBAF PD,PP/SAF PD,PP ASCBA	Con	nausea	Breath:	
Remove:	When wet (flam)	Escape: GMFOV/SCBAE			Swallow	
Change:	N.R.					
[n-Amyl acetate]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	1000 ppm: CCROV*/GMFOV/PAPROV*/SA*/SCBAF	Ing	nausea, derm possible kidney,	Skin:	kidneys, liver, CNS
Wash skin:	When contam	§ SCBAF PD,PP/SAF PD,PP ASCBA	Con	liver inj; possible CNS depres	Breath:	
Remove:	When wet (flam)	Escape: GMFOV/SCBAE			Swallow	
Change:	N.R.					
[sec-Amyl acetate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Aniline (and homologs) <chem>C6H5NH2</chem> 62-53-3 BW6650000	Aminobenzene, Aniline oil, Benzenamine, Phenylamine	NIOSH Ca See Appendix A OSHA† 5 ppm (19 mg/m³) [skin]	Ca [100 ppm]	Colorless to brown, oily liquid with an aromatic amine- like odor. [Note: A solid below 21°F.]	MW 93.1 BP 363°F Sol 4% Fl P 158°F IP 2.79 eV	VP 0.6 mm FRZ 21°F UEL 11% LEL 1.5%	Strong oxidizers, strong acids, trinitrochloroacetate, alkalis	Sig el. Fract. GC/FID, III [#2002, Aromatic Amines]
1547 57	1 ppm = 3.87 mg/m³				Sp Gr 1.02 Class IIIA Combustible Liquid			
o-Anisidine <chem>NH2C6H4OCH3</chem> 90-04-0 BZ5410000	ortho-Aminoanisole, 2-Anisidine, o-Methoxyaniline [Note: o-Anisidine has been used as a basis for many dyes.]	NIOSH Ca 0.5 mg/m³ [skin] See Appendix A OSHA 0.5 mg/m³ [skin]	Ca [50 mg/m³]	Red or yellow, oily liquid with an amine-like odor. [Note: A solid below 41°F.]	MW 123.2 BP 437°F Sol (77°F): 1% Fl P (oc): 244°F IP 7.44 eV	VP <0.1 mm FRZ 41°F UEL ? LEL ?	Strong oxidizers	XAD-2, Methanol, HPLC/UVD, III [#2514]
2431 55	1 ppm = 5.12 mg/m³				Sp Gr 1.10 Class IIIB Combustible Liquid			
p-Anisidine <chem>NH2C6H4OCH3</chem> 104-94-9 BZ5450000	para-Aminoanisole, 4-Anisidine, p-Methoxyaniline	NIOSH/OSHA 0.5 mg/m³ [skin]	50 mg/m³	Yellow to brown, crystalline solid with an amine-like odor.	MW 123.2 BP 475°F Sol Moderate Fl P 7 IP 7.44 eV	VP (77°F): 0.006 mm MLT 135°F UEL ? LEL ?	Strong oxidizers	XAD-2, Methanol, HPLC/UVD, III [#2514]
2431 55	1 ppm = 5.12 mg/m³				Sp Gr 1.07 Combustible Solid			
Antimony Sb 7440-36-0 CC4025000	Antimony metal, Antimony powder, Stibium	NIOSH/OSHA* 0.3 mg/m³ [Note: The REL and PEL also apply to other Antimony compounds (as Sb).]	50 mg/m³ (as Sb)	Silver-white, lustrous, hard, brittle solid, scale-like crystals, or a dark-gray lustrous powder	MW 121.8 BP 2975°F Sol Insoluble Fl P NA IP NA	VP 0 mm (approx) MLT 1166°F UEL NA LEL NA	Strong oxidizers, acids, halogenated acids [Note: Stibine is formed when antimony is exposed to nascent (freshly formed) hydrogen.] Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame	Filter, Acid, AAS, II(4) [P&CAM #261]
2871 53 (powder)					Sp Gr 6.69 Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N/A Quick drench	NIOSH X: SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, weak, dizz; cyan; ataxia, dyp on effort, tacer, irrit eyes; methemo; circ; [carc]	Eye Skin Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Blood, CVS, eyes, liver, kidneys, resp sys [in animals: tumors of the spleen]
[Aniline (and homologs)]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH X: SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, dizz; cyan, RBC Heinz bodies, [carc]	Eye Skin Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Blood, kidneys, liver, CVS, CNS [in animals: tumors of the thyroid gland, bladder & kidneys]
[o-Anisidine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	NIOSH/OSHA 5 mg/m ³ : DMXSQ/SA 12.5 mg/m ³ : SA:CF/PAPRDM 25 mg/m ³ : HIEF/PAPRTHIE/SCBAF/SAF 50 mg/m ³ : SA:PD,PP ^a S: SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, dizz; cyan, RBC Heinz bodies, [carc]	Eye Skin Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Blood, kidneys, liver, CVS, CNS
[p-Anisidine]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 5 mg/m ³ : DMXSQ/SA 12.5 mg/m ³ : SA:CF/PAPRDM ^a 25 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF 50 mg/m ³ : SA:PD,PP ^a S: SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, mouth, cough; dizz; head, nau, vomit, diarr; stomach cramps; insom; anor; unable to smell properly	Eye: Skin Breath Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS
[Antimony]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
ANTU $C_{10}H_8NHC(NH_2)_2S$ 86-88-4 YT9275000	α -Naphthyl thiocarbamide, 1-Naphthyl thiourea, α -Naphthyl thiourea	NIOSH/OSHA 0.3 mg/m ³	100 mg/m ³	White crystalline or gray, odorless powder. [rodenticide]	MW: 202.3 BP: Decomposes Sol: 0.06% Fl.P: NA	VP: Low MLT: 388°F UEL: NA LEL: NA IP: ?	Strong oxidizers, silver nitrate	Filter, Methanol, HPLC/UVD, II(5) [#S276]
1651 53					Sp. Gr: ? Noncombustible Solid			
Arsenic (inorganic compounds, as As)	Arsenic metal: Arsenia Other synonyms vary depending upon the specific As compound. [Note: OSHA considers "Inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except Arsine.]	NIOSH Ca C 0.002 mg/m ³ [15-min] See Appendix A	Ca [5 mg/m ³ (as As)]	Metal: Silver-gray or tin-white, brittle, odorless solid.	MW: 74.9 BP: Sublimes Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx.) MLT: 1135°F (Sublimes) UEL: NA LEL: NA	Strong oxidizers, bromine azide [Note: Hydrogen gas can react with inorganic arsenic to form the highly toxic gas arsine.]	Filter, Acid, AAS, III [#7900]
As (Metal) 7440-38-2 (Metal) CG0525000 (Metal) 1558 53 (Metal)		OSHA [1910.1018] 0.010 mg/m ³			Sp. Gr: 5.73 (Metal) Metal: Noncombustible Solid in bulk form, but a slight explosion hazard in the form of dust when exposed to flame			
Arsenic (organic compounds, as As)	Synonyms vary depending upon the specific organic arsenic compound.	NIOSH none OSHA 0.5 mg/m ³	N.D.	Appearance and odor vary depending upon the specific organic arsenic compound.	Properties vary depending upon the specific organic arsenic compound.	Varies		Filter; Reagent; IC; III [#5022, Arsenic, organo-]
Arsine AsH_3 7784-42-1 CG6475000	Arsenic hydride, Arsenic trihydride, Arseniuretted hydrogen, Arsenous hydride, Hydrogen arsenide	NIOSH Ca C 0.002 mg/m ³ [15-min] See Appendix A OSHA 0.05 ppm (0.2 mg/m ³)	Ca [3 ppm]	Colorless gas with a mild, garlic-like odor. [Note: Shipped as a liquefied compressed gas.]	MW: 78.0 BP: -81°F Sol: 20% Fl.P: NA (Gas) IP: 9.89 eV RGasD: 2.69 Flammable Gas	VP (70°F): 14.9 atm FRZ: -179°F UEL: 78% LEL: 5.1%	Strong oxidizers, chlorine, nitric acid [Note: Decomposes above 446°F. There is a high potential for the generation of arsine gas when inorganic arsenic is exposed to nascent (freshly formed) hydrogen.]	Char, HNO ₃ , AAS/GF, III [#5001]
2188 18	1 ppm = 3.24 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	NIOSH/OSHA	Inh	After ingestion of large doses: vomit, dyp, cyan, coarse pulm rales; liver damage	Eye:	Irrimed	Resp sys, blood, liver
Eyes:	N.R.	3 mg/m ³ : CCROVDMFu/SA	Ing		Skin:	Soap wash prompt	
Wash skin:	N.R.	7.5 mg/m ³ : SA/CF/PAPROVDMFu			Breath:	Resp support	
Remove:	N.R.	15 mg/m ³ : CCRFOVHIE/GMFOVHIE/PAPRTOVHIE/SAT/CF/SCBAF/SAF			Swallow:	Medical attention immed	
Change:	Daily	100 mg/m ³ : SA/PP					
[ANTU]		§ SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOVHIE/SCBAE					
Skin:	Prevent skin contact	NIOSH	Inh	Ulceration of nasal septum, derm. GI disturbances, peri neur, resp imt, hyperpig of skin, [carc]	Eye:	Irrimed	Liver, kidneys, skin, lungs, lymphatic sys [lung & lymphatic cancer]
Eyes:	Prevent eye contact	§ SCBAF/PD,PP/SAF/PD,PP/ASCBA	Abs		Skin:	Soap wash immed	
Wash skin:	When contam/Daily	Escape: GMFAGHIE/SCBAE	Con		Breath:	Resp support	
Remove:	When wet or contam		Ing		Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Arsenic (inorganic compounds, as As)]							
Recommendations vary depending upon the specific compound.		TBAL	Inh Ing Con	In animals: irrit skin, possible derm; resp distress; diar; kidney damage; musc tremor, sez; possible GI tract, terato, repro effects; possible liver damage	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Skin, resp sys, kidneys, CNS, liver, GI tract, repro sys
[Arsenic (organic compounds, as As)]							
Skin:	Frostbite	NIOSH	Inh	Head, mal, weak, dizz; dyp; abdom, back pain; nau, vomit; bronze skin; hema, jaun, perineur; liq; frostbite; [carc]	Eye:	Frostbite	Blood, kidneys, liver [lung & lymphatic cancer]
Eyes:	Frostbite	§ SCBAF/PD,PP/SAF/PD,PP/ASCBA	Con		Skin:	Frostbite	
Wash skin:	N.R.	Escape: GMFS/SCBAE	(liq)		Breath:	Resp support	
Remove:	When wet (flam)						
Change:	N.R.						
Provide:	Frostbite						
[Arsine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Asbestos Hydrated mineral silicates 1332-21-4 C16475000 2212 31 (blue) 2590 31 (white)	Actinolite, Actinolite asbestos, Amosite (cummingtonite- grunerite), Anthophyllite, Anthophyllite asbestos, Chrysotile, Crocidolite (Riebeckite), Tremolite, Tremolite asbestos	NIOSH Ca See Appendix A See Appendix C OSHA [1910.1001] [1910.1101] See Appendix C	Ca [N.D.]	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids	MW: Varies BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr. 7 Noncombustible Solids	VP: 0 mm (approx) MLT: 1112°F (Decomposes) UEL: NA LEL: NA	None reported	Filter, Acetone/ Triacetin, PCM, III [#7400, Fibers] [Also #7402 (TEM).]
Asphalt fumes 8052-42-4 C19900000 1999 27 (Asphalt)	Asphalt; Asphaltum, Bitumen (European term), Petroleum asphalt, Petroleum bitumen, Road asphalt, Roofing asphalt	NIOSH Ca C 5 mg/m ³ [15-min] See Appendix A OSHA none	Ca [N.D.]	Fumes generated during the produc- tion or application of asphalt (a dark- brown to black cement-like sub- stance manufactured by the vacuum dis- tillation of crude petroleum oil).	Properties vary depending upon the specific asphalt formulation or mixture. Asphalt: Combustible Solid		None reported [Note: Asphalt becomes molten at about 200°F.]	Filter; none; Grav; NIOSH Asphalt Fumes Crit. Doc.
Atrazine C ₆ H ₈ ClN ₆ 1912-24-9 XY5600000 2763 55 (triazine pesticide)	2-Chloro-4-ethylamino-6- isopropylamino-s-triazine; 6-Chloro-N-ethyl-N'- (1-methylethyl)-1,3,5- triazine-2,4-diamine	NIOSH 5 mg/m ³ OSHA none	N.D.	Colorless or white, odorless, crystalline powder. [herbicide]	MW: 215.7 BP: Decomposes Sol: 0.003% Fl.P: NA IP: NA Sp.Gr. 1.19 Noncombustible Solid, but may be mixed with flammable liquids.	VP: 0.0000003 mm MLT: 340°F UEL: NA LEL: NA	Strong acids, strong bases	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Azinphos-methyl C ₁₀ H ₁₂ O ₃ PS ₂ H ₂ 86-50-C TE1925000 2783 55	0,0-Dimethyl-S-4-oxo- 1,2,3-benzotriazin- 3(4H)-ylmethyl phosphoro- dithioate, Guthion®, Methyl azinphos [(CH ₃ O) ₂ P(S)SCH ₂ (N ₂ C ₆ H ₄ O)]	NIOSH/OSHA 0.2 mg/m ³ [skin]	10 mg/m ³	Colorless crystals or a brown, waxy solid. [insecticide]	MW: 317.3 BP: Decomposes Sol: 0.003% Fl.P: NA IP: ? Sp.Gr. 1.44 Noncombustible Solid	VP: 8 x 10 ⁻⁶ mm MLT: 163°F UEL: NA LEL: NA	Strong oxidizers, acids	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: H/EF/SCBAE	Inh Ing Con	Asbestosis (chronic exposure); dysp, interstitial fib, restricted pulm function, finger clubbing, irrit eyes; [carc]	Eye: Breath:	Irrimmed Fresh air	Respsys, eyes [lung cancer]
Eyes:	Prevent eye contact						
Wash skin:	Daily						
Remove:	N.R.						
Change:	Daily						
[Asbestos]							
Skin:	Prevent skin contact	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Con	Irriteyes, resp sys; [carc]	Eye: Breath:	Irrimmed Resp support	Eyes, resp sys [in animals: skin tumors]
Eyes:	Prevent eye contact						
Wash skin:	Daily						
Remove:	N.R.						
Change:	Daily						
[Asphalt fumes]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irriteyes, skin; derm, sens skin; dysp, weak, inco, saliv; hypothermia; liverinj	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Atrazine]							
Skin:	Prevent skin contact	NIOSH/OSHA 2 mg/m ³ : CCROVDMFu/SA 5 mg/m ³ : SA:CF/PAPROVDMFu 10 mg/m ³ : CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SAT:CF/ SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Miosis; ache eyes, blurred vision, lac, rhin, head; tight chest, wheez, lar spas; saliv, cyan, anor; nau, vomit, diarr; sweat, twitch, para, convuls; low BP, card irreg	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash immed Resp support Medical attention immed	Resp sys, CNS, CVS, blood chol
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	Daily						
Provide:	Quick drench						
[Azinphos-methyl]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Barium chloride (as Ba) BaCl ₂ 10361-37-2 CQ8750000	Barium dichloride	NIOSH*/OSHA* 0.5 mg/m ³ [*Note: The REL and PEL also apply to other soluble barium compounds (as Ba) except Barium sulfate.]	50 mg/m ³ (as Ba)	White, odorless solid	MW: 208.2 BP: 2840°F SOL: 38% F.P.: NA IP: ? Sp. Gr: 3.86 Noncombustible Solid	VP: Low MLT: 1765°F UEL: NA LEL: NA	Acids, oxidizers	Filter, Water, AAS, III [#7056, Barium, soluble cmpds]
1564 55 (Barium compound, n.o.s.)								
Barium nitrate (as Ba) Ba(NO ₃) ₂ 10022-31-8 CQ9625000	Barium dinitrate, Barium(II) nitrate (1:2), Barium salt of nitric acid	NIOSH*/OSHA* 0.5 mg/m ³ [*Note: The REL and PEL also apply to other soluble barium compounds (as Ba) except Barium sulfate.]	50 mg/m ³ (as Ba)	White, odorless solid	MW: 261.4 BP: Decomposes SOL: 9% F.P.: NA IP: ? Sp. Gr: 3.24 Noncombustible Solid, but will accelerate the burning of combustible materials	VP: Low MLT: 1094°F UEL: NA LEL: NA [Note: Contact with combustible material may cause fire.]	Acids, oxidizers, aluminum-magnesium alloys, (barium dioxide + zinc) [Note: Contact with combustible material may cause fire.]	Filter, Water, AAS, III [#7056, Barium, soluble cmpds]
1446 42								
Barium sulfate BaSO ₄ 7727-43-7 CR0600000	Artificial barite, Barite, Barium salt of sulfuric acid, Barytes (natural)	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White or yellowish, odorless powder.	MW: 233.4 BP: 2912°F (Decomposes) Sol (64°F): 0.0002% F.P.: NA IP: NA Sp. Gr: 4.25-4.5 Noncombustible Solid	VP: 0 mm (approx) MLT: 2876°F UEL: NA LEL: NA	Phosphorus, aluminum [Note: Aluminum in the presence of heat can cause an explosion.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
1564 55 (Barium compound, n.o.s.)								
Benomyl C ₁₄ H ₁₆ N ₂ O ₄ 17804-35-2 DD6475000	Methyl 1-(butylcarbamoyl)- 2-benzimidazolecarbamate	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White crystalline solid with a faint, acid odor. [fungicide] [Note: Decomposes without melting above 572°F.]	MW: 290.4 BP: Decomposes Sol: 0.0004% F.P.: NA IP: NA Sp. Gr: ? Noncombustible Solid	VP: <0.00001 mm MLT: >572°F (Decomposes) UEL: NA LEL: NA	Heat, strong acids, strong alkalis	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
2757 55 (carbamate pesticide, n.o.s.)								

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
[Azinphos-methyl]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 5 mg/m ³ : DMXSQ/SA 12.5 mg/m ³ : SA:CF/PAPRDM 25 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 50 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrite eyes, skin, upper resp sys; skin burns, gastroenteritis; musc spasm; slow pulse, extrasystoles; hypokalemia	Eye: Skin: Breath: Swallow: Irrigated Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, heart, CNS
[Barium chloride (as Ba)]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 5 mg/m ³ : DMXSQ/SA 12.5 mg/m ³ : SA:CF/PAPRDM 25 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 50 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrite eyes, skin, upper resp sys; skin burns, gastroenteritis; musc spasm; slow pulse, extrasystoles; hypokalemia	Eye: Skin: Breath: Swallow: Irrigated Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, heart, CNS
[Barium nitrate (as Ba)]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Con	Irrite eyes, nose, upper resp sys; benign pneumoconiosis (baritosis)	Eye: Skin: Breath: Swallow: Irrigated Soap wash Resp support Medical attention immed	Eyes, resp sys
[Barium sulfate]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	TBAL	Inh Ing Con	Irrite eyes, skin, upper resp sys; skin sens; possible repro, terato effects	Eye: Skin: Breath: Swallow: Irrigated Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, repro sys
[Benomyl]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Benzene C_6H_6 71-43-2 CY1400000	Benzol, Phenyl hydride	NIOSH Ca 0.1 ppm ST 1 ppm See Appendix A OSHA(1910.1028) 1 ppm ST 5 ppm See Appendix F	Ca [500 ppm]	Colorless to light-yellow liquid with an aromatic odor [Note: A solid below 42°F]	MW 78.1 BP 176°F Sol 0.07% Fl P 12°F IP 9.24 eV	VP 75 mm FRZ 42°F UEL 7.8% LEL 1.2%	Strong oxidizers, many fluorides & perchlorates, nitric acid	Char. CS, GC/FID, III [#1500, Hydro- carbons] [Also #3700.]
1114 27	1 ppm = 3.25 mg/m ³				Sp Gr: 0.88 Class IB Flammable Liquid			
Benzenethiol C_6H_5SH 108-98-5 DC0525000	Mercaptobenzene, Phenylmercaptan, Thiophenol	NIOSH 0.1 ppm (0.5 mg/m ³) [15-min] OSHA† none	N.D.	Water-white liquid with an offensive, garlic-like odor. [Note: A solid below 5°F.]	MW: 110.2 BP: 336°F Sol(77°F): 0.08% Fl P: 132°F IP: 8.33 eV	VP(65°F): 1 mm FRZ: 5°F UEL: ? LEL: ?	Strong acids & bases, calcium hypochlorite, alkali metals [Note: Oxidizes on exposure to air.]	None available
2337 57	1 ppm = 4.58 mg/m ³				Sp. Gr: 1.08 Class II Combustible Liquid			
Benzidine $NH_2C_6H_4C_6H_4NH_2$ 92-87-5 DC9625000	Benzidine-based dyes. 4,4'-Bianiline; 4,4'-Biphenyldiamine, 1,1'-Biphenyl-4,4'-diamine, 4,4'-Diaminobiphenyl, p-Diaminodiphenyl [Note: Benzidine has been used as a basis for many dyes.]	NIOSH Ca See Appendix A See Appendix C OSHA(1910.1010) See Appendix B See Appendix C	Ca [N.D.]	Grayish-yellow, reddish-gray, or white crystalline powder. [Note: Darkens on exposure to air and light.]	MW 184.3 BP 752°F Sol(54°F): 0.04% Fl P ? IP ?	VP: Low MLT 239°F UEL ? LEL ?	Red fuming nitric acid	Filter/ Sigel, Reagent, HPLC/UVD, III [#5509]
1885 53					Sp Gr 1.25 Combustible Solid, but difficult to burn			
Benzoyl peroxide $(C_6H_5CO)_2O_2$ 94-36-0 DM8575000	Benzoperoxide, Dibenzoyl peroxide	NIOSH/OSHA 5 mg/m ³	1500 mg/m ³	Colorless to white crystals or a granular powder with a faint, benzaldehyde-like odor.	MW 242.2 BP Decomposes explosively Sol <1% Fl P 176°F IP ?	VP <1 mm MLT 217°F UEL ? LEL ?	Combustible substances (wood, paper, etc.), acids, alkalis, alcohols, amines, ethers [Note: Containers may explode when heated. Extremely explosion-sensitive to shock, heat, and friction.]	Filter, Diethyl ether, HPLC/UVD, III [#5009]
2085/2086/2087 49 2088/2089/2090 49					Sp Gr 1.33 Combustible Solid (easily ignited and burns very rapidly)			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	§ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	resp sys, gidd, head, nau,	Skin	blood, CNS, bone
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	staggered gait, fig, enor,	Breath	marrow
Remove:	When wet (flamm)		Con	lass, derm, bone marrow	Swallow	[leukemia]
Change:	N.R.			depres. [carc]		
Provide:	Eyewash, Quick drench					
[Benzene]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm: CCROV/SA	Abs	derm; cyan; cough, wheez;	Skin:	CNS, kidneys, liver,
Wash skin:	When contam	2.5 ppm: SA:CF/PAPROV	Ing	dysp, pulm edema, pneumitis;	Breath:	spleen
Remove:	When wet or contam	5 ppm: CCRFOV/GMFOV/PAPRTOV/	Con	head, dizz, CNS depres;	Swallow:	
Change:	N.R.	SCBAF/SAF		nau, vomit; kidney, liver,		
Provide:	Eyewash, Quick drench	§: SCBAF PD, PP/SAF PD, PP ASCBA		spleen damage		
		Escape: GMFOV/SCBAE				
[Benzenethiol]						
Skin:	Prevent skin contact	NIOSH	Inh	Hema, secondary anemia	Eye	Bladder, skin,
Eyes:	Prevent eye contact	§ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	from hemolysis, acute	Skin	kidneys, liver,
Wash skin:	When contam/Daily	Escape: HiEF/SCBAE	Ing	cystitis, acute liver	Breath	blood
Remove:	When wet or contam		Con	disorders, derm, painful,	Swallow	[liver, kidney &
Change:	Daily			irreg urination. [carc]		bladder cancer]
Provide:	Eyewash, Quick drench					
[Benzidine]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	50 mg/m ³ DMXSO*/SA*	Ing	memb, sens derm	Skin	
Wash skin:	When contam	125 mg/m ³ SA:CF*/PAPRDM*	Con		Breath:	
Remove:	When wet or contam	250 mg/m ³ HiEF/PAPRTHiE*/SCBAF/			Swallow	
Change:	Daily	SAF				
		1500 mg/m ³ : SAF:PD,PP				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: HiEF/SCBAE				
[Benzoyl peroxide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Benzyl chloride $C_6H_5CH_2Cl$ 100-44-7 XS8925000 1738 53	Chloromethylbenzene, α -Chlorotoluene 1 ppm = 5.26 mg/m ³	NIOSH C 1 ppm (5 mg/m ³) [15-min] OSHA 1 ppm (5 mg/m ³)	10 ppm	Colorless to slightly yellow liquid with a pungent, aromatic odor.	MW: 126.6 BP: 354°F Sol: 0.05% Fl.P: 153°F IP: ? Sp.Gr: 1.10 Class IIIA Combustible Liquid	VP: 1 mm FRZ: -38°F UEL: ? LEL: 1.1%	Oxidizers, acids, copper, aluminum, magnesium, iron, zinc, tin [Note: Can polymerize when in contact with all common metals except nickel & lead Hydrolyzes in H ₂ O to benzyl alcohol]	Char; CS; GC/FID; III [#1003, Halo- genated Hydro- carbons]
Beryllium & beryllium compounds (as Be) Be (Metal) 7440-41-7 (Metal) DS1750000 (Metal) 1566 53 (compounds) 1567 32 (powder)	Beryllium metal. Beryllium Other synonyms vary depending upon the specific beryllium compound	NIOSH Ca Not to exceed 0.0005 mg/m ³ See Appendix A OSHA 0.002 mg/m ³ C 0.005 mg/m ³ 0.025 mg/m ³ [30-min maximum peak]	Ca [4 mg/m ³ (as Be)]	Metal. A hard, brittle, gray- white solid	MW: 9.0 BP: 4532°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 1.85 (Metal) Metal. Noncombustible Solid in bulk form, but a slight explosion hazard in the form of a powder or dust.	VP: 0 mm (approx) MLT: 2349°F UEL: NA LEL: NA	Acids, caustics, chlorinated hydro- carbons, oxidizers, molten lithium	Filter; Acid; AAS/GF; III [#7102]
Bismuth telluride, doped with Selenium sulfide (as Bi ₂ Te ₃)	Doped bismuth sesqu telluride, Doped bismuth telluride, Doped bismuth tritelluride, Doped tellurobismuthite [Note: Doped with selenium sulfide. Commercial mix may contain 80% Bi ₂ Te ₃ , 20% stannous telluride, plus some tellurium.]	NIOSH 5 mg/m ³ OSHA† none	N.D.	Gray, crystalline solid that has been enhanced (doped) with a small amount of selenium sulfide (SeS). [Note: Doping alters the conductivity of a semiconductor.]	Properties are unavailable but should be similar to Bismuth telluride, undoped. Sp.Gr: ? Noncombustible Solid		Strong oxidizers, moisture	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Bismuth telluride, undoped Bi ₂ Te ₃ 1304-82-1 EB3110000	Bismuth sesqu telluride, Bismuth telluride, Bismuth tritelluride, Tellurobismuthite	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Gray, crystalline solid.	MW: 800.8 BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 7.7 Noncombustible Solid	VP: 0 mm (approx) MLT: 1063°F UEL: NA LEL: NA	Strong oxidizers (e.g., bromine, chlorine, or fluorine), moisture, nitric acid (decomposes)	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Irrimed	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	10 ppm: CCROVAG*/GMFOVAG/	Ing	weak, irrity, head, skin	Skin	Soap wash immed	CNS
Wash skin:	When contam	PAPROVAG*/SA*/SCBAF	Con	eruption, pulm edema	Breath	Resp support	
Remove:	When wet or contam	§ SCBAF PD,PP/SAF PD,PP ASCBA			Swallow	Medical attention immed	
Change:	N.R.	Escape: GMFOVAG/SCBAE					
Provide:	Eyewash, Quick drench						
[Benzyl chloride]							
Skin:	Prevent skin contact	NIOSH	Inh	Berylliosis (chronic exposure): anor, low-wgt,	Eye	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Con	weak, chest pain, cough, clubbing of fingers, cyan, pulm insufficiency; irrit eyes; derm; [carc]	Breath:	Fresh air	[lung cancer]
Wash skin:	Daily	Escape: HIEF/SCBAE					
Remove:	When wet or contam						
Change:	Daily						
Provide:	Eyewash						
[Beryllium & beryllium compounds (as Be)]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper resp sys; garlic breath; in animals: pulm lesions (nonfibrotic)	Eye:	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con		Skin:	Soap wash immed	
Wash skin:	When contam				Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Bismuth telluride, doped with Selenium sulfide (as Bi ₂ Te ₃)]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper resp sys; garlic breath	Eye:	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con		Skin:	Soap wash immed	
Wash skin:	When contam				Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Bismuth telluride, undoped]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Borates, tetra, sodium salts (Anhydrous) $\text{Na}_2\text{B}_4\text{O}_7$ 1330-43-4 ED4588000	Anhydrous borax, Borax dehydrated, Disodium salt of boric acid, Disodium tetraborate, Fused borax, Sodium borate (anhydrous), Sodium tetraborate	NIOSH 1 mg/m ³ OSHA† none	N.D.	White to gray, odorless powder. [herbicide] [Note: Becomes opaque on exposure to air.]	MW: 201.2 BP: 2867°F [Decomposes] Sol: 3% Fl.P: NA IP: NA Sp.Gr: 2.37 Noncombustible Solid	VP: 0 mm (approx) MLT: 1366°F UEL: NA LEL: NA	Moisture [Note: Forms partial hydrate in moist air.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Borates, tetra, sodium salts (Decahydrate) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ 1303-96-4 VZ2275000	Borax, Borax decahydrate, Sodium borate decahydrate, Sodium tetraborate decahydrate	NIOSH 5 mg/m ³ OSHA† none	N.D.	White, odorless, crystalline solid. [herbicide] [Note: Becomes anhydrous at 608°F.]	MW: 381.4 BP: 608°F Sol: 6% Fl.P: NA IP: NA Sp.Gr: 1.73 Noncombustible Solid (an inherent fire retardant).	VP: 0 mm (approx) MLT: 167°F UEL: NA LEL: NA	Zirconium, strong acids, metallic salts	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Borates, tetra, sodium salts (Pentahydrate) $\text{Na}_2\text{B}_4\text{O}_7 \cdot 5\text{H}_2\text{O}$ 12179-04-3	Borax pentahydrate, Sodium borate pentahydrate, Sodium tetraborate pentahydrate	NIOSH 1 mg/m ³ OSHA† none	N.D.	Colorless or white, odorless crystals or free-flowing powder. [herbicide] [Note: Begins to lose water of hydration at 252°F.]	MW: 291.4 BP: ? Sol: 4% Fl.P: NA IP: NA Sp.Gr: 1.82 Noncombustible Solid	VP: 0 mm (approx) MLT: 392°F UEL: NA LEL: NA	None reported [Note: However, see the reactivities & incompatibilities reported for the related substance Borax decahydrate above.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Boron oxide B_2O_3 1303-86-2 ED7900000	Boric anhydride, Boric oxide, Boron trioxide	NIOSH 10 mg/m ³ OSHA† 15 mg/m ³	2000 mg/m ³	Colorless, semi- transparent lumps or hard, white, odorless crystals	MW: 69.6 BP: 3380°F Sol: 3% Fl.P: NA IP: 13.50 eV Sp.Gr: 2.46 Noncombustible Solid	VP: 0 mm (approx) MLT: 842°F UEL: NA LEL: NA	Water [Note: Reacts slowly with water to form boric acid.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazard's				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.				Skin:	Soap wash	
Wash skin:	Daily				Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention immed	
Change:	Daily						
[Borates, tetra sodium salts (Anhydrous)]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.				Skin:	Soap wash	
Wash skin:	Daily				Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention immed	
Change:	Daily						
[Borates, tetra sodium salts (Decahydrate)]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.				Skin:	Soap wash	
Wash skin:	Daily				Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention immed	
Change:	Daily						
[Borates, tetra sodium salts (Pentahydrate)]							
Skin:	Prevent skin contact	NIOSH 50 mg/m ³ : DM* 100 mg/m ³ : DMXSQ**/SA* 250 mg/m ³ : SA CF*/PAPRDM** 500 mg/m ³ : HiEF/PAPRTHiE*/SCBAF/ SAF 2000 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; cough; conj; skin eryt	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	Prevent eye contact				Skin:	Water flush prompt	
Wash skin:	When contam				Breath:	Fresh air	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
[Boron oxide]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (Sec Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Boron tribromide <chem>BBr3</chem> 10294-33-4 ED7400000	Boron bromide, Tribromoborane	NIOSH C1 ppm (10 mg/m ³) OSHA† none	N.D.	Colorless, fuming liquid with a sharp, irritating odor.	MW: 250.5 BP: 194°F Sol: Decomposes Fl.P: NA IP: 9.70 eV	VP(57°F): 40 mm FRZ: -51°F UEL: NA LEL: NA	Moisture, water, heat, potassium, sodium, alcohols [Note: Attacks metals, wood & rubber. Reacts with water to form boric acid and hydrogen bromide.]	None available
2692 59	1 ppm = 10.41 mg/m ³				Sp.Gr(65°F): 2.64 Noncombustible Liquid			
Boron trifluoride <chem>BF3</chem> 7637-07-2 ED2275000	Boron fluoride, Trifluoroborane	NIOSH/OSHA C1 ppm (3 mg/m ³)	25 ppm	Colorless gas with a pungent, suffocating odor. [Note: Forms dense white fumes in moist air. Shipped as a nonliquefied compressed gas.]	MW: 67.8 BP: -148°F Sol: 106% (in cold H ₂ O) Fl.P: NA IP: 15.50 eV	VP >50 atm FRZ: -196°F UEL: NA LEL: NA	Alkali metals calcium oxide [Note: Hydrolyzes in moist air or hot water to form boric acid, hydrogen fluoride & fluoboric acid.]	None available
1008 15	1 ppm = 2.82 mg/m ³				RGasD: 2.38 Nonflammable Gas			
Bromacil <chem>C6H11BrN2O2</chem> 314-40-9 YQ9100000	5-Bromo-3-sec-butyl-6- methyluracil, 5-Bromo-6-methyl-3- (1-methylpropyl)uracil	NIOSH 1 ppm (10 mg/m ³) OSHA† none	N.D.	Odorless, colorless to white, crystalline solid. [herbicide] [Note: Commercially available as a wetable powder or in liquid formulations.]	MW: 261.2 BP: Sublimes Sol(77°F): 0.08% Fl.P: NA IP: ?	VP(212°F): 0.0008 mm MLT: 317°F (Sublimes) UEL: NA LEL: NA	Strong acids (decomposes slowly), oxidizers, heat, sparks, open flames	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
	1 ppm = 10.85 mg/m ³				Sp.Gr: 1.55 Noncombustible Solid, but may be dissolved in flammable liquids.			
Bromine <chem>Br2</chem> 7726-95-6 EFS100000	Molecular bromine	NIOSH 0.1 ppm (0.7 mg/m ³) ST 0.3 ppm (2 mg/m ³) OSHA† 0.1 ppm (0.7 mg/m ³)	3 ppm	Dark reddish-brown, fuming liquid with suffocating, irritating fumes	MW: 159.8 BP: 139°F Sol: 4% Fl.P: NA IP: 10.55 eV	VP: 172 mm FRZ: 19°F UEL: NA LEL: NA	Combustible organics (sawdust, wood, cotton, straw, etc.), aluminum, readily oxidizable materials, ammonia, hydrogen, acetylene, phosphorus, potassium, sodium [Note: Corrodes non-steel, stainless steel & copper.]	Filter; Na ₂ S ₂ O ₅ ; IC; III [#0111]
1744 53	1 ppm = 6.64 mg/m ³				Sp.Gr: 3.12 Noncombustible Liquid, but accelerates the burning of combustibles			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing	skin, eye burns; dysp,	Skin:	Water flush immed	
Wash skin:	When contam		Con	pulm edema	Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Boron tribromide]							
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Irrigated	Eyes, skin, resp sys,
Eyes:	N.R.	10 ppm: SA*	Con	resp sys, epis. eye, skin	Skin	Water flush immed	kidneys
Wash skin:	N.R.	25 ppm: SA/CF*/SCBAF/SAF		burns,	Breath	Resp support	
Remove:	N.R.	§ SCBAF/PD, PP/SAF PD, PP, ASCBA		in animals: pneu, kidney			
Change:	N.R.	Escape: GMFS/SCBAE		damage			
[Boron trifluoride]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irrigated	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	resp sys;	Skin:	Soap wash immed	thyroid
Wash skin:	When contam		Con	in animals: thyroid inj	Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Bromacil]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Dizz, head, lac, epis,	Eye	Irrigated	Resp sys, eyes,
Eyes:	Prevent eye contact	2.5 ppm: SA/CF*/PAPRS,*	Ing	cough, feeling of	Skin:	Soap wash immed	CNS, skin
Wash skin:	When contam	3 ppm: CCRFS*/GMFS*/PAPRS*/†/SCBAF/SAF	Con	oppression, pulm edema,	Breath	Resp support	
Remove:	When wet or contam	§ SCBAF/PD, PP/SAF PD, PP, ASCBA		pneu, abdom pain, diarr,	Swallow:	Medical attention immed	
Change:	N.R.	Escape: GMFS/SCBAE		measle-like eruptions,			
Provide:	Eyewash, Quick drench			eye, skin burns			
[Bromine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Bromine pentafluoride <chem>BrF5</chem> 7789-30-2 EF9350000	Bromine fluoride	NIOSH 0.1 ppm (0.7 mg/m³) OSHA† none	N.D.	Colorless to pale- yellow, turning liquid with a pungent odor. [Note: A colorless gas above 105°F. Shipped as a compressed gas.]	MW: 174.9 BP: 105°F Sol: Reacts violently Fl.P: NA IP: ?	VP: 328 mm FRZ: -77°F UEL: NA LEL: NA	Acids, halogens, arsenic, selenium, sulfur, glass, organic materials, water [Note: Reacts with all elements except inert gases, nitrogen & oxygen.]	None available
1745 44	1 ppm = 7.27 mg/m³				Sp.Gr: 2.48 Noncombustible Liquid, but a very powerful oxidizer.			
Bromoform <chem>CHBr3</chem> 75-25-2 PB5600000	Methyl tribromide, Tribromomethane	NIOSH/OSHA 0.5 ppm (5 mg/m³) [skin]	850 ppm	Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.]	MW: 252.8 BP: 301°F Sol: 0.1% Fl.P: NA IP: 10.48 eV	VP: 5 mm FRZ: 47°F UEL: NA LEL: NA	Lithium, sodium, potassium, calcium, aluminum, zinc, magnesium, strong caustics, acetone [Note: Gradually decomposes, acquir- ing yellow color; air & light accel- erate decomposition.]	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
2515 58	1 ppm = 10.51 mg/m³				Sp.Gr: 2.89 Noncombustible Liquid			
1,3-Butadiene <chem>CH2=CHCH=CH2</chem> 106-99-0 E19275000	Biethylene, Bivinyll, Butadiene, Divinyll, Erythrene, Vinylethylene	NIOSH Ca See Appendix A OSHA 1000 ppm (2200 mg/m³)	Ca [2000 ppm] [LEL]	Colorless gas with a mild aromatic or gasoline-like odor. [Note: A liquid below 24°F. Shipped as a liquefied compressed gas.]	MW: 54.1 BP: 24°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.63 eV RGasD: 1.8e Sp.Gr: 0.65 (Liquid at 31°F) Flammable Gas, Class IA Flammable Liquid	VP: 2.4 atm FRZ: -164°F UEL: 15.1% LEL: 1.6%	Phenol, chlorine dioxide, copper, crotonaldehyde [Note: May contain inhibitors (such as hydroquinone) to prevent polymeriza- tion. May form explosive peroxides upon exposure to air.]	Char(2), CH, CL, GC/FID, II [#1024]
1010 17 (inhibited)	1 ppm = 2.25 mg/m³							
n-Butane <chem>CH3CH2CH2CH3</chem> 106-97-8 EJ4200000	normal-Butane, Butylhydride, Diethyl, Methylethylmethane [Note: Also see specific listing for isobutane.]	NIOSH 800 ppm (1900 mg/m³) OSHA† none	N.D.	Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 31°F.]	MW: 58.1 BP: -11°F Sol: Slight Fl.P: NA (Gas) IP: 10.63 eV RGasD: 2.11 Sp.Gr: 0.6 (Liquid at 31°F) Flammable Gas Class IA Flammable Liquid	VP: 2.0 atm FRZ: -217°F UEL: 8.4% LEL: 1.6%	Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, (nickel carbonyl + oxygen)	None available
1011 22	1 ppm = 2.42 mg/m³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 5)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irritate eyes, skin, resp sys; corn nec; skin	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	burns; cough, dysp,	Skin:	liver, kidneys
Wash skin:	When contam		Con	pulmedema; liver, kidney inj	Breath:	
Remove:	When wet or contam				Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Bromine pentafluoride]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritate eyes, skin, resp sys; CNS depres, liver,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	12.5 ppm: SA CF ₄ /PAPROV ⁴	Abs	kidney damage	Skin	CNS, liver, kidneys
Wash skin:	When contam	25 ppm: CCRFOV/GMFOV/PAPRTOV ⁴	Ing		Breath	
Remove:	When wet or contam	SCBAF/SAF	Con		Swallow	
Change:	N.R.	850 ppm: SAF:PD,PP				
		§ SCBAF PD,PP/SAF PD,PP ASCBA				
		Escape: GMFOV/SCBAE				
[Bromoform]						
Skin:	Frostbite	NIOSH	Inh	Irritate eyes, nose,	Eye:	Eyes, resp sys,
Eyes:	Frostbite	W: SCBAF PD,PP/SAF PD,PP ASCBA	Con	throat; drow, li-head,	Skin:	CNS, repro sys
Wash skin:	N.R.	Escape: GMFS/SCBAE	(liq)	liq: frostbite, terato, repro effects; [carc]	Breath	[hemato cancer]
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Frostbite					
[1,3-Butadiene]						
Skin:	Frostbite	TBAL	Inh	Drow, narco, asphy;	Eye:	CNS
Eyes:	Frostbite		Con	liq: frostbite	Skin:	
Wash skin:	N.R.		(liq)		Breath	
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Frostbite					
[n-Butane]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2-Butanone <chem>CH3COCH2CH3</chem> 78-93-3 EL6475000 1193 26 1232 26	Ethyl methyl ketone, MEK, Methyl acetone, Methyl ethyl ketone 1 ppm = 3.00 mg/m ³	NIOSH 200 ppm (590 mg/m ³) ST 300 ppm (865 mg/m ³) OSHA† 200 ppm (590 mg/m ³)	3000 ppm	Colorless liquid with a moderately sharp, fragrant, mint- or acetone- like odor.	MW: 72.1 BP: 175°F Sol: 28% Fl.P: 16°F IP: 9.54 eV Sp Gr: 0.81 Class IB Flammable Liquid	VP: 78 mm FRZ: -123°F UEL(200°F): 11% LEL(200°F): 1.4%	Strong oxidizers, amines, ammonia, inorganic acids, caustics, copper, isocyanates, pyridines	Ambersorb, CS, GC/FID, III [#2500]
2-Butoxyethanol <chem>C4H9OCH2CH2OH</chem> 111-76-2 KJ8575000 2369 26	Butyl Cellosolve®, Butyl oxitcl, Dowanol EB, EGBE, Ektasolve EB, Ethylene glycol monobutyl ether, Jcflersol EB 1 ppm = 4.91 mg/m ³	NIOSH 5 ppm (24 mg/m ³) [skin] OSHA† 50 ppm (240 mg/m ³) [skin]	700 ppm	Colorless liquid with a mild, ether-like odor.	MW: 118.2 BP: 339°F Sol: Miscible Fl.P: 143°F IP: 10.00 eV Sp Gr: 0.90 Class IIIA Combustible Liquid	VP: 0.8 mm FRZ: -107°F UEL(275°F): 12.7% LEL(200°F): 1%	Strong oxidizers, strong caustics	Char, Methanol/ CH ₃ Cl, GC/FID, III [#1403, Alcohols IV]
2-Butoxyethanol acetate <chem>C4H9O(CH2)2OCOCH3</chem> 112-07-2 KJ8925000 1 ppm = 6.66 mg/m ³	2-Butoxyethyl acetate, Butyl Cellosolve® acetate, Butyl glycol acetate, EGBEA, Ektasolve EB® acetate, Ethylene glycol monobutyl ether acetate 1 ppm = 6.66 mg/m ³	NIOSH 5 ppm (33 mg/m ³) OSHA none	N.D.	Colorless liquid with a pleasant, sweet, fruity odor.	MW: 160.2 BP: 378°F Sol: 15% Fl.P: 71°F IP: ? Sp.Gr: 0.94 Class IB Flammable Liquid	VP: 0.3 mm FRZ: -82°F UEL(275°F): 0.88% LEL(200°F): 8.54%	Oxidizers	Char, CH ₃ Cl/ Methanol; GC/FID; OSHA [#83]
n-Butyl acetate <chem>CH3COO(CH2)3CH3</chem> 123-86-4 AF7350000 1123 26	Butyl acetate, n-Butyl ester of acetic acid, Butyl ethanoate 1 ppm = 4.83 mg/m ³	NIOSH 150 ppm (710 mg/m ³) ST 200 ppm (950 mg/m ³) OSHA† 150 ppm (710 mg/m ³)	1700 ppm [LEL]	Colorless liquid with a fruity odor.	MW: 116.2 BP: 258°F Sol: 1% Fl.P: 72°F IP: 10.00 eV Sp Gr: 0.88 Class IB Flammable Liquid	VP: 10 mm FRZ: -107°F UEL: 7.6% LEL: 17%	Nitrates; strong oxidizers, alkalis & acids	Char, CS, GC/FID, III [#1450, Esters I]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash	NIOSH/OSHA 3000 ppm: SA:CF/PAPROV/ CCRFOV/GMFOV/SCBAF/ SAF § SCBAF PD,PP/SAF PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irritate eyes, skin, nose, head, dizziness, vomit, dermat	Eye: Skin: Breath: Swallow:	Irritated Water wash immediately Fresh air Medical attention immediately	Eyes, skin, resp sys, CNS
[2-Butanone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quickdrench	NIOSH 50 ppm: CCROV/SA* 125 ppm: SA:CF/PAPROV* 250 ppm: CCRFOV/GMFOV/PAPRTOV/ N.R. SCBAF/SAF 700 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritate eyes, skin, nose, throat; hemolysis, hemoglobinuria; CNS depression, head, vomit	Eye: Skin: Breath: Swallow:	Irritated Soap wash promptly Respiratory support Medical attention immediately	Eyes, skin, resp sys, CNS, hematologic sys, blood, kidneys, liver, lymphoid sys
[2-Butoxyethanol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 50 ppm: CCROV/SA* 125 ppm: SA:CF/PAPROV* 250 ppm: CCRFOV/GMFOV/PAPRTOV/ N.R. SCBAF/SAF 700 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritate eyes, skin, nose, throat; hemolysis, hemoglobinuria; CNS depression, head, vomit	Eye: Skin: Breath: Swallow:	Irritated Soap wash promptly Respiratory support Medical attention immediately	Eyes, skin, resp sys, CNS, hematologic sys, blood, kidneys, liver, lymphoid sys
[2-Butoxyethanol acetate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1500 ppm: CCROV/SA* 1700 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irritate eyes, skin, upper resp sys; head, drowsy, narco	Eye: Skin: Breath: Swallow:	Irritated Water flush promptly Respiratory support Medical attention immediately	Eyes, skin, resp sys, CNS
[n-Butyl acetate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
sec-Butyl acetate <chem>CH3COOCH(CH3)CH2CH3</chem> 105-46-4 AF7380000	sec-Butyl ester of acetic acid, 1-Methylpropyl acetate	NIOSH/OSHA 200 ppm (350 mg/m ³)	1700 ppm [LEL]	Colorless liquid with a pleasant, fruity odor	MW 116.2 BP 234°F Sol 0.8% Fl.P 64°F IP 9.91 eV	VP 10 mm FRZ -100°F UEL 9.8% LEL 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1450, Esters I]
1123 26	1 ppm = 4.83 mg/m ³				Sp Gr 0.86 Class IB Flammable Liquid			
tert-Butyl acetate <chem>CH3COOC(CH3)3</chem> 540-88-5 AF7400000	tert-Butyl ester of acetic acid	NIOSH/OSHA 200 ppm (950 mg/m ³)	1500 ppm [LEL]	Colorless liquid with a fruity odor	MW 116.2 BP 208°F Sol Insoluble Fl.P 72°F IP ?	VP ? FRZ ? UEL ? LEL 1.5%	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1450, Esters I]
1123 26	1 ppm = 4.83 mg/m ³				Sp Gr 0.87 Class IB Flammable Liquid			
Butyl acrylate <chem>CH2=CHCOOC4H9</chem> 141-32-2 UD3150000	n-Butyl acrylate, Butyl ester of acrylic acid, Butyl 2-propenoate	NIOSH 10 ppm (55 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a strong, fruity odor. [Note: Highly reactive; may con- tain an inhibitor to prevent spontaneous polymerization.]	MW: 128.2 BP: 293°F Sol: 0.1% Fl.P: 103°F IP: ?	VP: 4 mm FRZ: -83°F UEL: 9.9% LEL: 1.5%	Strong acids & alkalis, amines, halogens, hydrogen compounds, oxidizers, heat, flame, sunlight [Note: Polymerizes readily on heating.]	None available
2348 26	1 ppm = 5.33 mg/m ³				Sp.Gr: 0.89 Class II Combustible Liquid			
n-Butyl alcohol <chem>CH3CH2CH2CH2OH</chem> 71-36-3 EO1400000	1-Butanol, n-Butanol, Butyl alcohol, 1-Hydroxybutane, n-Propyl carbinol	NIOSH C 50 ppm (150 mg/m ³) [skin] OSHA† 100 ppm (300 mg/m ³)	1400 ppm [LEL]	Colorless liquid with a strong, characteristic, mildly alcoholic odor.	MW 74.1 BP 243°F Sol 9% Fl.P 84°F IP 10.04 eV	VP 6 mm FRZ -129°F UEL 11.2% LEL 1.4%	Strong oxidizers, strong mineral acids, alkali metals, halogens	Char. 2-Propanol/ CS, GC/FID, III [#1401, Alcohols II]
1120 26	1 ppm = 3.08 mg/m ³				Sp Gr 0.81 Class IC Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, head, drow,	Eye	Irr immed	Eyes, skin, resp
Eyes:	Prevent eye contact	1700 ppm: SA:CF/PAPROV/CCRFOV/	Ing	dryness upper resp sys,	Skin	Water flush prompt	sys, CNS
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	skin, narco	Breath	Resp support	
Remove:	When wet (flamm)	S: SCBAF PD,PP/SAF PD,PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape: GMFOV/SCBAE				immed	
[sec-Butyl acetate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Itch, inflamm eyes, irrit	Eye	Irr immed	Resp sys, eyes,
Eyes:	Prevent eye contact	1500 ppm: SA:CF/PAPROV/CCRFOV/	Ing	upper resp tract, head,	Skin	Water flush prompt	skin, CNS
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	narco, derm	Breath	Resp support	
Remove:	When wet (flamm)	S: SCBAF PD,PP/SAF PD,PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape: GMFOV/SCBAE				immed	
[tert-Butyl acetate]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	resp sys; sens derm; dvsp	Skin:	Soap wash immed	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention	
Change:	N.R.					immed	
Provide:	Eyewash, Quick drench						
[Butyl acrylate]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1250 ppm: SA:CF/PAPROV ⁺	Abs	head, vert, drow;	Skin	Water flush prompt	CNS
Wash skin:	When contam	1400 ppm: CCRFOV/GMFOV/PAPRTOV ⁺ /	Ing	corn inflamm, blurred	Breath	Resp support	
Remove:	When wet (flamm)	SCBAF/SAF	Con	vision, lac, photo, derm;	Swallow	Medical attention	
Change:	N.R.	S: SCBAF PD,PP/SAF PD,PP ASCBA		possible auditory nerve		immed	
		Escape: GMFOV/SCBAF		damage, hearing loss;			
				CNS depres			
[n-Butyl alcohol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
sec-Butyl alcohol <chem>CH3CH(OH)CH2CH3</chem> 78-92-2 EO1750000	2-Butanol, Butylene hydrate, 2-Hydroxybutane, Methyl ethyl carbinol	NIOSH 100 ppm (305 mg/m ³) ST 150 ppm (455 mg/m ³) OSHA† 150 ppm (450 mg/m ³)	2000 ppm	Colorless liquid with a strong, pleasant odor.	MW 74.1 BP 211°F Sol 16% Fl.P 75°F IP 10 10 eV	VP: 12 mm FRZ: -175°F UEL(212°F) 9.8% LEL(212°F) 1.7%	Strong oxidizers, organic peroxides, perchloric & permono- sulfuric acids	Char, 2-Propanol/ CS, GC/FID, III [#1401, Alcohols II]
1120 26	1 ppm = 3.08 mg/m ³				Sp Gr. 0.81 Class IC Flammable Liquid			
tert-Butyl alcohol <chem>(CH3)3COH</chem> 75-65-0 EO1925000	2-Methyl-2-propanol, Trimethyl carbinol	NIOSH 100 ppm (300 mg/m ³) ST 150 ppm (450 mg/m ³) OSHA† 100 ppm (300 mg/m ³)	1600 ppm	Colorless solid or liquid (above 78°F) with a camphor-like odor. [Note: Often used in aqueous solutions.]	MW 74.1 BP: 180°F Sol: Miscible Fl.P: 52°F IP: 9.70 eV	VP(77°F): 42 mm FRZ: 78°F UEL: 8.0% LEL: 2.4%	Strong mineral acids, strong hydrochloric acid, oxidizers	Char, 2-Butanol/ CS, GC/FID, III [#1400, Alcohols I]
1120 26	1 ppm = 3.08 mg/m ³				Sp Gr. 0.79 (Solid) Combustible Solid Class IB Flammable Liquid			
n-Butylamine <chem>CH3CH2CH2CH2NH2</chem> 109-73-9 EO2975000	1-Aminobutane, Butylamine	NIOSH/OSHA C 5 ppm (15 mg/m ³) [skin]	300 ppm	Colorless liquid with a fishy, ammonia-like odor.	MW 73.2 BP: 172°F Sol: Miscible Fl.P: 10°F IP: 8.71 eV	VP: 82 mm FRZ: -58°F UEL: 9.8% LEL: 1.7%	Strong oxidizers, strong acids [Note: May corrode some metals in presence of water.]	Si gel*, Methanol, GC/FID, III [#S138]
1125 68	1 ppm = 3.04 mg/m ³				Sp Gr. 0.74 Class IB Flammable Liquid			
tert-Butyl chromate <chem>[(CH3)3CO]2CrO2</chem> 1189-85-1 GB2900000	di-tert-Butyl ester of chromic acid	NIOSH Ca 0.001 mg Cr(VI)/m ³ See Appendix A See Appendix C OSHA C 0.1 mg CrO ₃ /m ³ [skin] See Appendix C	Ca [15 mg/m ³ as Cr(VI)]	Liquid [Note: Solidifies at 32-23°F.]	MW 230.3 BP: ? Sol: ? Fl.P: ? IP: ?	VP: ? FRZ: 32-23°F UEL: ? LEL: ?	Reducing agents, moisture, acids, alcohols, hydrazine, combustible materials	Filter; NaOH/Na ₂ CO ₃ ; IC; III [#7604, Hexavalent Chromium]
	1 ppm = 9.57 mg/m ³				Sp Gr. ?			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH 1000 ppm: CCROV*/SA* 2000 ppm: SA:CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, nose, throat; narco	Eye	Irrigated Water flush prompt Resp. support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Ing		Skin		
Wash skin:	When contam		Con		Breath		
Remove:	When wet (flamm)				Swallow		
Change:	N.R.						
[sec-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA 1600 ppm: SA:CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, nose, throat; drow, narco	Eye	Irrigated Water flush prompt Resp. support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Ing		Skin		
Wash skin:	When contam		Con		Breath		
Remove:	When wet (flamm)				Swallow		
Change:	N.R.						
[tert-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA 50 ppm: CCRS*/SA* 125 ppm: SA:CF*/PAPRS* 250 ppm: CCRFS/GMFS/PAPRTS*/ SCBAF/SAF 300 ppm: SAF:PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFS/SCBAE	Inh	Irrit eyes, skin, nose, throat, head, skin flush, burns	Eye	Irrigated Water flush immed Resp. support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs		Skin		
Wash skin:	When contam		Ing		Breath		
Remove:	When wet (flamm)		Con		Swallow		
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Butylamine]							
Skin:	Prevent skin contact	NIOSH § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, resp sys; eye, skin burns; drow, musc weak; skin ulcers; lung changes; [carc]	Eye	Irrigated Soap wash immed Resp. support Medical attention immed	Eyes, skin, resp sys, CNS [lung cancer]
Eyes:	Prevent eye contact		Abs		Skin		
Wash skin:	When contam/Daily		Ing		Breath		
Remove:	When wet or contam		Con		Swallow		
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[tert-Butyl chromate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
n-Butyl glycidyl ether $C_8H_{16}O_3$ 2426-08-6 TX4200000	BGE, 1,2-Epoxy-3-butoxypropane	NIOSH C 5.6 ppm (30 mg/m ³) [15-min] OSHA† 50 ppm (270 mg/m ³)	250 ppm	Colorless liquid with an irritating odor	MW: 130.2 BP: 327°F Sol: 2% Fl.P: 130°F IP: ?	VP: (77°F) 3 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics	Char, CS, GC/FID, III [#S81]
	1 ppm = 5.41 mg/m ³				Sp Gr: 0.91 Class II Combustible Liquid			
n-Butyl lactate $CH_3CH(OH)COOC_4H_9$ 138-22-7 OD4025000	Butyl ester of 2-hydroxy- propanoic acid, Butyl ester of lactic acid, Butyl lactate	NIOSH 5 ppm (25 mg/m ³) OSHA† none	N.D.	Clear, colorless to white liquid with a mild, transient odor.	MW: 146.2 BP: 370°F Sol: Slight Fl.P: 160°F IP: ?	VP: 0.4 mm FRZ: -45°F UEL: ? LEL: 1.15%	Strong acids & bases, strong oxidizers, heat, sparks, open flames	None available
1993 27 (combustible liquid, n.o.s.)	1 ppm = 6.08 mg/m ³				Sp.Gr: 0.98 Class IIIA Combustible Liquid			
n-Butyl mercaptan $CH_3CH_2CH_2CH_2SH$ 109-79-5 EK6300000	Butanethiol, 1-Butanethiol, n-Butanethiol, 1-Mercaptobutane	NIOSH C 0.5 ppm (1.8 mg/m ³) [15-min] OSHA† 10 ppm (35 mg/m ³)	500 ppm	Colorless liquid with a strong, garlic-, cabbage-, or skunk-like odor.	MW: 90.2 BP: 209°F Sol: 0.06% Fl.P: 35°F IP: 9.15 eV	VP: 35 mm FRZ: -176°F UEL: ? LEL: ?	Strong oxidizers (such as dry bleaches), acids	Filter*: HCV/DCE; FPD; III [#2542]
2347 27	1 ppm = 3.75 mg/m ³				Sp Gr: 0.83 Class IB Flammable Liquid			
o-sec-Butylphenol $CH_3CH_2CH(CH_3)C_6H_4OH$ 89-72-5 SJ8920000	2-sec-Butylphenol, 2-(1-Methylpropyl)phenol	NIOSH 5 ppm (30 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 61°F).	MW: 150.2 BP: 227°F Sol: Insoluble Fl.P: 225°F IP: ?	VP: Low FRZ: 61°F UEL: ? LEL: ?	None reported	None available
2228 55 (liquid) 2229 53 (solid)	1 ppm = 6.24 mg/m ³				Sp.Gr: 0.89 Class IIB Combustible Liquid Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, nose,	Eye:	Eyes, skin, resp
Eyes:	Prevent eye contact	56 ppm: CCROV*/SA*	Ing	sens, narco, possible	Skin:	sys, CNS, blood
Wash skin:	When contam	140 ppm: SA CF*/PAPROV*	Con	hemato effects; CNS	Breath:	
Remove:	When wet or contam	250 ppm: CCRFOV/GMFOV/PAPRTOV*/		depres	Swallow:	
Change:	N.R.	SCBAF/SAF				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOV/SCBAE				
[n-Butyl glycidyl ether]						
Skin:	Prevent skin contact	TBAL	Inh	Irritate eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	throat; drow, head, CNS	Skin:	CNS
Wash skin:	When contam		Con	depres; nau, vomit	Breath:	
Remove:	When wet or contam				Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[n-Butyl lactate]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin; musc	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Ing	weak, mal, sweat, nau,	Skin:	CNS, liver, kidneys
Wash skin:	When contam	12.5 ppm: SA CF/PAPROV	Con	vomit, head, conf;	Breath:	
Remove:	When wet (flamm)	25 ppm: CCRFOV/GMFOV/PAPRTOV/		in animals: narco, inco,	Swallow:	
Change:	N.R.	SCBAF/SAF		weak, cyan, pulm irrit,		
		500 ppm: SA PD, PP*		liver, kidney damage		
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOV/SCBAE				
[n-Butyl mercaptan]						
Skin:	Prevent skin contact	TBAL	Inh	Irritate eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	skin burns	Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[o-sec-Butylphenol]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
p-tert-Butyltoluene (CH ₃) ₂ CC ₆ H ₄ CH ₃ 98-51-1 XS8400000	4-tert-Butyltoluene, 1-Methyl-4-tert-butylbenzene	NIOSH 10 ppm (60 mg/m ³) ST 20 ppm (120 mg/m ³) OSHA† 10 ppm (60 mg/m ³)	100 ppm	Colorless liquid with a distinct aromatic odor, somewhat like gasoline.	MW 148.3 BP 379°F Sol Insoluble Fl P 155°F IP 828 eV	VP(77°F) 0.7 mm FRZ -52°F UEL ? LEL ?	Oxidizers	Char, CS, GC/FID, III #1501 Aromatic Hydro- carbons]
2667 27	1 ppm = 6.16 mg/m ³				Sp Gr: 0.86 Class IIIA Combustible Liquid			
n-Butyronitrile CH ₃ CH ₂ CH ₂ CN 109-74-0 ET8750000	Butanenitrile, Butyronitrile, 1-Cyanopropane, Propyl cyanide, n-Propyl cyanide	NIOSH 8 ppm (22 mg/m ³) OSHA none	N.D.	Colorless liquid with a sharp, suffocating odor. [Note: Forms cyanide in the body.]	MW: 69.1 BP: 244°F Sol(77°F): 3% Fl, P: 62°F IP: 11.67 eV	VP: 14 mm FRZ: -170°F UEL: 7 LEL: 1.65%	Strong oxidizers & reducing agents, strong acids & bases	Char; Benzene; GC/FID; III [Adapt #1606]
2411 28	1 ppm = 2.87 mg/m ³				Sp, Gr: 0.81 Class IB Flammable Liquid			
Cadmium dust (as Cd) Cd (Metal) 7440-43-9 (Metal) EUSJ00000 (Metal)	Cadmium metal, Cadmium Other synonyms vary depending upon the specific cadmium compound	NIOSH* Ca See Appendix A OSHA* [1910.1027] 0.005 mg/m ³ [*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]	Ca [9 mg/m ³ (as Cd)]	Metal, Silver-white, blue-tinged, lustrous, odorless solid.	MW 112.4 BP 1409°F Sol Insoluble Fl P NA IP NA	VP 0 mm (approx) MLT 610°F UEL NA LEL NA	Strong oxidizers; elemental sulfur, selenium & tellurium	Filter, Acid, AAS, III [#7048]
2570 53 (compound)					Sp Gr: 8.65 (Metal) Metal, Noncombustible Solid in bulk form, but will burn in powder form			
Cadmium fume (as Cd) CdO/Cd 1306-19-0 (CdO) EV1930000 (CdO)	CdO: Cadmium monoxide, Cadmium oxide fume Cd: Cadmium	NIOSH* Ca See Appendix A OSHA* [1910.1027] 0.005 mg/m ³ [*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]	Ca [9 mg/m ³ (as Cd)]	Odorless, yellow- brown, finely divided partic- ulate dispersed in air.	MW 128.4 BP Decomposes Sol Insoluble Fl P NA IP NA	VP 0 mm (approx) MLT 2599°F UEL NA LEL NA	Not applicable	Filter, Acid, AAS, III [#7048]
					Sp Gr: 8.15 (crystalline form)/6.95 (amorphous form) Noncombustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, dry nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	100 ppm: SA:CF/PAPROV/CCRFOV/	ing	throat, head, low BP,	Skin:	CVS, CNS, bone
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	tacar, abnor CVS stress;	Breath:	marrow, liver,
Remove:	When wet or contam	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA		CNS; hemato depres;	Swallow:	kidneys
Change:	N.R.	Escape: GMFOV/SCBAE		metallic taste; liver, kidney inj		
[p-tert-Butyltoluene]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	80 ppm: CCROV/SA	Abs	sys; head, dizz, weak,	Skin:	CNS, CVS
Wash skin:	When contam	200 ppm: SA:CF/PAPROV	ing	gidd, conf, convuls;	Breath:	
Remove:	When wet (flamm)	400 ppm: CCRFOV/GMFOV/PAPRTOV/	Con	dysp; abdom pain, nau,	Swallow:	
Change:	N.R.	SCBAF/SAF		vomit		
Provide:	Quick drench	1000 ppm: SAF:PD,PP				
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[n-Butyronitrile]						
Skin:	N.R.	NIOSH	Inh	Pulm edema, dysp,	Eye:	Resp sys,
Eyes:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	ing	cough, chest tight, subs	Skin:	kidneys,
Wash skin:	Daily	Escape: HIEF/SCBAE		pain, head, chills, musc	Breath:	prostate, blood
Remove:	N.R.			aches, nau, vomit, diarr,	Swallow:	[prostatic &
Change:	Daily			anos, emphy, prot, mild		lung cancer]
				anemia, [canc]		
[Cadmium dust (as Cd)]						
Skin:	N.R.	NIOSH	Inh	Pulm edema, dysp,	Breath:	Resp sys,
Eyes:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA		cough, tight chest, subs		kidneys, blood
Wash skin:	Daily	Escape: HIEF/SCBAE		pain, head, chills, musc		[prostatic &
Remove:	N.R.			aches, nau, vomit, diarr,		lung cancer]
Change:	Daily			emphy, prot, anos, mild		
				anemia, [canc]		
[Cadmium fume (as Cd)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Calcium arsenate (as As) $\text{Ca}_3(\text{AsO}_4)_2$ 7778-44-1 CG0830000 1573 53	Calcium salt (2/3) of arsenic acid. Cucumbr dust. Tricalcium arsenate. Tricalcium ortho-arsenate [Note: Also see specific listing for Arsenic (inorganic compounds, as As).]	NIOSH Ca C 0.002 mg/m ³ [15-min] See Appendix A OSHA [1910.1018] 0.010 mg/m ³	Ca [5 mg/m ³ (as As)]	Colorless to white, odorless solid [insecticide/ herbicide]	MW: 398.1 BP: Decomposes Sol: (77°F) 0.01% Fl.P: NA IP: NA Sp Gr: 3.62 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported [Note: Produces toxic fumes of arsenic when heated to decomposition.]	Filter, Acid, AAS; III [#7900, Arsenic]
Calcium carbonate CaCO_3 1317-65-3 EV9580000	Calcium salt of carbonic acid [Note: Occurs in nature as limestone, chalk, marble, dolomite, aragonite, calcite & oyster shells.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White, odorless powder or colorless crystals.	MW: 100.1 BP: Decomposes Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 2.7-2.95 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517- 2442°F (Decomposes) UEL: NA LEL: NA	Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium	Filter; Acid; AAS; III [#7020, Calcium]
Calcium cyanamide CaCN_2 156-62-7 GS6000000 1403 40 (with >0.1% calcium carbide)	Calcium carbimide, Cyanamide, Limenitrogen, Nitrogen lime [Note: Cyanamide is also a synonym for Hydrogen cyanamide, NH_2CN .]	NIOSH 0.5 mg/m ³ OSHA† none	N.D.	Colorless, gray, or black crystals or powder. [fertilizer] [Note: Commercial grades may contain calcium carbide.]	MW: 80.1 BP: Sublimes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.29 Noncombustible Solid, but a fire risk if it contains calcium carbide.	VP: 0 mm (approx) MLT: 2444°F UEL: NA LEL: NA	Water [Note: May polymerize in water or alkaline solutions to dicyanamide. Decomposes in water to form acetylene & ammonia.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Calcium hydroxide $\text{Ca}(\text{OH})_2$ 1305-62-0 EW2800000	Calcium hydrate, Caustic lime, Hydrated lime, Slaked lime	NIOSH 5 mg/m ³ OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White, odorless powder. [Note: Readily absorbs CO_2 from the air to form calcium carbonate.]	MW: 74.1 BP: Decomposes Sol: (32°F): 0.2% Fl.P: NA IP: NA Sp.Gr: 2.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 1076°F (Decomposes) (Loses H_2O) UEL: NA LEL: NA	Maleic anhydride, phosphorus, nitroethane, nitromethane, nitroparaffins, nitropropane [Note: Attacks some metals.]	Filter; Acid; AAS; III [#7020, Calcium]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH * SCBAF PD, PP/SAF PD, PP, ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Weak; GI dist, peri neur, skin hyperpig, palmar planter hyperkeratoses, derm. [carc]. in animals: liver damage	Eye Skin Breath Swallow Irrimmed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, liver, skin, CNS, lymphatic sys [lymphatic & lung cancer]
[Calcium arsenate (as As)]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irrite eyes, skin, resp sys; cough	Eye: Skin: Breath: Irrimmed Soap wash Fresh air	Eyes, skin, resp sys
[Calcium carbonate]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Ing Con	Irrite eyes, skin, resp sys; head, vert, rapid breath, low BP, nau, vomit; skin burns, sens; cough; Antabuse-like effects	Eye: Skin: Breath: Swallow: Irrimmed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys; vasomotor sys
[Calcium cyanamide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Ing Con	Irrite eyes, skin, upper resp sys; eye, skin burns; skin vesic; cough, bron, pneu	Eye: Skin: Breath: Swallow: Irrimmed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Calcium hydroxide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Calcium oxide CaO 1305-78-8 EW3100000	Burnt lime. Burnt lime. Lime. Pebble lime. Quick lime. Unslaked lime	NIOSH 2 mg/m ³ OSHA 5 mg/m ³	25 mg/m ³	White or gray, odorless lumps or granular powder.	MW 56.1 BP 5162°F Sol Reacts Fl.P. NA IP NA	VP 0 mm (approx) MLT 4662°F UEL: NA LEL: NA	Water (liberates heat), fluorine, ethanol [Note: Reacts with water to form calcium hydroxide.]	Filter, Acid, AAS, III [#7020, Calcium]
1910 60					Sp.Gr: 3.34 Noncombustible Solid, but will support combustion by liberation of oxygen			
Calcium silicate CaSiO ₃ 1344-95-2 VV9150000	Calcium hydrosilicate, Calcium metasilicate, Calcium monosilicate, Calcium salt of silicic acid, Wollastonite (mineral)	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White or cream- colored, free- flowing powder. [Note: The com- mercial product is prepared from diatomaceous earth & lime.]	MW: 116.2 BP: ? Sol: 0.01% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 2804°F UEL: NA LEL: NA	None reported [Note: After prolonged contact with water, solution reverts to soluble calcium salts & amorphous silica.]	Filter; Acid; AAS; III [#7020, Calcium]
					Sp.Gr: 2.9 Noncombustible Solid			
Calcium sulfate CaSO ₄ 7778-18-9 WS6920000	Anhydrous calcium sulfate, Anhydrous gypsum, Anhydrous sulfate of lime, Calcium salt of sulfuric acid [Note: Gypsum is the dihydrate form & Plaster of Paris is the hemihydrate form.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, white powder or colorless, crystalline solid. [Note: May have blue, gray, or reddish tinge.]	MW: 136.1 BP: Decomposes Sol: 0.3% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 2340°F (Decomposes) UEL: NA LEL: NA	Diazomethane, aluminum phosphorus, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum & Plaster of Paris.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
					Sp.Gr: 2.96 Noncombustible Solid			
Camphor (synthetic) C ₁₀ H ₁₆ O 76-22-2 EX1225000	2-Camphonone, Gum camphor, Laurel camphor, Synthetic camphor	NIOSH/OSHA 2 mg/m ³	200 mg/m ³	Colorless or white crystals with a penetrating, aromatic odor.	MW 152.3 BP: 399°F Sol: Insoluble Fl.P 150°F IP: 8.76 eV	VP: 0.2 mm MLT 345°F UEL: 3.5% LEL: 0.6%	Strong oxidizers (especially chromic anhydride & potassium permanganate);	Char; Methanol/ CS; GC/FID, III [#1301, Ketones III]
2717 32					Sp.Gr: 0.99 Combustible Solid			

[illegible]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Caprolactam $C_6H_{11}NO$ 105-60-2 CM3675000	Aminocaproic lactam, epsilon-Caprolactam, Hexahydro-2H-azepin-2-one, 2-Oxohexamethyleneimine 1 ppm = 4.70 mg/m ³	NIOSH Dust: 1 mg/m ³ ST 3 mg/m ³ Vapor: 0.22 ppm (1 mg/m ³) ST 0.66 ppm (3 mg/m ³) OSHA† none	N.D.	White, crystalline solid or flakes with an unpleasant odor. [Note: Significant vapor concentra- tions would be expected only at elevated temperatures.]	MW: 113.2 BP: 515°F Sol: 53% Fl.P: 282°F IP: ? Sp.Gr: 1.01 Combustible Solid	VP: 0.00000008 mm MLT: 156°F UEL: 8.0% LEL: 1.4%	Strong oxidizers, (acetic acid + dinitrogen trioxide)	None available
Captan $C_{10}H_8Cl_4NO_2S$ 2425-06-1 GS4900000	Captan®; Difolatan®; N-((1,1,2,2-Tetrachloro- ethyl)thio)-4-cyclohexene- 1,2-dicarboximide	NIOSH Ca 0.1 mg/m ³ [skin] See Appendix A OSHA† none	Ca [N.D.]	White, crystalline solid with a slight, characteristic pungent odor. [fungicide] [Note: Available commercially as a wetable powder or in liquid form.]	MW: 349.1 BP: Decomposes Sol: 0.0001% Fl.P: NA IP: NA Sp.Gr: ? Noncombustible Solid, but may be dissolved in flammable liquids.	VP: 0.000008 mm MLT: 321°F (Decomposes) UEL: NA LEL: NA	Acids, acid vapors, strong oxidizers	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Captan $C_{10}H_8Cl_4NO_2S$ 133-06-2 GW5075000 9188 31	Captane; N-Trichloromethylmercapto- 4-cyclohexene-1,2- dicarboximide	NIOSH Ca 5 mg/m ³ See Appendix A OSHA† none	Ca [N.D.]	Odorless, white, crystalline powder. [fungicide] [Note: Commercial product is a yellow powder with a pungent odor.]	MW: 300.6 BP: Decomposes Sol(77°F): 0.0003% Fl.P: ? IP: NA Sp.Gr: 1.74 Combustible Solid; may be dissolved in flammable liquids.	VP: 0 mm (approx) MLT: 352°F (Decomposes) UEL: ? LEL: ?	Strong alkaline materials (e.g., hydrated lime) [Note: Corrosive to metals.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Carbaryl $CH_3NHCOOC_{10}H_7$ 63-25-2 FC5950000 2757 55	α-Naphthyl N-methyl- carbamate, 1-Naphthyl N-Methyl- carbamate, Sevin®	NIOSH/OSHA 5 mg/m ³	100 mg/m ³	White or gray, odorless solid. [pesticide]	MW: 201.2 BP: Decomposes Sol: 0.01% Fl.P: NA IP: ? Sp.Gr: 1.23 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(77°F): <0.00004 mm MLT: 293°F UEL: NA LEL: NA	Strong oxidizers, strongly alkaline pesticides	Filter; Reagent; Vis; III [#5006]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; epis; derm, skin sens; asthma; irrity, conf, dizz, head; abdom cramps, diarr, nau, vomit; liver, kidney inj	Eye: Skin: Breath: Swallow:	Irrimed Water wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, liver, kidneys
[Caprolactam]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH V: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; derm, skin sens; con; bron, wheez; diarr, vomit; liver, kidney inj, high BP; in animals: terato effects; [carc]	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, CVS [in animals: tumors at many sites]
[Captafol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent skin contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH V: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; blurred vision; derm, skin sens; dysp; diarr, vomit; [carc]	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, GI tract, liver, kidneys [in animals: duodenal tumors]
[Captan]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 50 mg/m ³ : SA* 100 mg/m ³ : SA:CF*/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVH/E/SCBAE	Inh Abs Ing Con	Miosis, blurred vision, tear, rhin, saliv, sweat, abdom cramps, nau, vomit, diarr, tremor, cyan, convuls, irrit skin possible repro effects	Eye Skin Breath Swallow	Irrimed Soap wash prompt Resp support Medical attention immed	Resp sys, CNS, CVS, skin, blood chol, repro sys
[Carbaryl]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Carbofuran $C_{12}H_{16}NO_3$ 1563-66-2 FB9450000	2,3-Dihydro-2,2-dimethyl-7- benzofuranyl methyl- carbamate; Furacarb®; Furadan®	NIOSH 0.1 mg/m³ OSHA† none	N.D.	Odorless, white or grayish, crystalline solid. [insecticide] [Note: May be dissolved in a liquid carrier.]	MW: 221.3 BP: ? Sol(77°F): 0.07% Fl.P: NA IP: NA	VP(77°F): 0.000003 mm MLT: 304°F UEL: NA LEL: NA	Alkaline substances, acid, strong oxidizers (e.g., perchlorates, peroxides, chlorates, nitrates, permanganates)	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
2757 55					Sp.Gr: 1.18 Noncombustible Solid			
Carbon black C 1333-86-4 FF5800000	Acetylene black, Channel black, Furnace black, Lamp black, Thermal black	NIOSH/OSHA 3.5 mg/m³ NIOSH Ca 0.1 mg PAHs/m³ [Carbon black in presence of polycyclic aromatic hydrocarbons (PAHs)] See Appendix A	1750 mg/m³	Black, odorless solid	MW 12.0 BP: Sublimes Sol Insoluble Fl.P. NA IP: NA	VP: 0 mm (approx) MLT: Sublimes UEL: NA LEL: NA	Strong oxidizers such as chlorates, bromates & nitrates	Filter; none; Grav; III [#5000]
					Sp Gr: 1.8-2.1 Combustible Solid that may contain flammable hydrocarbons			
Carbon dioxide CO_2 124-38-9 FF6400000	Carbonic acid gas, Dry ice [Note: Normal constituent of air (about 300 ppm).]	NIOSH 5000 ppm (9000 mg/m³) ST 30,000 ppm (54,000 mg/m³) OSHA† 5000 ppm (9000 mg/m³)	40,000 ppm	Colorless, odorless gas. [Note: Shipped as liquefied compressed gas. Solid form is utilized as dry ice.]	MW 44.0 BP: Sublimes Sol(77°F) 0.2% Fl.P: NA IP: 13.77 eV	VP 56.5 atm MLT: -109°F (Sublimes) UEL: NA LEL: NA	Dusts of various metals, such as magnesium, zirconium, titanium, aluminum, chromium & manga- nese are ignitable and explosive when suspended in carbon dioxide. Forms carbonic acid in water.	Bag; none; GC/TCD; III [#S249]
1013 21 1845 21 (dry ice) 2187 21 (liquid)	1 ppm = 1.83 mg/m³				RGasD: 1.53 Nonflammable Gas			
Carbon disulfide CS_2 75-15-0 FF6650000	Carbon bisulfide	NIOSH 1 ppm (3 mg/m³) ST 10 ppm (30 mg/m³) [skin] OSHA† 20 ppm C 30 ppm 100 ppm (30-min max peak)	500 ppm	Colorless to faint-yellow liquid with a sweet ether-like odor. [Note: Reagent grades are foul smelling.]	MW 76.1 BP: 116°F Sol: 0.3% Fl.P: -22°F IP: 10 08 eV	VP: 297 mm FRZ: -169°F UEL: 50.0% LEL: 1.3%	Strong oxidizers; chemically-active metals such as sodium, potassium & zinc; azides, rust, halogens; amines [Note: Vapors may be ignited by contact with ordinary light bulb.]	Char/ Dry tube; Toluene; GC/FPD; III [#1600]
1131 28	1 ppm = 3.16 mg/m³				Sp Gr: 1.26 Class IB Flammable Liquid			

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Carbon monoxide CO 630-08-0 FG3500000 1016 18 9202 67 (cryogenic liquid)	Carbon oxide, Flue gas, Monoxide 1 ppm = 1.16 mg/m ³	NIOSH/OSHA* 35 ppm (40 mg/m ³) C 200 ppm (229 mg/m ³) OSHA† 50 ppm (55 mg/m ³)	1200 ppm	Colorless, odorless gas [Note: Shipped as a nonliquefied or liquefied compressed gas.]	MW: 28.0 BP: -313°F Sol: 2% F.P.: NA (Gas) IP: 14.01 eV RGasD: 0.97 Flammable Gas	VP: >35 atm MLT: -337°F UEL: 74% LEL: 12.5%	Strong oxidizers, bromine trifluoride, chlorine trifluoride, lithium	Bag none ECA III [#S340]
Carbon tetrabromide CBr ₄ 558-13-4 FG4725000 2516 53	Carbon bromide, Methane tetrabromide, Tetrabromomethane 1 ppm = 13.78 mg/m ³	NIOSH 0.1 ppm (14 mg/m ³) ST 0.3 ppm (4 mg/m ³) OSHA† none	N.D.	Colorless to yellow-brown crystals with a slight odor.	MW: 331.7 BP: 374°F Sol: 0.02% F.P.: NA IP: 10.31 eV Sp.Gr: 3.42 Noncombustible Solid	VP(205°F): 40 mm MLT: 194°F UEL: NA LEL: NA	Strong oxidizers, hexacyclohexyldiiodide, lithium	None available
Carbon tetrachloride CCl ₄ 56-23-5 FG4900000 1846 55	Carbon chloride, Carbon tet, Freon® 10, Halon® 104, Tetrachloromethane 1 ppm = 6.39 mg/m ³	NIOSH Ca ST 2 ppm (12.6 mg/m ³) [60-min] See Appendix A OSHA† 10 ppm C 25 ppm 200 ppm (5-min max peak in any 4 hrs)	Ca [200 ppm]	Colorless liquid with a character- istic ether-like odor	MW: 153.8 BP: 170°F Sol: 0.05% F.P.: NA IP: 11.47 eV Sp.Gr: 1.59 Noncombustible Liquid	VP: 91 mm FRZ: -9°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium & magnesium, fluorine, aluminum [Note: Forms highly toxic phosgene gas when exposed to flames or welding arcs.]	Char CS, GC/FID, III [#1003, Halogenated Hydrocarbons]
Carbonyl fluoride COF ₂ 353-50-4 FG6125000 2417 15	Carbon difluoride oxide, Carbon fluoride oxide, Carbon oxyfluoride, Carbonyl difluoride, Fluoroformyl fluoride, Fluorophosgene 1 ppm = 2.74 mg/m ³	NIOSH 2 ppm (5 mg/m ³) ST 5 ppm (15 mg/m ³) OSHA† none	N.D.	Colorless gas with a pungent and very irritating odor. [Note: Shipped as a liquefied compressed gas.]	MW: 66.0 BP: -118°F Sol: Reacts F.P.: NA IP: 13.02 eV RGasD: 2.29 Nonflammable Gas	VP: 55.4 atm FRZ: -173°F UEL: NA LEL: NA	Heat, moisture, hexafluoroisopropyl- ideneamino-lithium [Note: Reacts with water to form hydrogen fluoride & carbon dioxide.]	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				Target organs (See Table 5)
		Route	Symptoms (See Table 5)	First aid (See Table 6)		
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH 350 ppm: SA 875 ppm: SA CF 1200 ppm: GMFS/SCBAF/SAF S: SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Head, tachypnea, nau, weak, dizz, conf, halu cyan, depres S-T segment of electrocardiogram, angina, syncope	Eye: Skin: Breath	Frostbite Frostbite Resp support	CVS, lungs blood, CNS
[Carbon monoxide]						
Skin: N.R. Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily Provide: Eyewash	TBAL	Inh Ing Con	Irriteyes, skin, resp sys; lac; lung, liver, kidney inj; in animals: com damage	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Carbon tetrabromide]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH S: SCBAF PD, PP/SAF PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irriteyes, skin, CNS depres; nau, vomit, liver, kidney inj; drow, dizz, inco; [carc]	Eye Skin Breath Swallow	Irrimed Soap wash immed Resp support Medical attention immed	CNS, eyes, lungs, liver, kidneys, skin [in animals: liver cancer]
[Carbon tetrachloride]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite	TBAL	Inh Con	Irriteyes, skin, muc memb, resp sys; eye, skin burns; lac; cough, pulm edema, dysp; chronic exposure: GI pain, musc fib, skeletal fluorosis; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys, bone
[Carbonyl fluoride]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.L.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Catechol $C_6H_4(OH)_2$ 120-80-9 UX1050000	1,2-Benzenediol; o-Benzenediol; 1,2-Dihydroxybenzene; o-Dihydroxybenzene; 2-Hydroxyphenol; Pyrocatechol	NIOSH 5 ppm (20 mg/m ³) [skin] OSHA† none	N.D.	Colorless, crystalline solid with a faint odor. [Note: Discolors to brown in air & light.]	MW: 110.1 BP: 474°F Sol: 44% F.L.P.: 261°F IP: ?	VP(244°F): 10 mm MLT: 221°F UEL: ? LEL: 1.4%	Strong oxidizers, nitric acid	None available
	1 ppm = 4.58 mg/m ³				Sp.Gr: 1.34 Combustible Solid			
Cellulose ($C_6H_{10}O_5$) _n 9004-34-6 FJ5691460	Hydroxycellulose, Pyrocellulose	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, white substance. [Note: The principal fiber cell wall material of vegetable tissues (wood, cotton, flax, grass, etc.).]	MW: 160,000- 560,000 BP: Decomposes Sol: Insoluble F.L.P.: NA IP: NA	VP: 0 mm (approx) MLT: 500-518°F (Decomposes) UEL: NA LEL: NA	Water, bromine pentafluoride, sodium nitrate, fluorine, strong oxidizers	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
					Sp.Gr: 1.27-1.61 Combustible Solid			
Cesium hydroxide CsOH 21351-79-1 FK9800000	Cesium hydrate, Cesium hydroxide dimer	NIOSH 2 mg/m ³ OSHA† none	N.D.	Colorless or yellowish, crystalline solid. [Note: Hygroscopic (i.e., absorbs moisture from the air.)]	MW: 149.9 BP: ? Sol(59°F): 395% F.L.P.: NA IP: NA	VP: 0 mm (approx) MLT: 522°F UEL: NA LEL: NA	Water, acids, CO, metals (e.g., Al, Pb, Sn, Zn), oxygen [Note: CsOH is a strong base, causing the generation of considerable heat in contact with water or moisture.]	None available
					Sp.Gr: 3.68 Noncombustible Solid			
Chlordane $C_{10}H_6Cl_8$ 57-74-9 PB9800000	Chlordan; Chlordano; 1,2,4,5,6,7,8,8- Octachloro-3a,4,7,7a- tetrahydro-4,7- methanonane	NIOSH Ca 0.5 mg/m ³ [skin] See Appendix A OSHA 0.5 mg/m ³ [skin]	Ca [100 mg/m ³]	Amber-colored viscous liquid with a pungent, chlorine-like odor. [insecticide]	MW 409.8 BP Decomposes Sol: 0.0001% F.L.P. NA IP ?	VP 0.00001 mm FRZ 217-228°F UEL NA LEL NA	Strong oxidizers, alkaline reagents	Filter/ Chrom-102, Toluene, GC/ECD, III [#5510]
	1 ppm = 17.04 mg/m ³				Sp.Gr(77°F): 1.6 Noncombustible Liquid, but may be utilized in flammable solutions			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrite eyes, skin, resp sys; skin sens, derm; lac, burns eyes; convuls, incr BP, kidney inj]	Eye:	Irrigated	Eyes, skin, resp sys, CNS, kidneys
Eyes:	Prevent eye contact		Abs		Skin:	Water wash	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eye wash						
[Catechol]							
Skin:	N.R.	TBAL	Inh	Irrite eyes, skin, muc memb	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.		Con		Skin:	Soap wash	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Cellulose]							
Skin:	Prevent skin contact	TBAL	Inh	Irrite eyes, skin, upper resp tract; eye, skin burns	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing		Skin:	Water flush	
Wash skin:	When contam		Con		Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash, Quick drench						
[Cesium hydroxide]							
Skin:	Prevent skin contact	NIOSH * SCBAF PD, PP/SAF PD, PP ASC5A Escape GMFOVH/E/SCBAE	Inh	Blurred vision, conf, ataxia, delirium, cough, abdom pain, nau, vomit, diarr, irrit, tremor, convuls, anura, in animals lung, liver, kidney damage. [carc]	Eye	Irrigated	CNS, eyes, lungs, liver, kidneys [in animals liver cancer]
Eyes:	Prevent eye contact		Abs		Skin	Soap wash	
Wash skin:	When contam		Ing		Breath	Resp support	
Remove:	When wet or contam		Con		Swallow	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash, Quick drench						
[Chlordane]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chlorinated camphene $C_{10}H_{10}Cl_4$ 8001-35-2 XW5250000	Chlorocamphene, Octachlorocamphene, Polychlorocamphene, Toxaphene	NIOSH Ca [skin] See Appendix A OSHA† 0.5 mg/m³ [skin]	Ca [200 mg/m³]	Amber, waxy solid with a mild, piney, chlorine- and camphor-like odor [insecticide]	MW 413.8 BP Decomposes Sol. 0.0003% Fl.P.: NA IP ?	VP(77°F) 0.4 mm MLT 149-194°F UEL: NA LEL: NA	Strong oxidizers [Note: Slightly corrosive to metals under moist conditions.]	Filter; Petroleum ether; GC/ECD, III [#S67]
2761 55					Sp Gr. 1.65 Noncombustible Solid, but may be dissolved in flammable liquids.			
Chlorinated diphenyl oxide $C_{12}H_{10}Cl_2O$	Synonyms depend on the degree of chlorination of diphenyl oxide [(C ₆ H ₅) ₂ O], ranging from monochlorodi- phenyl oxide [(C ₆ H ₄ Cl)(C ₆ H ₅)] to decachlorodiphenyl oxide [(C ₆ Cl ₄) ₂ O(C ₆ Cl ₄) ₂].	NIOSH/OSHA 0.5 mg/m³	5 mg/m³	Appearance and odor vary depending upon the specific compound.	Properties vary depending upon the specific compound.		Strong oxidizers	Filter; Isocane; GC/ECD, III [#S025, Chlori- nated diphenyl ether]
	1 ppm = 8.5-21.4 mg/m³							
Chlorine Cl_2 7782-50-5 FO2100000	Molecular chlorine	NIOSH C 0.5 ppm (1.45 mg/m³) [15-min] OSHA† C 1 ppm (3 mg/m³)	10 ppm	Greenish-yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]	MW 70.9 BP -29°F Sol. 0.7% Fl.P. NA IP 11.48 eV	VP 6.8 atm FRZ -150°F UEL NA LEL NA	Reacts explosively or forms explosive compounds with many common substances such as acetylene, ether, turpentine, ammonia, fuel gas, hydrogen & finely divided metals	Filter; Na ₂ S ₂ O ₅ ; IC, III [#6011]
1017 20	1 ppm = 2.95 mg/m³				RGasD: 2.47 Nonflammable Gas, but a strong oxidizer			
Chlorine dioxide ClO_2 10049-04-4 FO3000000	Chlorine oxide, Chlorine peroxide	NIOSH 0.1 ppm (0.3 mg/m³) ST 0.3 ppm (0.9 mg/m³) OSHA† 0.1 ppm (0.3 mg/m³)	5 ppm	Yellow to red gas or a red-brown liquid (below 52°F) with an unpleasant odor similar to chlorine and nitric acid	MW 67.5 BP 52°F Sol(77°F) 0.3% Fl.P. NA (Gas) ? (Liq) IP 10.36 eV RGasD: 2.33 Sp Gr. 1.6 (Liquid at 32°F) Flammable Gas/Combustible Liquid	VP >1 atm FRZ -74°F UEL ? LEL ?	Organic materials, heat, phosphorus, potassium hydroxide, sulfur, mercury, carbon monoxide [Note: Unstable in light. A powerful oxidizer.]	Bub; IC; IC; OSHA [#D202]
	1 ppm = 2.81 mg/m³							

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Nau, conf, agitation, tremor, convuls, uncon; dry, red skin, [carc]	Eye Skin Breath Swallow Irr, immed Soap wash prompt Resp support Medical attention immed	CNS, skin [in animals: liver cancer]	
[Chlorinated camphene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 5 mg/m ³ SA/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOVAGHIE/SCBAE	Inh Ing Con	Acne-form derm, liver damage	Eye Skin Breath Swallow Irr, immed Soap wash prompt Resp support Medical attention immed	Skin, liver	
[Chlorinated diphenyl oxide]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite	NIOSH 5 ppm: CCRS*/SA* 10 ppm: SA:CF*/PAPRS*/CCRFs/ GMFS/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFS/SCBAE	Inh Con	Burning of eyes, nose, mouth, lac, rhin, cough, choking, subst pain, nau, vomit, head, dizz, syncope, pulm edema, pneu, hypox, derm, liq, frostbite	Eye: Skin: Breath Frostbite Resp support	Eyes, skin, resp sys	
[Chlorine]						
Skin: Prevent skin contact (liq) Eyes: Prevent eye contact (liq) Wash skin: When contam (liq) Remove: When wet (flamm) Change: N.R. Provide: Eyewash (liq), Quick drench (liq)	NIOSH/OSHA 1 ppm: CCRS /SA 2.5 ppm: SA:CF*/PAPRS* 5 ppm: CCRFG /GMFS /SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFS /SCBAE	Inh Ing (liq) Con	Irrit eyes, nose, throat, cough, wheez, bron, pulm edema, chronic bron	Eye Skin Breath Swallow Irr, immed (liq) Soap wash immed (liq) Resp support Medical attention immed (liq)	Eyes, resp sys	
[Chlorine dioxide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chlorine trifluoride <chem>CF3</chem> 7790-91-2 F028C0000	Chlorine fluoride, Chlorotrifluoride	NIOSH/OSHA C 0.1 ppm (0.4 mg/m ³)	20 ppm	Colorless gas or a greenish-yellow liquid (below 53°F) with a somewhat sweet, suffocating odor. [Note: Shipped as a liquefied compressed gas.]	MW: 92.5 BP: 53°F Sol: R ⁺ acts Fl.P: NA IP: 13.00 eV RGasD: 3.21 Sp Gr: 1.77 (Liquid at 53°F) Nonflammable Gas Noncombustible Liquid, but contact with organic materials may result in SPONTANEOUS ignition	VP: 1.4 atm FRZ: -105°F UEL: NA LEL: NA	Oxidizers, water, acids, combustible materials, sand, glass, metals (corrosive) [Note: Reacts with water to form chlorine & hydro- fluoric acid.]	None available
1749 44	1 ppm = 3.85 mg/m ³							
Chloroacetaldehyde <chem>ClCH2CHO</chem> 107-20-0 A82450000	Chloroacetaldehyde (40% aqueous solution), 2-Chloroacetaldehyde, 2-Chloroethanal	NIOSH/OSHA C 1 ppm (3 mg/m ³)	45 ppm	Colorless liquid with an acid, penetrating odor. [Note: Typically found as a 40% aqueous solution.]	MW: 78.5 BP: 186°F Sol: Miscible Fl.P: 190°F (40% soln.) IP: 10.61 eV Sp Gr: 1.19 (40% solution) Class IIIA Combustible Liquid	VP: 100 mm FRZ: -3°F (40% soln.) UEL: ? LEL: ?	Oxidizers, acids	Si gel, Methanol, GC/ECD, III [#S11]
2232 55	1 ppm = 3.26 mg/m ³							
α -Chloroacetophenone <chem>C6H5COCH2Cl</chem> 532-27-4 AM6300000	2-Chloroacetophenone, Chloromethyl phenyl ketone, Mace®, Phenacyl chloride, Phenyl chloromethyl ketone, Tear gas	NIOSH/OSHA 0.3 mg/m ³ (0.05 ppm)	15 mg/m ³	Colorless to gray crystalline solid with a sharp, irritating odor	MW: 154.6 BP: 472°F Sol: Insoluble Fl.P: 244°F IP: 9.44 eV Sp Gr: 1.32 Combustible Solid	VP: 0.005 mm MLT: 134°F UEL: ? LEL: ?	Water, steam, strong oxidizers [Note: Slowly corrodes metals.]	Tenax GC (2), Thermal desorp., GC/FID, II(5) [P&CAM #291]
1697 55	1 ppm = 6.42 mg/m ³							
Chloroacetyl chloride <chem>ClCH2COCl</chem> 79-04-9 A06475000	Chloroacetic acid chloride, Chloroacetic chloride, Monochloroacetyl chloride	NIOSH 0.05 ppm (0.2 mg/m ³) OSHA† none	N.D.	Colorless to yellowish liquid with a strong, pungent odor.	MW: 112.9 BP: 223°F Sol: Decomposes Fl.P: NA IP: 10.30 eV Sp.Gr: 1.42 Noncombustible Liquid	VP: 19 mm FRZ: -7°F UEL: NA LEL: NA	Water, alcohols, bases, metals (corrosive), amines [Note: Decomposes in water to form chloroacetic acid & hydrogen chloride gas.]	None available
1752 59	1 ppm = 4.67 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Eye, skin burns (liq or high vap conc); resp irrit; in animals lac, corn ulcer, pulm edema	Eye	Irrimmed	Skin, eyes, resp sys
Eyes:	Prevent eye contact	2.5 ppm: SA, CF ¹	Ing		Skin	Water flush immed	
Wash skin:	When contam (liq)	5 ppm: SCBAF/SAF	Ing		Breath	Resp support	
Remove:	When wet or contam (liq)	20 ppm: SAF-PD, PP	Con		Swallow	Medical attention immed (liq)	
Change:	N.R.	§ SCBAF-PD, PP/SAF-PD, PP ASCBA					
Provide:	Eyewash (liq), Quick drench (liq)	Escape: GMFS/SCBAE					
[Chlorine trifluoride]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit skin, eyes, muc memb, skin burns, eye damage, pulm edema; skin, resp sys sens	Eye	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm: CCROV ¹ /SA ¹	Abs		Skin	Water flush immed	
Wash skin:	When contam	25 ppm: SA, CF ¹ /PAPROV ¹	Ing		Breath	ssupport	
Remove:	When wet or contam	45 ppm: CCRFOV/GMFOV/PAPRTOV ¹	Con		Swallow	Medical attention immed	
Change:	N.R.	SCBAF/SAF					
Provide:	Eyewash, Quick drench	§ SCBAF-PD, PP/SAF-PD, PP ASCBA Escape: GMFOV/SCBAE					
[Chloroacetaldehyde]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys; pulm edema	Eye	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	3 mg/m ³ : CCROVDM/SA	Ing		Skin	Soap wash immed	
Wash skin:	When contam	7.5 mg/m ³ : SA, CF ¹ /PAPROVDM ¹	Con		Breath	Resp support	
Remove:	When wet or contam	15 mg/m ³ : CCRFOV/HI/GMFSHIE/SCBAF/SAF			Swallow	Medical attention immed	
Change:	Daily	§ SCBAF-PD, PP/SAF-PD, PP ASCBA					
Provide:	Eyewash	Escape: GMFSHIE/SCBAE					
[α-Chloroacetophenone]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys; eye, skin burns; cough, wheez, dysp; lac	Eye:	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs		Skin:	Water flush immed	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Chloroacetyl chloride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chlorobenzene C_6H_5Cl 108-90-7 C20175000	Benzene chloride, Chlorobenzol, MCB, Monochlorobenzene, Phenyl chloride	NIOSH See Appendix D OSHA 75 ppm (350 mg/m ³)	1000 ppm	Colorless liquid with an almond- like odor.	MW 112.6 BP: 270°F Sol: 0.05% F.P.: 82°F IP: 9.07 eV	VP 9 mm FRZ -50°F UEL 9.6% LEL 1.3%	Strong oxidizers	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1134 27	1 ppm = 4.68 mg/m ³				Sp Gr: 1.11 Class IC Flammable Liquid			
o-Chlorobenzylidene malononitrile $ClC_6H_4CH=C(CN)_2$ 2698-41-1 003675000	2-Chlorobenzalmononitrile, CS, OCBM	NIOSH C 0.05 ppm (0.4 mg/m ³) [skin] OSHA† 0.15 ppm (0.4 mg/m ³)	2 mg/m ³	White crystalline solid with a pepper-like odor.	MW 188.6 bP: 590-599°F Sol: Insoluble F.P. ? IP: ?	VP: 0.00003 mm MLT: 203-205°F UEL ? LEL ? MEC: 25 g/m ³	Strong oxidizers	Filter/ Tenax GC, Reagent, HPLC/UV/D, II(5) [P&CAM #304]
	1 ppm = 7.84 mg/m ³				Sp Gr: ? Combustible Solid			
Chlorobromomethane CH_2BrCl 74-97-5 PA5250000	Bromochloromethane, CB, CBM, Fluorocarbon 1011, Halon® 1011, Methyl chlorobromide	NIOSH/OSHA 200 ppm (1050 mg/m ³)	2000 ppm	Colorless to pale- yellow liquid with a chloroform-like odor. [Note: May be used as a fire extinguishing agent.]	MW 129.4 BP: 155°F Sol: Insoluble F.P. NA IP: 10.77 eV	VP 115 mm FRZ -124°F UEL: NA LEL: NA	Chemically-active metals such as calcium, powdered aluminum, zinc & magnesium	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1887 58	1 ppm = 5.38 mg/m ³				Sp Gr: 1.93 Noncombustible Liquid			
Chlorodifluoromethane $CHClF_2$ 75-45-6 PA6390060	Difluorochloromethane, Fluorocarbon-22, Freon® 22, Genetron® 22, Monochlorodifluoromethane, Refrigerant 22	NIOSH 1000 ppm (3500 mg/m ³) ST 1250 ppm (4375 mg/m ³) OSHA† none	N.D.	Colorless gas with a faint, sweetish odor. [Note: Shipped as a liquefied compressed gas.]	MW: 86.5 BP: -41°F Sol(77°F): 0.3% F.P.: NA IP: 12.45 eV	VP: 9.4 atm FRZ: -231°F UEL: NA LEL: NA	Alkalis, alkaline earth metals (e.g., powdered aluminum, sodium, potassium, zinc)	None available
1018 12	1 ppm = 3.59 mg/m ³				RGasD: 3.11 Nonflammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Change: Remove:	Prevent skin contact Prevent eye contact When contam N.R. When wet (flamm)	OSHA 1000 ppm: SA:CF ¹ /PAPROV ¹ /CCRFOV/ GMFOV/SCBAF/SAF S: SCBAF/PD,PP/SAF PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, drow, inco, CNS depres; in animals: liver, lung, kidney inj	Eye Skin Breath Swallow	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys. CNS, liver
[Chlorobenzene]							
Skin: Eyes: Wash skin: Change: Remove:	Prevent skin contact Prevent eye contact When contam/Daily Daily When wet or contam	NIOSH/OSHA 2 mg/m ³ : SA:CF ¹ /GMFShIE/SCBAF/SAF S: SCBAF/PD,PP/SAF PD,PP,ASCBA Escape: GMFShIE/SCBAE	Inh Abs Ing Con	Pain, burn eyes, lac, conj, eryt eyelids, blepharospasm, irrit throat, cough, chest tight; head, eryt, vesic skin	Eye Skin Breath Swallow	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys
[o-Chlorobenzylidene malononitrile]							
Skin: Eyes: Wash skin: Change: Remove:	Prevent skin contact Prevent eye contact When contam N.R. When wet or contam	NIOSH/OSHA 2000 ppm: SA:CF ¹ /PAPROV ¹ /CCRFOV/ GMFOV/SCBAF/SAF S: SCBAF/PD,PP/SAF PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, throat, conf, dizz, CNS depres; pulm edema	Eye Skin Breath Swallow	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys. liver, kidneys, CNS
[Chlorobromomethane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	TBAL	Inh Con (liq)	Irrit resp sys; conf, drow, ringing in ears; heart palp, card arrhy; asphy; liver, kidney, spleen inj; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Resp sys, CVS, CNS liver, kidneys, spleen
[Chlorodifluoromethane]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Chlorodiphenyl (42% chlorine) $C_{12}H_8Cl_2$ (approx) 53469-21-9 TQ1356000	Aroclor® 1242, PCB, Polychlorinated biphenyl	NIOSH* Ca 0.001 mg/m ³ See Appendix A [Note: The NIOSH REL also applies to other PCBs.] OSHA 1 mg/m ³ [skin]	Ca [5 mg/m ³]	Colorless to light- colored, viscous liquid with a mild, hydrocarbon odor.	MW: 258 (approx) BP: 617-691°F Sol: Insoluble Fl.P: NA IP: ?	VP: 0.001 mm FRZ: -2°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Florisil, Hexane, GC/ECD, III [#5503, PCBs]
2315 31	1 ppm 10.72 mg/m ³ (approx)				Sp.Gr(77°F): 1.39 Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans & chlorinated dibenzo-p-dioxins.			
Chlorodiphenyl (54% chlorine) $C_{12}H_6Cl_4$ (approx) 11097-69-1 TQ1360000	Aroclor® 1254, PCB, Polychlorinated biphenyl	NIOSH* Ca See Appendix A 0.001 mg/m ³ [Note: The NIOSH REL also applies to other PCBs.] OSHA 0.5 mg/m ³ [skin]	Ca [5 mg/m ³]	Colorless to pale- yellow, viscous liquid or solid (below 50°F) with a mild, hydro- carbon odor.	MW: 326 (approx) BP: 689-734°F Sol: Insoluble Fl.P: NA IP: ?	VP: 0.00006 mm FRZ: 50°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Florisil, Hexane, GC/ECD, III [#5503, PCBs]
2315 31	1 ppm 13.55 mg/m ³ (approx)				Sp.Gr(77°F): 1.38 Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans & chlorinated dibenzo-p-dioxins.			
Chloroform $CHCl_3$ 67-66-3 FS9100000	Methane trichloride, Trichloromethane	NIOSH Ca See Appendix A ST 2 ppm (9.78 mg/m ³) [60-min] OSHA† C 50 ppm (240 mg/m ³)	Ca [500 ppm]	Colorless liquid with a pleasant odor.	MW: 119.4 BP: 143°F Sol(77°F): 0.5% Fl.P: NA IP: 11.42 eV	VP: 160 mm FRZ: -82°F UEL: NA LEL: NA	Strong caustics; chemically-active metals such as aluminum or mag- nesium powder, sodium & potassium; strong oxidizers [Note: When heated to decomposition, forms phosgene gas]	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1888 55	1 ppm = 4.96 mg/m ³				Sp.Gr: 1.48 Noncombustible Liquid			
bis-Chloromethyl ether $(CH_2Cl)_2O$ 542-88-1 KN1575000	BCME, bis-CME, Chloromethyl ether, Dichlorodimethyl ether, Dichloromethyl ether, Oxybis(chloromethane)	NIOSH Ca See Appendix A OSHA(1910.1008) See Appendix B	Ca [N.D.]	Colorless liquid with a suffocating odor.	MW: 115.0 BP: 223°F Sol: Reacts Fl.P: <66°F IP: ?	VP(72°F): 30 mm FRZ: -43°F UEL: ? LEL: ?	Acids, water [Note: Reacts with water to form hydrochloric acid & formaldehyde]	Imp. Reagent, GC/ECD, OSHA [#10]
2249 55	1 ppm = 4.78 mg/m ³				Sp.Gr: 1.32 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVH/E/SCBAE	Inh Abs Ing Con	Irrit eyes, chloracne; liver damage, repro effects; [carc]	Eye Skin Breath Swallow Irrimmed Soap wash immed Resp support Medical attention immed	Skin, eyes, liver, repro sys [in animals: tumors of the pituitary gland & liver, leukemia]
[Chlorodiphenyl (42% chlorine)]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVH/E/SCBAE	Inh Abs Ing Con	Irrit eyes, chloracne; liver damage, repro effects; [carc]	Eye Skin Breath Swallow Irrimmed Soap wash immed Resp support Medical attention immed	Skin, eyes, liver, repro sys [in animals: tumors of the pituitary gland & liver, leukemia]
[Chlorodiphenyl (54% chlorine)]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVH/E/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, dizz, mental dullness, nau, conf; head fig anes enlarged liver; [carc]	Eye Skin Breath Swallow Irrimmed Soap wash prompt Resp support Medical attention immed	Liver, kidneys, heart, eyes, skin, CNS [in animals: liver & kidney cancer]
[Chloroform]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet (flamm) Daily Eyewash, Quick drench	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVH/E/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb, resp sys; pulm congestion, edema, corn damage, nec, decr pulm function, cough, dysp wheez, blood-stained sputum, bronchial secretions, [carc]	Eye Skin Breath Swallow Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys [lung cancer]
[bis-Chloromethyl ether]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chloromethyl methyl ether <chem>CH3OCH2Cl</chem> 107-30-2 KN6650000	Chlorodimethyl ether, Chloromethoxymethane, CMME, Dimethylchloroether, Methylchloromethyl ether	NIOSH Ca See Appendix A OSHA [1910 1006] See Appendix B	Ca [N.D.]	Colorless liquid with an irritating odor	MW: 80.5 BP: 138°F Sol. Reacts Fl.P(oc): 32°F IP: 10.25 eV	VP(70°F): 192 mm FRZ: -154°F UEL: ? LEL: ?	Water [Note: Reacts with water to form hydrochloric acid & formaldehyde]	Imp. Hexane GC/ECD. #1) [P&CAM #220]
1239 57	1 ppm = 3.35 mg/m ³				Sp Gr: 1.06 Class IB Flammable Liquid			
1-Chloro-1-nitropropane <chem>CH3CH2CHClNO2</chem> 600-25-9 TX5075000	Korax® Lanstar®	NIOSH 2 ppm (10 mg/m ³) OSHA† 20 ppm (100 mg/m ³)	100 ppm	Colorless liquid with an unpleasant odor. [fungicide]	MW: 123.6 BP: 289°F Sol: 0.5% Fl.P(oc): 144°F IP: 9.90 eV	VP(77°F): 6 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, acids	Chrom-108, Ethyl acetate, GC/FID, II(S) [#S211]
	1 ppm = 5.14 mg/m ³				Sp Gr: 1.21 Class IIIA Combustible Liquid			
Chloropentafluoroethane <chem>CClF4CF3</chem> 76-15-3 KH7877500	Fluorocarbon-115, Freon® 115, Genetron® 115, Halocarbon 115, Monochloropentafluoroethane	NIOSH 1000 ppm (6320 mg/m ³) OSHA† none	N.D.	Colorless gas with a slight, ethereal odor. [Note: Shipped as a liquefied compressed gas.]	MW: 154.5 BP: -38°F Sol(77°F): 0.006% Fl.P: NA IP: 12.96 eV	VP(70°F): 7.9 atm FRZ: -223°F UEL: NA LEL: NA	Alkalis, alkaline earth metals (e.g., aluminum powder, sodium, potassium, zinc)	None available
1020 12	1 ppm = 6.42 mg/m ³				RGasD: 5.55 Nonflammable Gas			
Chloropicrin <chem>CCl3NO2</chem> 76-06-2 PB6300000 1580 56 1583 56 (mixture) 2929 57 (flammable mixture)	Nitrochloroform, Nitrotrichloromethane, Trichloronitromethane	NIOSH/OSHA 0.1 ppm (0.7 mg/m ³)	2 ppm	Colorless to faint- yellow, oily liquid with an intensely irritating odor. [pesticide]	MW: 164.4 BP: 234°F Sol: 0.2% Fl.P: NA IP: ?	VP: 18 mm FRZ: -93°F UEL: NA LEL: NA	Strong oxidizers [Note: The material may explode when heated under confinement.]	None available
	1 ppm = 6.83 mg/m ³				Sp Gr: 1.66 Noncombustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin,	Eye	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Abs	muc memb, pulm	Skin	Soap wash immed	[in animals: skin
Wash skin:	When contam/Daily	Escape GMFOV/SCBAE	Inh	edema, pulm congestion,	Breath	Resp support	& lung cancer]
Remove:	When wet (flam)		Ing	pneu, skin burns, nec,	Swallow	Medical attention	
Change:	Daily		Con	cough, wheez, pulm congestion, blood stained-sputum, low-wgt, bronchial secretions, [carc]		immed	
Provide:	Eyewash, Quick drench						
[Chloromethyl methyl ether]							
Skin:	Prevent skin contact	NIOSH	Inh	In animals irrit eyes,	Eye	Irrimed	Resp sys, liver,
Eyes:	Prevent eye contact	20 ppm: SA*	Ing	pulm edema, liver, kidney,	Skin	Soap wash	kidneys, CVS, eyes
Wash skin:	When contam	50 ppm: SA:CF*/PAPROV*	Con	heart damage	Breath:	Resp support	
Remove:	When wet or contam	100 ppm: CCRFOV/GMFOV/PAPRTOV*/SCBAF/SAF			Swallow	Medical attention	
Change:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA				immed	
Provide:		Escape GMFOV/SCBAE					
[1-Chloro-1-nitropropane]							
Skin:	Frostbite	TBAL	Inh	Dysp; dizz, inco, narco;	Eye:	Frostbite	Skin, CNS, CVS
Eyes:	Frostbite		Con	(liq)	Skin:	Frostbite	
Wash skin:	N.R.				Breath:	Resp support	
Remove:	N.R.						
Change:	N.R.						
Provide:	Frostbite						
[Chloropentafluoroethane]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp	Eye	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	2 ppm: SA:CF*/PAPROV*/CCRFOV/	Ing	sys, lac, cough, pulm	Skin	Soap wash immed	
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	edema, nau, vomit	Breath	Resp support	
Remove:	When wet or contam	§ SCBAF PD,PP/SAF PD,PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape GMFOV/SCBAE				immed	
Provide:	Eyewash, Quick drench						
[Chloropicrin]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
β-Chloroprene $\text{CH}_2=\text{CClCH}=\text{CH}_2$ 126-99-8 E19625000	2-Chloro-1,3-butadiene, Chlorobutadiene, Chloroprene	NIOSH Ca See Appendix A C 1 ppm (3.6 mg/m ³) (15-min) OSHA† 25 ppm (90 mg/m ³) [skin]	Ca [300 ppm]	Colorless liquid with a pungent, ether-like odor	MW: 88.5 BP: 139°F Sol: Slight Fl.P: -4°F IP: 8.79 eV	VP: 188 mm FRZ: -153°F UEL: 20.0% LEL: 4.0%	Peroxides & other oxidizers [Note: Polymerizes at room temperature unless inhibited with antioxidants]	Char. CS, GC/FID, III [#1002]
1991 30 (inhibited)	1 ppm = 3.68 mg/m ³				Sp.Gr: 0.96 Class IB Flammable Liquid			
o-Chlorostyrene $\text{ClC}_6\text{H}_4\text{CH}=\text{CH}_2$ 2039-87-4 WL4160000	2-Chlorostyrene, ortho-Chlorostyrene, 1-Chloro-2-ethenylbenzene	NIOSH 50 ppm (285 mg/m ³) ST 75 ppm (428 mg/m ³) OSHA† none	N.D.	Colorless liquid.	MW: 138.6 BP: 372°F Sol: Insoluble Fl.P: 138°F IP: ?	VP(77°F): 0.96 mm FRZ: -82°F UEL: ? LEL: ?	None reported	None available
	1 ppm = 5.76 mg/m ³				Sp.Gr: 1.10 Class II Combustible Liquid			
o-Chlorotoluene $\text{ClC}_6\text{H}_4\text{CH}_3$ 95-49-8 XS9000000	1-Chloro-2-methylbenzene, 2-Chloro-1-methylbenzene, 2-Chlorotoluene, o-Tolyl chloride	NIOSH 50 ppm (250 mg/m ³) ST 75 ppm (375 mg/m ³) OSHA† none	N.D.	Colorless liquid with an aromatic odor.	MW: 126.6 BP: 320°F Sol(77°F): 0.009% Fl.P: 96°F IP: 8.83 eV	VP(77°F): 4 mm FRZ: -31°F UEL: ? LEL: ?	Acids, alkalis, oxidizers, reducing materials, water	None available
2238 27	1 ppm = 5.26 mg/m ³				Sp.Gr: 1.08 Class IC Flammable Liquid			
2-Chloro-6-trichloro- methylpyridine $\text{ClC}_5\text{H}_4\text{NCCl}_3$ 1929-82-4 US7525000	2-Chloro-6-(trichloro- methyl)pyridine; Nitrapyrin; N-serve®; 2,2,2,6-Tetrachloro- 2-picoline	NIOSH 10 mg/m ³ (total) ST 20 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Colorless or white, crystalline solid with a mild, sweet odor.	MW: 230.9 BP: ? Sol: Insoluble Fl.P: ? IP: ?	VP(73°F): 0.003 mm MLT: 145°F UEL: ? LEL: ?	Aluminum, magnesium [Note: Emits oxides of nitrogen and chloride ion when heated to decomposition.]	None available
					Sp.Gr: 7 Combustible Solid [Explosive]			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	NIOSH ✕ SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys, ner, irrity, derm, alopecia, repro effects; [carc]	Eye Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, repro sys [lung & skin cancer]
[3-Chloroprene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Ing Con	In animals: irrit eyes, skin; hema, prot, acidosis; enlarged liver, jaun	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, liver, kidneys, CNS, PNS
[o-Chlorostyrene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; derm; drow, inco, anes; cough; liver, kidney inj	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[o-Chlorotoluene]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	No adverse effects noted in ingestion studies with animals.	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin
[2-Chloro-6-trichloromethyl pyridine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chlorpyrifos $C_8H_{11}Cl_2NO_3PS$ 2921-88-2 TF6300000	Chlorpyrifos-ethyl; O,O-Diethyl O-3,5,6- trichloro-2-pyridyl phosphorothioate; Dursban®	NIOSH 0.2 mg/m ³ ST 0.6 mg/m ³ [skin] OSHA† none	N.D.	Colorless to white, crystalline solid with a mild mercaptan-like odor. [pesticide] [Note: Commercial formulations may be combined with combustible liquids.]	MW: 350.6 BP: 320°F (Decomposes) Sol: 0.0002% Fl, P: ? IP: ? Sp, Gr: 1.40 (Liquid at 110°F) Combustible Solid	VP: 0.00002 mm MLT: 108°F UEL: ? LEL: ?	Strong acids, caustics, amines [Note: Corrosive to copper & brass.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
2783 55								
Chromic acid and chromates CrO_3 (acid) 1333-82-0 (CrO_3) GB6650000 (CrO_3) 1755 60 (acid, soln.) 1463 42 (acid, solid)	Chromic acid (CrO_3); Chromic anhydride; Chromic oxide; Chromium(VI) oxide (1:3); Chromium trioxide Synonyms of chromates (i.e., chromium(VI) compounds) such as zinc chromate vary depending upon the specific compound	NIOSH (as Cr) Ca See Appendix A 0.001 mg/m ³ See Appendix C OSHA (as CrO_3) C 0.1 mg/m ³ See Appendix C	Ca [15 mg/m ³ as Cr(VI)]	CrO_3 : Dark-red, odorless flakes or powder. [Note: Often used in an aqueous solution (H_2CrO_4).]	MW 100.0 BP 482°F (Decomposes) Sol 63% Fl P NA IP NA Sp Gr: 2.70 (CrO_3) CrO_3 : Noncombustible Solid, but will accelerate the burning of combustible materials	VP Very low MLT 387°F UEL NA LEL NA	Combustible, organic, or other readily oxidizable materials (paper, wood, sulfur, aluminum, plastics, etc.), corrosive to metals	Filter, Reagent, Vis. III [#7600, Hexavalent Chromium]
Chromium(II) compounds (as Cr)	Synonyms vary depending upon the specific chromium(II) compound [Note: Chromium(II) compounds include soluble chromous salts.]	NIOSH/OSHA 0.5 mg/m ³ See Appendix C	250 mg/m ³ [as Cr(II)]	Appearance and odor vary depending upon the specific chromium(II) compound	Properties vary depending upon the specific chromium(II) compound		Varies	Filter, Acid, AAS, III [#7024, Chromium]
Chromium(III) compounds (as Cr)	Synonyms vary depending upon the specific chromium(III) compound. [Note: Chromium(III) compounds include soluble chromic salts.]	NIOSH/OSHA 0.5 mg/m ³ See Appendix C	25 mg/m ³ [as Cr(III)]	Appearance and odor vary depending upon the specific chromium(III) compound	Properties vary depending upon the specific chromium(III) compound		Varies	Filter, Acid, AAS, III [#7024, Chromium]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Wheez, laraspasms, salv;	Eye:	Resp sys, CNS,
Eyes:	Prevent eye contact		Abs	bluish lips, skin; miosis,	Skin:	PNS, plasma chol
Wash skin:	When contam		Ing	blurred vision; nau, vomit,	Breath:	
Remove:	When wet or contam		Con	abdom cramps, diarr	Swallow:	
Change:	Daily				Irr immed	
					Soap wash immed	
					Resp support	
					Medical attention	
					immed	
[Chlorpyrifos]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit resp sys, nasal	Eye	Blood, resp sys,
Eyes:	Prevent eye contact	§ SCBAF: PD, PP/SAF: PD, PP ASCBA	Ing	septum perf, liver,	Skin:	liver, kidneys,
Wash skin:	When contam	Escape: HiEF/SCBAE	Con	kidney damage; leucyt,	Breath:	eyes, skin
Remove:	When wet or contam			leupen, monocyt, eosin;	Swallow:	[lung cancer]
Change:	Daily			eye inj, conj; skin ulcer,		
Provide:	Eyewash, Quick drench			sens derm, [carc]		
[Chromic acid and chromates]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes; sens derm	Eye	Eyes, skin
Eyes:	Prevent eye contact	2.5 mg/m ³ DM*	Ing		Skin:	
Wash skin:	When contam	5 mg/m ³ DMXSO*/SA*	Con		Breath:	
Remove:	When wet or contam	12.5 mg/m ³ SA/CF*/PAPRDM*			Swallow:	
Change:	N.R.	25 mg/m ³ HiEF/PAPRTHiE*/SCBAF/SAF				
		250 mg/m ³ SAF: PD, PP				
		§ SCBAF: PD, PP/SAF: PD, PP ASCBA				
		Escape: HiEF/SCBAE				
[Chromium(II) compounds (as Cr)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes; sens derm	Eye	Eyes, skin
Eyes:	Prevent eye contact	2.5 mg/m ³ DM*	Ing		Skin:	
Wash skin:	When contam	5 mg/m ³ DMXSO*/SA*	Con		Breath:	
Remove:	When wet or contam	12.5 mg/m ³ SA/CF*/PAPRDM*			Swallow:	
Change:	N.R.	25 mg/m ³ HiEF/PAPRTHiE*/SCBAF/SAF				
		§ SCBAF: PD, PP/SAF: PD, PP ASCBA				
		Escape: HiEF/SCBAE				
[Chromium(III) compounds (as Cr)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chromium metal Cr 7440-47-3 GB4200000	Chrome, Chromium	NIOSH 0.5 mg/m ³ See Appendix C OSHA* 1 mg/m ³ See Appendix C [*Note: The PEL also applies to insoluble chromium salts.]	250 mg/m ³ (as Cr)	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid	MW: 52.0 BP: 4788°F Sol: Insoluble F.P.: NA IP: NA Sp Gr: 7.14 Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame	VP: 0 mm (approx) MLT: 3452°F UEL: NA LEL: NA	Strong oxidizers (such as hydrogen peroxide), alkalis	Filter; Acid; AAS; III [#7024]
Chromyl chloride Cr(OCl) ₂ 14977-61-8 GB5775000 1758 39	Chlorochromic anhydride, Chromic oxychloride, Chromium chloride oxide, Chromium dichloride dioxide, Chromium dioxide dichloride, Chromium dioxychloride, Chromium oxychloride, Dichlorodioxochromium	NIOSH Ca See Appendix A See Appendix C 0.001 mg Cr(VI)/m, OSHA none	Ca [N.D.]	Deep-red liquid with a musty, burning, acid odor. [Note: Fumes in moist air.]	MW: 154.9 BP: 243°F Sol: Reacts F.P.: NA IP: 12.60 eV Sp.Gr(77°F): 1.91 Noncombustible Liquid, but a powerful oxidizer.	VP: 20 mm FRZ: -142°F UEL: NA LEL: NA	Water, combustible substances, halides, phosphorus, turpentine [Note: Reacts violently in water; forms chromic acid, chromic chloride, hydrochloric acid & chlorine. Corrodes common metals.]	None available
Clopidol C ₇ H ₅ Cl ₂ NO 2371-90-6 UU7711500	Coyden®; 3,5-Dichloro-2,6-dimethyl- 4-pyridinol	NIOSH 10 mg/m ³ (total) ST 20 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White to light- brown, crystalline solid.	MW: 192.1 BP: ? Sol: Insoluble F.P.: NA IP: ? Sp.Gr: ? Noncombustible Solid, but dust may explode in cloud form.	VP: ? MLT: >608°F UEL: NA LEL: NA	None reported	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Coal dust GF8281000 1361 32	Anthracite coal dust, Bituminous coal dust, Lignite coal dust	NIOSH See Appendix D OSHA† See Appendix C (Mineral Dusts)	N.D.	Dark-brown to black solid dispersed in air.	Properties vary depending upon the specific coal type. Combustible Solid; slightly explosive when exposed to flame.		None reported	Filter; none; Grav; III [#0600, Nuisance Dust (resp) [Also #7500.]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Route	Symptoms (See Table 5)	Health hazards		Target organs (See Table 5)
					First aid (See Table 6)		
Skin:	N.R.	NIOSH	Inh	Irritate eyes, skin; lung	Eye	Irr	Eyes, skin, resp sys
Eyes:	N.R.	2.5 mg/m ³ : DM*	ing	fib (histologic)	Skin	imed	
Wash skin:	N.R.	5 mg/m ³ : DMXSQ*/SA*	Con		Breath	Soap wash	
Remove:	N.R.	12.5 mg/m ³ : SA CF*/PAPRDM*			Swallow	Resp support	
Change:	N.R.	25 mg/m ³ : HIEF/PAPRTHIE*/SCBAF/SAF				Medical attention	
		250 mg/m ³ : SAF/PD,PP				imed	
		§: SCBAF/PD,PP/SAF/PD,PP ASCBA					
		Escape: HIEF/SCBAE					
[Chromium metal]							
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, upper	Eye:	Irr	Eyes, skin, resp sys
Eyes:	Prevent eye contact	§: SCBAF/PD,PP/SAF/PD,PP:ASCBA	Abs	resp sys; eye, skin burns	Skin:	Water flush	[lung cancer]
Wash skin:	When contam	Escape: GMFOV/SCBAE	ing		Breath:	imed	
Remove:	When wet or contam		Con		Swallow:	Resp support	
Change:	N.R.					Medical attention	
Provide:	Eyewash, Quick drench					imed	
[Chromyl chloride]							
		TBAL	Inh	Irritate eyes, skin, nose,	Eye:	Irr	Eye, skin, resp sys
Skin:	N.R.		Con	throat; cough	Skin:	Soap wash	
Eyes:	N.R.				Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Clopidol]							
		TBAL	Inh	Chronic bron, decr pulm	Breath:	Fresh air	Resp sys
Skin:	N.R.			func, emphy			
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Coal dust]							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	NIOSH * SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFOVH/E/SCBAE	Inh Con	Derm, bron, [carc]	Eye: Skin: Breath: Swallow:	Irr:immed Soap wash:immed Resp support Medical attention:immed	Resp sys, skin, bladder, kidneys [lung, kidney & skin cancer]
[Coal tar pitch volatiles]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam Daily	NIOSH 0.25 mg/m ³ DM* 0.5 mg/m ³ DMXSQ**/DMFu*/SA* 1.25 mg/m ³ SA, CF*/PAPRDM**/ PAPRDMFu* 2.5 mg/m ³ HIEF/SCBAF/SAF 20 mg/m ³ SAF: PD, PP S: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Cough, dysp, wheez, decr pulm func, low-wgt; derm; diffuse nodular fib; resp hypersensitivity, asthma	Eye: Skin: Breath: Swallow:	Irr:immed Soap wash Resp support Medical attention:immed	Skin, resp sys
[Cobalt (dust and fume)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	Irr:eyes, skin, muc memb; cough, decr pulm func, wheez, dysp; in animals: liver, kidney inj; pulmedema	Eye: Skin: Breath: Swallow:	Irr:immed Soap wash Resp support Medical attention:immed	Eyes, skin, resp sys, blood, CNS
[Cobalt carbonyl (as Co)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Con	In animals: irrit resp sys; dysp, cough, decr pulm func, pulm edema	Eye: Skin: Breath:	Irr:immed Soap wash Resp support	Eyes, skin, resp sys
[Cobalt hydrocarbonyl (as Co)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Coke oven emissions GH0346000	Synonyms vary depending upon the specific constituent.	NIOSH Ca 0.5-0.7 mg/m ³ (total) (screening level) See Appendix A See Appendix C OSHA [1910.1029] 0.150 mg/m ³ (benzene-soluble fraction)	Ca [N.D.]	Emissions released during the carboni- zation of bituminous coal for the production of coke. [Note: See Appendix C for more information.]	Properties vary depending upon the constituent.		None reported	Filter; Benzene; Grav; III [#5023, Coal tar pitch volatiles]
Copper (dusts and mists) Cu 7440-50-6 GL5325000	Copper metal dusts, Copper metal mists	NIOSH*/OSHA* 1 mg/m ³ [*Note: The REL and PEL also apply to other copper compounds (as Cu) except Copper fume.]	100 mg/m ³ (as Cu)	Reddish, lustrous, malleable, odorless solid	MW 63.5 BP: 4703°F Sol. Insoluble Fl.P: NA IP: NA Sp Gr: 8.94 Noncombustible Solid in bulk form, but powdered form may ignite	VP: 0 mm (approx) MLT: 1981°F UEL: NA LEL: NA	Oxidizers, alkalis, sodium azide, acetylene	Filter; Acid; AAS; III [#7029]
Copper fume (as Cu) CuO/Cu 1317-38-0 (CuO) GL7900000 (CuO)	CuO: Black copper oxide, Copper monoxide, Copper(II) oxide, Cupric oxide Cu: Copper fume [Note: Also see specific listing for Copper (dusts and mists).]	NIOSH/OSHA 0.1 mg/m ³	100 mg/m ³ (as Cu)	Finely divided black particulate dispersed in air. [Note: Exposure may occur in copper & brass plants and during the welding of copper alloys.]	MW 79.5 BP: Decomposes Sol. Insoluble Fl.P: NA IP: NA [Note: See Copper (dusts and mists) for properties of Copper metal] Sp Gr: 6.4 (CuO) CuO: Noncombustible Solid	VP: 0 mm (approx) MLT: 1879°F (Decomposes) UEL: NA LEL: NA	CuO Acetylene, zirconium	Filter; Acid; AAS; III [#7029]
Cotton dust (raw) GN2275000	Raw cotton dust	NIOSH <0.200 mg/m ³ See Appendix C OSHA [Z-1-A & 1910.1043] See Appendix C	100 mg/m ³	Colorless, odorless solid.	MW ? BP: Decomposes Sol. Insoluble Fl.P: NA IP: NA Sp Gr: ? Combustible Solid	VP: 0 mm (approx) MLT: Decomposes UEL: NA LEL: NA	Strong oxidizers	Vertical elut, none; Grav; OSHA [1910.1043]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily		NIOSH X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Con	Irrit eyes, resp sys; cough, dysp, wheez; [carc]	Eye: Breath:	Irrimed Resp support	Skin, resp sys, urinary sys [skin, lung, kidney & bladder cancer]
[Coke oven emissions]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		NIOSH/OSHA 5 mg/m ³ : DM* 10 mg/m ³ : DMXSQ**/SA* 25 mg/m ³ : SA CF*/PAPRDM* 50 mg/m ³ : HIEF/PAPRTHIE*/SCBAF/SAF 100 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, nose, pharynx, nasal perf; metallic taste, derm, in animals: lung, liver, kidney; damage, anemia	Eye Skin Breath Swallow	Irrimed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys (incr risk with Wilson's disease)
[Copper (dusts and mists)]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 1 mg/m ³ : DMFu/SA 2.5 mg/m ³ : SA CF/PAPRDMFu 5 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 100 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, upper resp sys, metal fume fever, chills, muscle ache, nau, fever, dry throat, cough, weak, lass, metallic or sweet taste, discoloration skin, hair	Breath:	Resp support	Eyes, skin, resp sys (incr risk with Wilson's disease)
[Copper fume (as Cu)]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH 1 mg/m ³ : D 2 mg/m ³ : DXSQ/HIE/SA 5 mg/m ³ : SA CF/PAPRD 10 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 100 mg/m ³ : SA PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Byssinosis: chest tight, cough, wheez, dysp, decr FEV, bron, mal, fever, chills, upper resp symptoms after initial exposure	Breath:	Fresh air	CVS, resp sys
[Cotton dust (raw)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLV unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Crag® herbicide $C_6H_4Cl_2OCH_2CH_2OSO_3Na$ 136-78-7 KK4900000	Crag® herbicide No. 1. 2-(2,4-Dichlorophenoxy)- ethyl sodium sulfate. Sesone	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	500 mg/m ³	Colorless to white crystalline, odorless solid [herbicide]	MW 309.1 BP Decomposes Sol(77°F) 25% Fl.P NA IP ? Sp Gr 1.70 Noncombustible Solid	VP 0.1 mm MLT 473°F (Decomposes) UEL NA LEL NA	Strong oxidizers, acids	Filter Water. Vis. III(5) [#S356]
o-Cresol $CH_3C_6H_4OH$ 95-48-7 GO6300000	ortho-Cresol. 2-Cresol. o-Cresylic acid. 1-Hydroxy-2-methylbenzene. 2-Hydroxytoluene. 2-Methyl phenol	NIOSH 2.3 ppm (10 mg/m ³) OSHA 5 ppm (22 mg/m ³) [skin]	250 ppm	White crystals with a sweet, tarry odor. [Note: A liquid above 88°F.]	MW 108.2 BP 376°F Sol 2% Fl.P 178°F IP 8.93 eV Sp Gr 1.05 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.29 mm MLT 88°F UEL ? LEL(300°F) 14%	Strong oxidizers, acids	Si gel. Acetone. GC/FID. III [#2001]
m-Cresol $CH_3C_6H_4OH$ 108-39-4 GO6125000	meta-Cresol. 3-Cresol. m-Cresylic acid. 1-Hydroxy-3-methylbenzene. 3-Hydroxytoluene. 3-Methyl phenol	NIOSH 2.3 ppm (10 mg/m ³) OSHA 5 ppm (22 mg/m ³) [skin]	250 ppm	Colorless to yellowish liquid with a sweet, tarry odor. [Note: A solid below 54°F.]	MW 108.2 BP 397°F Sol 2% Fl.P 187°F IP 8.98 eV Sp Gr 1.03 Class IIIA Combustible Liquid	VP(77°F): 0.14 mm FRZ 54°F UEL ? LEL(302°F) 15%	Strong oxidizers, acids	Si gel. Acetone. GC/FID. III [#2001]
p-Cresol $CH_3C_6H_4OH$ 106-44-5 GO6475000	para-Cresol. 4-Cresol. p-Cresylic acid. 1-Hydroxy-4-methylbenzene. 4-Hydroxytoluene. 4-Methyl phenol	NIOSH 2.3 ppm (10 mg/m ³) OSHA 5 ppm (22 mg/m ³) [skin]	250 ppm	Crystalline solid with a sweet, tarry odor. [Note: A liquid above 95°F.]	MW 108.2 BP 396°F Sol 2% Fl.P 187°F IP 8.97 eV Sp Gr 1.04 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.11 mm MLT 95°F UEL ? LEL(302°F) 15%	Strong oxidizers, acids	Si gel. Acetone. GC/FID. III [#2001]
2076 55	1 ppm = 4.50 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin; liver,	Eye	Eyes, skin, CNS,
Eyes:	Prevent eye contact	50 mg/m ³ : DM	Abs	kidney damage;	Skin	liver, kidneys
Wash skin:	When contam	100 mg/m ³ : DMXSO/SA	Inh	in animals: CNS effects,	Breath	
Remove:	When wet or contam	250 mg/m ³ : SA, CF/PAPRODM	Ing	convuls	Swallow	
Change:	Daily	500 mg/m ³ : H/EF/PAPRTHIE*/SAT:CF*/SCBAF/SAF	Con			
		§: SCBAF:PD, PP/SAF:PD, PP:ASCBA				
		Escape: H/EF/SCBAE				
[Crag® herbicide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	23 ppm: CCROVDM/SA	Abs	memb; CNS effects: conf,	Skin	CNS, liver, kidneys,
Wash skin:	When contam	57.5 ppm: SA, CF/PAPROVDM	Inh	depres, resp fail, dysp,	Breath	pancreas, CVS
Remove:	When wet or contam	115 ppm: CCRFOVHiE/GMFOVHiE/PAPRTHIE*/SAT:CF*/SCBAF/SAF	Ing	irreg rapid resp, weak	Swallow	
Change:	Daily	250 ppm: SAF:PD, PP	Con	pulse; eye, skin burns;		
Provide:	Eyewash, Quick drench	§: SCBAF:PD, PP/SAF:PD, PP:ASCBA		derm; lung, liver,		
		Escape: GMFOVHiE/SCBAE		kidney, pancreas damage		
[o-Cresol]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	23 ppm: CCROVDM/SA	Abs	memb; CNS effects: conf,	Skin	CNS, liver, kidneys,
Wash skin:	When contam	57.5 ppm: SA, CF/PAPROVDM	Inh	depres, resp fail, dysp,	Breath	pancreas, CVS
Remove:	When wet or contam	115 ppm: CCRFOVHiE/GMFOVHiE/PAPRTHIE*/SAT:CF*/SCBAF/SAF	Ing	irreg rapid resp, weak	Swallow	
Change:	Daily	250 ppm: SAF:PD, PP	Con	pulse; eye, skin burns;		
Provide:	Eyewash, Quick drench	§: SCBAF:PD, PP/SAF:PD, PP:ASCBA		derm; lung, liver,		
		Escape: GMFOVHiE/SCBAE		kidney, pancreas damage		
[m-Cresol]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	23 ppm: CCROVDM/SA	Abs	memb; CNS effects: conf,	Skin	CNS, liver, kidneys,
Wash skin:	When contam	57.5 ppm: SA, CF/PAPROVDM	Inh	depres, resp fail, dysp,	Breath	pancreas, CVS
Remove:	When wet or contam	115 ppm: CCRFOVHiE/GMFOVHiE/PAPRTHIE*/SAT:CF*/SCBAF/SAF	Ing	irreg rapid resp, weak	Swallow	
Change:	Daily	250 ppm: SAF:PD, PP	Con	pulse; eye, skin burns;		
Provide:	Eyewash, Quick drench	§: SCBAF:PD, PP/SAF:PD, PP:ASCBA		derm; lung, liver,		
		Escape: GMFOVHiE/SCBAE		kidney, pancreas damage		
[p-Cresol]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	23 ppm: CCROVDM/SA	Abs	memb; CNS effects: conf,	Skin	CNS, liver, kidneys,
Wash skin:	When contam	57.5 ppm: SA, CF/PAPROVDM	Inh	depres, resp fail, dysp,	Breath	pancreas, CVS
Remove:	When wet or contam	115 ppm: CCRFOVHiE/GMFOVHiE/PAPRTHIE*/SAT:CF*/SCBAF/SAF	Ing	irreg rapid resp, weak	Swallow	
Change:	Daily	250 ppm: SAF:PD, PP	Con	pulse; eye, skin burns;		
Provide:	Eyewash, Quick drench	§: SCBAF:PD, PP/SAF:PD, PP:ASCBA		derm; lung, liver,		
		Escape: GMFOVHiE/SCBAE		kidney, pancreas damage		

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, FLP, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Crotonaldehyde <chem>CH3CH=CHCHO</chem> 4170-30-3 GP9499000	2-Butenal, β-Methyl acrolein, Propylene aldehyde	NIOSH 2 ppm (6 mg/m³) See Appendix C (Aldehydes) OSHA 2 ppm (6 mg/m³)	50 ppm	Water-white liquid with a suffocating odor. [Note: Turns pale- yellow on contact with air.]	MW 70.1 BP 219°F Sol 18% FLP 45°F IP 9.73 eV	VP 19 mm FRZ -101°F UEL 15.5% LEL 2.1%	Caustics, ammonia, strong oxidizers, nitric acid, amines. [Note: Polymerization may occur at elevated tempera- tures, such as in fire conditions.]	Sub Reagent; PLR III [P&CAM #285]
1143 28 (inhibited)	1 ppm = 2.91 mg/m³				Sp Gr: 0.87 Class IB Flammable Liquid			
Crofonate <chem>C12H11ClNO3P</chem> 299-86-5 TB3850000	4-t-Butyl-2-chlorophenyl methylmethylphos- phoramidate, Dowco® 132, Ruelene®	NIOSH 5 mg/m³ ST 20 mg/m³ OSHA† none	N.D.	White, crystalline solid in pure form. [pesticide] [Note: Commercial product is a yellow oil.]	MW: 291.7 BP: Decomposes Sol: Insoluble FLP: ? IP: ?	VP (243°F): 0.01 mm MLT: 140°F UEL: ? LEL: ?	Strongly alkaline & strongly acidic media. [Note: Unstable over long periods in aqueous preparations or above 140°F.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
					Sp.Gr: 1.16 Combustible Solid			
Cumene <chem>C6H5CH(CH3)2</chem> 98-82-8 GR8575000	Cumol, Isopropyl benzene, 2-Phenyl propane	NIOSH/OSHA 50 ppm (245 mg/m³) [skin]	900 ppm [LEL]	Colorless liquid with a sharp, penetrating, aromatic odor.	MW 120.2 BP 306°F Sol: Insoluble FLP 96°F IP 8.75 eV	VP 8 mm FRZ -141°F UEL 6.5% LEL 0.9%	Oxidizers, nitric acid, sulfuric acid. [Note: Forms cumene hydroperoxide upon long exposure to air.]	Char. CS, GC/FID. III [#1501, Aromatic Hydro- carbons]
1918 28	1 ppm = 5.00 mg/m³				Sp Gr: 0.86 Class IC Flammable Liquid			
Cyanamide <chem>NH2CN</chem> 420-04-2 GS5950000	Amidocyanogen, Carbimide, Carbodiimide, Cyanogen nitride, Hydrogen cyanamide [Note: Cyanamide is also a synonym for Calcium cyanamide.]	NIOSH 2 mg/m³ OSHA† none	N.D.	Crystalline solid.	MW: 42.1 BP: 500°F (Decomposes) Sol (59°F): 78% FLP: 288°F IP: 10.65 eV	VP: ? MLT: 113°F UEL: ? LEL: ?	Above 104°F: Moisture, acids, or alkalis; 1,2-phenylenediamine salts. [Note: Polymerization may occur on evaporation of aqueous solutions.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
					Sp.Gr: 1.28 Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, resp sys,	Eye	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	20 ppm CCROV*/SA*	Ing	in animals dysp, pulm	Skin	Water flush immed	
Wash skin:	When contam	50 ppm: SA:CF*/PAPROV*/CCRFOV/	Con	edema, irrit skin	Breath	Resp support	
Remove:	When wet (flamm)	GMFOV/SCBAF/SAF			Swallow	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Provide:	Eyewash, Quick drench	Escape: GMFOV/SCBAE					
[Crotonaldehyde]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Irrimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	sys; wheez, dysp; blurred	Skin:	Soap wash immed	blood chol
Wash skin:	When contam		Ing	vision, lac; sweat; abdom	Breath:	Resp support	
Remove:	When wet or contam		Con	cramps, diarr, nau, anor	Swallow:	Medical attention immed	
Change:	Daily						
[Cruformate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb,	Eye	Irrimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	500 ppm CCROV*/SA*	Abs	derm, head, narco, coma	Skin	Water flush prompt	CNS
Wash skin:	When contam	900 ppm: SA:CF*/PAPROV*/CCRFOV/	Ing		Breath	Resp support	
Remove:	When wet (flamm)	GMFOV/SCBAF/SAF	Con		Swallow	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
		Escape: GMFOV/SCBAE					
[Cumene]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Irrimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	sys; eye, skin burns;	Skin:	Water flush immed	CNS
Wash skin:	When contam		Ing	miosis, saliv, lac, twitch;	Breath:	Resp support	
Remove:	When wet or contam		Con	Antabuse-like effects	Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Cyanamide]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Cyanogen NCCN 460-19-5 GT1925000	Carbon nitride, Dicyan, Dicyanogen, Ethanedinitrile, Oxalonitrile	NIOSH 10 ppm (20 mg/m ³) OSHA† none	N.D.	Colorless gas with a pungent, almond- like odor. [Note: Shipped as a liquefied compressed gas. Forms cyanide in the body.]	MW: 52.0 BP: -6°F Sol: 1% FLP: NA (Gas) IP: 13.57 eV RGasD: 1.82 Sp.Gr: 0.95 (Liquid at -6°F) Flammable Gas	VP(70°F): 5.1 atm FRZ: -18°F UEL: 32% LEL: 6.6%	Acids, water, strong oxidizers (e.g., dichlorine oxide, fluorine) [Note: Slowly hydrolyzed in water to form hydrogen cyanide, oxalic acid, or ammonia.]	None available
1026 18	1 ppm = 2.16 mg/m ³							
Cyanogen chloride CKCN 506-77-4 GT2275000	Chlorocyan, Chlorine cyanide, Chlorocyanide, Chlorocyanogen	NIOSH C 0.3 ppm (0.6 mg/m ³) OSHA† none	N.D.	Colorless gas or liquid (below 55°F) with an irritating odor. [Note: Shipped as a liquefied gas. A solid below 20°F. Forms cyanide in the body.]	MW: 61.5 BP: 55°F Sol: 7% FLP: NA IP: 12.49 eV RGasD: 2.16 Sp.Gr: 1.22 (Liquid at 32°F) Nonflammable Gas	VP: 1010 mm FRZ: 20°F UEL: NA LEL: NA	Water, acids, alkalis, ammonia, alcohols [Note: Can react very slowly with water to form hydrogen cyanide. May be stabilized to prevent polymeriza- tion.]	None available
1589 15 (inhibited)	1 ppm = 2.55 mg/m ³							
Cyclohexane C ₆ H ₁₂ 110-82-7 GU6300000	Benzene hexahydride, Hexahydrobenzene, Hexamethylene, Hexanaphthene	NIOSH/OSHA 300 ppm (1050 mg/m ³)	1300 ppn* [LEL]	Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.]	MW: 84.2 BP: 177°F Sol: Insoluble FLP: 0°F IP: 9.88 eV Sp.Gr: 0.78 Class IB Flammable Liquid	VP: 78 mm FRZ: 44°F UEL: 8% LEL: 1.3%	Oxidizers	Char, CS, GC/FID, III [#1500, Hydro- carbons]
1145 26	1 ppm = 3.50 mg/m ³							
Cyclohexanethiol C ₆ H ₁₁ SH 1589-69-3 GV7525000	Cyclohexylmercaptan, Cyclohexylthiol	NIOSH C 0.5 ppm (2.4 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with a strong, offensive odor.	MW: 116.2 BP: 316°F Sol: Insoluble FLP: 110°F IP: ?	VP: 10 mm FRZ: -181°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids, alkali metals	None available
3054 28	1 ppm = 4.83 mg/m ³				Sp.Gr: 0.98 Class II Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Prevent eye contact/ Frostbite N.R. When wet (flamm) N.R. Frostbite	TBAL	Inh Con	Irritate eyes, nose, upper resp sys; lac; cherry red lips, tachypnea, hypermea, bradycardia; head, verti, convuls; dizz, loss of appetite, low-wgt; liq; frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, resp sys, CNS, CVS
[Cyanogen]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq) Prevent eye contact (liq) When contam (liq) When wet or contam (liq) N.R. Eyewash (liq), Quick drench (liq)	TBAL	Inh Abs (liq) Con (liq)	Irritate eyes, upper resp sys; cough, delayed pulm edema; weak, head, gidd, dizz, conf, nau, vomit; irreg heartbeat; irrit skin (liq)	Eye: Skin: Breath: Swallow:	Irrimmed Water wash immed (liq) Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS
[Cyanogen chloride]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1300 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irritate eyes, skin, resp sys; drows, derm, narco, coma	Eye: Skin Breath Swallow	Irrimmed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Cyclohexane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritate eyes, skin, resp sys; head, dizz, weak, nau, vomit, convuls; cough, wheez, laryngitis, dysp	Eye: Skin: Breath: Swallow:	Irrimmed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Cyclohexanethiol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Cyclohexanol $C_6H_{11}OH$ 108-93-0 GV7875000	Anol. Cyclohexyl alcohol, Hexahydrophenol, Hexalin, Hydralin, Hydroxycyclohexane	NIOSH 50 ppm (200 mg/m ³) [skin] OSHA† 50 ppm (200 mg/m ³)	400 ppm	Sticky solid or colorless to light-yellow liquid (above 77°F) with a camphor-like odor.	MW 100.2 BP 322°F Sol 4% Fl.P 154°F IP 10.00 eV	VP 1 mm MLT 77°F UEL ? LEL ?	Strong oxidizers (such as hydrogen peroxide & nitric acid)	Char. 2-Propanol/ CS, GC/FID. III [#1402, Alcohols III]
1393 27 (combustible liquid, n.o.s.)	1 ppm = 4.17 mg/m ³				Sp Gr 0.96 Class IIIA Combustible Liquid			
Cyclohexanone $C_6H_{10}O$ 108-94-1 GW1050000	Anone, Cyclohexyl ketone, Pimelic ketone	NIOSH 25 ppm (100 mg/m ³) [skin] OSHA† 50 ppm (200 mg/m ³)	700 ppm	Water-white to pale-yellow liquid with a peppermint- or acetone-like odor	MW 98.2 BP 312°F Sol 15% Fl.P 146°F IP 9.14 eV	VP 5 mm FRZ -49°F UEL 9.4% LEL (212°F) 11%	Oxidizers, nitric acid	Char. CS, GC/FID. III [#1300, Ketones I]
1915 26	1 ppm = 4.00 mg/m ³				Sp Gr 0.95 Class IIIA Combustible Liquid			
Cyclohexene C_6H_{10} 110-83-8 GW2500000	Benzene tetrahydride, Tetrahydrobenzene	NIOSH/OSHA 300 ppm (1015 mg/m ³)	2000 ppm	Colorless liquid with a sweet odor	MW 82.2 BP 181°F Sol Insoluble Fl.P 11°F IP 8.95 eV	VP 67 mm FRZ -154°F UEL ? LEL ?	Strong oxidizers [Note: Forms explosive peroxides with oxygen upon storage]	Char. CS, GC/FID. III [#1500, Hydro- carbons]
2256 29	1 ppm = 3.42 mg/m ³				Sp Gr 0.81 Class IB Flammable Liquid			
Cyclohexylamine $C_6H_{11}NH_2$ 108-91-8 GX0700000	Aminocyclohexane, Aminohexahydrobenzene, Hexahydroaniline, Hexahydrobenzenamine	NIOSH 10 ppm (40 mg/m ³) OSHA† none	N.D.	Colorless or yellow liquid with a strong, fishy, amine-like odor.	MW 99.2 BP: 274°F Sol: Miscible Fl.P: 88°F IP: 8.37 eV	VP: 11 mm FRZ: 0°F UEL: 9.4% LEL: 1.5%	Oxidizers, organic compounds, acid anhydrides, acid chlorides, acids, lead [Note: Corrosive to copper, aluminum, zinc & galvanized steel.]	Sigal; H ₂ SO ₄ ; GC/FID; II [#221]
2357 68	1 ppm = 4.12 mg/m ³				Sp.Gr: 0.87 Class IC Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 400 ppm: CCR0V*/PAPROV*/GMFOV/ SA*/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, skin, narco	Eye Skin Breath Swallow	Irr immed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Cyclohexanol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 625 ppm: SA CF*/PAPROV* 700 ppm: CCRFOV/GMFOV/PAPRTOV*/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb, head, narco, coma, derm, in animals: liver, kidney damage	Eye Skin Breath Swallow	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Cyclohexanone]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: SA CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys, drow	Eye Skin Breath Swallow	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Cyclohexene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb, resp sys; eye, skin burns; skin sens; cough, pulmedema; drow, li-head, dizz; diarr, nau, vomit	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Cyclohexylamine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Cyclonite $C_3H_6N_6O_6$ 121-82-4 XY9450000	Cyclotrimethylenetrini- tramine; Hexahydro-1,3,5-trinitro- s-triazine; RDX; Trimethylenetrinitramine; 1,3,5-Trinitro-1,3,5- triazacyclohexane	NIOSH 1.5 mg/m ³ ST 3 mg/m ³ [skin] OSHA† none	N.D.	White, crystalline powder. [Note: A powerful high explosive.]	MW: 222.2 BP: ? Sol: Insoluble Fl.P: Explodes IP: ? Sp.Gr: 1.82 Combustible Solid [EXPLOSIVE]	VP(230°F): 0.0004 mm MLT: 401°F UEL: ? LEL: ?	Strong oxidizers, combustible materials, heat [Note: Detonates on contact with mercury fulminate.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Cyclopentadiene C_5H_6 542-92-7 GY1000000	1,3-Cyclopentadiene 1 ppm = 2.75 mg/m ³	NIOSH/OSHA 75 ppm (200 mg/m ³)	750 ppm	Colorless liquid with an irritating, terpene-like odor	MW 66.1 BP 107°F Sol Insoluble Fl P(oc) 77°F IP 8 56 eV Sp Gr 0.80 Class IC Flammable Liquid	VP 400 mm FRZ -121°F UEL ? LEL ?	Strong oxidizers, fuming nitric acid, sulfuric acid [Note: Polymerizes to dicyclopentadiene upon standing.]	Chrom-104* Ethyl acetate, GC/FID, III [#2523]
Cyclopentane C_5H_{10} 287-92-3 GY2390000	Pentamethylene 1 ppm = 2.92 mg/m ³	NIOSH 600 ppm (1720 mg/m ³) OSHA† none	N.D.	Colorless liquid with a mild, sweet odor.	MW: 70.2 BP: 121°F Sol: Insoluble Fl.P: -35°F IP: 10.52 eV Sp.Gr: 0.75 Class IB Flammable Liquid	VP(88°F): 400 mm FRZ: -137°F UEL: 8.7% LEL: 1.1%	Strong oxidizers (e.g., chlorine, bromine, fluorine)	None available
Cyhexatin (C_8H_{11}) ₂ SnOH 13121-70-5 WH8750000	TCHH, Tricyclohexylhydroxy- stannane, Tricyclohexylhydroxytin, Tricyclohexylstannium hydroxide, Tricyclohexyltin hydroxide	NIOSH 5 mg/m ³ OSHA† 0.32 mg/m ³ [0.1 mg/m ³ (as Sn)]	80 mg/m ³ [25 mg/m ³ (as Sn)]	Colorless to white, nearly odorless, crystalline powder. [insecticide]	MW: 385.2 BP: 442°F (Decomposes) Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: ?	VP: 0 mm (approx) MLT: 383°F UEL: NA LEL: NA	Strong oxidizers, ultraviolet light	Filter/ XAD-2; CH ₃ COOH/ CH ₃ CN; HPLC/ AAS-GF; III [#5504, Organotin]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Route	Symptoms (See Table 5)	Health hazards First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin; head, irrity, ftg, weak, tremor, nau, dizz, vomit, insom, convuls	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, CNS
[Cyclonite]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 750 ppm: CCROV/GMFOV/PAPROV/SA/ SCBAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose	Eye Skin Breath Swallow	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys
[Cyclopentadiene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet (flamm) N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; li-head, dizz, euph, inco, nau, vomit, stupor; dry, cracking skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Cyclopentane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam Daily	OSHA 3.2 mg/m ³ : CCROVD/SA 8 mg/m ³ : SA:CF/PAPROVDM 16 mg/m ³ : CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SAT:CF/ SCBAF/SAF 80 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, verti; sore throat, cough; abdompain, vomit; skin burns, pruntus; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Cyhexatin]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2,4-D <chem>Cl2C6H3OCH2COOH</chem> 94-75-7 AG6825000	Dichlorophenoxyacetic acid, 2,4-Dichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m ³	100 mg/m ³	White to yellow, crystalline, odorless powder [herbicide]	MW 221.0 BP: Decomposes Sol 0.05% Fl.P. NA IP: ?	VP(320°F): 0.4 mm MLT 280°F UEL NA LEL NA	Strong oxidizers	Filter, Methanol HPLC/UVD, III [#5001]
2765 55					Sp. Gr. 1.57 Noncombustible Solid, but may be dissolved in flammable liquids			
DDT <chem>(C6H4Cl)2CHCCl2</chem> 50-29-3 KJ3325000	p,p'-DDT, Dichlorodiphenyltrichloro- ethane, 1,1,1-Trichloro-2,2- bis(p-chlorophenyl)ethane	NIOSH Ca See Appendix A 0.5 mg/m ³ OSHA 1 mg/m ³ [skin]	Ca [500 mg/m ³]	Colorless crystals or off-white powder with a slight, aromatic odor [pesticide]	MW 354.5 BP 230°F (Decomposes) Sol. Insoluble Fl.P 162-171°F IP: ?	VP: 0.0000002 mm MLT 227°F UEL ? LEL ?	Strong oxidizers, alkalis	Filter, Isocetane, GC/ECD, II(3) [#S274]
2761 55					Sp. Gr. 0.99 Combustible Solid			
Decaborane <chem>B10H14</chem> 17702-41-9 HD1400000	Decaboron tetradecahydride	NIOSH 0.3 mg/m ³ (0.05 ppm) ST 0.9 mg/m ³ (0.15 ppm) [skin] OSHA† 0.3 mg/m ³ (0.05 ppm) [skin]	15 mg/m ³	Colorless to white crystalline solid with an intense, bitter, chocolate- like odor.	MW 122.2 BP 415°F Sol. Slight Fl.P 176°F IP 9.88 eV	VP 0.2 mm MLT 211°F UEL ? LEL ?	Oxidizers, water, halogenated com- pounds (especially carbon tetrachloride) [Note: May ignite SPONTANEOUSLY on exposure to air Decomposes slowly in hot water.]	None available
1868 34	1 ppm = 5.08 mg/m ³				Sp. Gr. 0.94 Combustible Solid			
1-Decanethiol <chem>CH3(CH2)9SH</chem> 143-10-2	Decylmercaptan, n-Decylmercaptan, 1-Mercaptodecane	NIOSH C 0.5 ppm (3.6 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with a strong odor.	MW: 174.4 BP: 465°F Sol: Insoluble Fl.P: 209°F IP: ?	VP: ? FRZ: -15°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, nitric acid	None available
	1 ppm = 7.25 mg/m ³				Sp. Gr. 0.84 Class IIIB Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Weak, stupor,	Eye	Skin, CNS, liver,
Eyes:	Prevent eye contact	100 mg/m ³ : CCROVDMFu/GMFOVHiE/	Abs	hyporeflexia, musc twitch,	Irr immed	kidneys
Wash skin:	When contam	PAPROVDMFu/SA/SCBAF	Ing	convuls; derm,	Soap wash prompt	
Remove:	When wet or contam	§ SCBAF PD,PP/SAF PD,PP ASCBA	Con	in animals liver, kidney inj	Resp support	
Change:	Daily	Escape: GMFOVHiE/SCBAE			Medical attention immed	
[2,4-D]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, pares	Eye	Eyes, skin, CNS,
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Abs	tongue, lips, face, tremor,	Soap wash prompt	kidneys, liver, PNS
Wash skin:	When contam/Daily	Escape: GMFOVHiE/SCBAE	Ing	appre, dizz, conf, mal,	Resp support	[in animals:
Remove:	When wet or contam		Con	head, ftg, convuls; paresis	Medical attention immed	liver, lung & lymphatic tumors]
Change:	Daily			hands; vomit, [carc]		
Provide:	Eyewash, Quick drench					
[DDT]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Dizz, head, nau, li-head,	Eye	CNS, liver, kidneys
Eyes:	Prevent eye contact	3 mg/m ³ : SA	Abs	drow; inco, local musc	Soap wash immed	
Wash skin:	When contam/Daily	7.5 mg/m ³ : SA, CF	Ing	spasm, tremor, convuls,	Resp support	
Remove:	When wet or contam	15 mg/m ³ : SAT, CF/SCBAF/SAF	Con	ftg,	Medical attention immed	
Change:	Daily	§ SCBAF PD,PP/SAF PD,PP ASCBA		in animals dyp, weak,		
Provide:	Eyewash, Quick drench	Escape: GMFOVHiE/SCBAE		liver, kidney damage		
[Decaborane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Abs	sys; conf, dizz, head,	Skin:	CNS
Wash skin:	When contam	12.5 ppm: SA, CF/PAPROV	Ing	drow, nau, vomit, weak,	Breath:	
Remove:	When wet or contam	25 ppm: CCRFOV/GMFOV/PAPRTOV/	Con	convuls	Swallow:	
Change:	N.R.	SCBAF/SAF				
		§ SCBAF PD,PP/SAF PD,PP ASCBA				
		Escape: GMFOV/SCBAE				
[1-Decanethiol]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Demeton (C ₈ H ₈ O) ₂ PSOC ₂ H ₄ SC ₂ H ₅ 8065-48-3 TF3150000	O-O-Diethyl-O-(and S)-2- (ethylthio)ethyl phosphorothioate mixture; Systox®	NIOSH/OSHA 0.1 mg/m ³ [skin]	10 mg/m ³	Amber, oily liquid with a sulfur-like odor [insecticide]	MW: 258.3 BP: Decomposes Sol: 0.01% Fl.P. 113°F IP: ?	VP: 0.0003 mm FRZ: <-13°F UEL: ? LEL: ?	Strong oxidizers, alkalis, water	Filter/ XAD-2; Toluene; GC/FPD, III [#5514]
	1 ppm = 10.74 mg/m ³				Sp.Gr: 1.12 Class II Combustible Liquid			
Diacetone alcohol CH ₃ COCH ₂ C(CH ₃) ₂ OH 123-42-2 SA9100000	Diacetone, 4-Hydroxy-4-methyl-2- pentanone, 2-Methyl-2-pentanol-4-one	NIOSH/OSHA 50 ppm (240 mg/m ³)	1800 ppm [LEL]	Colorless liquid with a faint, minty odor.	MW: 116.2 BP: 334°F Sol: Miscible Fl.P. 125°F IP: ?	VP: 1 mm FRZ: -47°F UEL: 6.9% LEL: 1.8%	Strong oxidizers, strong alkalis	Char. 2-Propanol/ CS; GC/FID, III [#1402, Alcohols III]
	1 ppm = 4.83 mg/m ³				Sp.Gr: 0.94 Class II Combustible Liquid			
2,4-Diaminoanisole (and its salts) (NH ₂) ₂ C ₆ H ₄ OCH ₃ 615-05-4 BZ8580500	1,3-Diamino-4-methoxy- benzene; 4-Methoxy-1,3-benzene- diamine; 4-Methoxy-m-phenylene- diamine Synonyms of salts vary depending upon the specific compound.	NIOSH Ca Minimize occupational exposure (especially skin exposures) See Appendix A OSHA none	Ca [N.D.]	Colorless solid (needles). [Note: The primary use (including its salts such as 2,4-diaminoanisole sulfate) is a component of hair & fur dye formu- lations.]	MW: 138.2 BP: ? Sol: ? Fl.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 153°F UEL: ? LEL: ?	Strong oxidizers	None available
o-Dianisidine (NH ₂ C ₆ H ₄ OCH ₃) ₂ 119-90-4 DD0875000	Dianisidine; 3,3'-Dianisidine; 3,3'-Dimethoxybenzidine	NIOSH Ca See Appendix A See Appendix C OSHA See Appendix C	Ca [N.D.]	Colorless crystals that turn a violet color on standing. [Note: Used as a basis for many dyes.]	MW: 244.3 BP: ? Sol: Insoluble Fl.P: 403°F IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 279°F UEL: ? LEL: ?	Oxidizers	Filter; water; HPLC/UVD; III [#5013, Dyes]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, miosis,	Eye	Eyes, skin, resp sys.	
Eyes:	Prevent eye contact	1 mg/m ³ SA	Abs	ache eyes, rhin, head,	Skin	CVS, CNS, blood chol	
Wash skin:	When contam	2.5 mg/m ³ SA CF	Inh	chest tight, wheez, lar	Breath		
Remove:	When wet or contam	5 mg/m ³ SAT CF/SCBAF/SAF	Con	spasm, saliv, cyan, anor,	Swallow		
Change:	Daily	10 mg/m ³ SA:PD,PP		naus, vomit, abdom cramps,			
Provide:	Eyewash, Quick drench	§ SCBAF PD,PP/SAF PD,PP ASCBA		diarr, local sweat, musc	Irr immed		
		Escape: GMFOVHIE/SCBAE		fasc, weak, para, gidd, conf,	Resp support		
				ataxia, convuls, coma, low	Medical attention immed		
				BP, card irreg			
[Demeton]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp	
Eyes:	Prevent eye contact	1250 ppm: SA:CF/PAPROV*	Inh	throat, corn damage,	Skin	sys, CNS, liver	
Wash skin:	When contam	1800 ppm: CCRFOV/GMFOV/PAPRTOV*/	Con	in animals: narco,	Breath		
Remove:	When wet or contam	SCBAF/SAF		liver damage	Swallow		
Change:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA			Medical attention immed		
		Escape: GMFOV/SCBAE					
[Diacetone alcohol]							
Skin:	Prevent skin contact	NIOSH	Inh	In animals: irrit skin;	Eye	Skin, thyroid, liver,	
Eyes:	Prevent eye contact	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	thyroid, liver changes;	Skin	repro sys	
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Inh	terato effects; [carc]	Breath:	[in animals:	
Remove:	When wet or contam		Con		Swallow:	thyroid, liver,	
Change:	Daily					skin & lymphatic	
Provide:	Eyewash, Quick drench					sys tumors]	
[2,4-Diaminoanisole (and its salts)]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit skin;	Eye	Skin, kidneys, liver,	
Eyes:	Prevent eye contact	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	in animals: kidney, liver	Skin	thyroid, spleen	
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Inh	damage; thyroid, spleen	Breath:	[in animals	
Remove:	When wet or contam		Con	changes; [carc]	Swallow:	bladder, liver,	
Change:	Daily					stomach & mammary	
Provide:	Eyewash, Quick drench					gland tumors]	
[o-Dianisidine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Diazinon® $C_{12}H_{21}N_3O_3PS$ 333-41-5 TF3325000	Basudin®; Diazide®; O,O-Diethyl-O-2-isopropyl- 4-methyl-6-pyrimidinyl- phosphorothioate; Spectracide®	NIOSH 0.1 mg/m³ [skin] OSHA† none	N.D.	Colorless liquid with a faint ester-like odor. [insecticide] [Note: Technical grade is pale to dark brown.]	MW: 304.4 BP: Decomposes Sol: 0.004% Fl.P: 180°F IP: ?	VP: 0.0001 mm FRZ: ? UEL: ? LEL: ?	Strong acids & alkalis, copper-containing compounds [Note: Hydrolyzes slowly in water & dilute acid.]	None available
2783 55	1 ppm = 12.65 mg/m³				Sp Gr: 1.12 Class IIIA Combustible Liquid			
Diazomethane CH_2N_2 334-88-3 PA7000000	Azomethylene, Azomethylene, Diazirine	NIOSH/OSHA 0.2 ppm (0.4 mg/m³)	2 ppm	Yellow gas with a musty odor [Note: Shipped as a liquefied compressed gas]	MW 42.1 BP -9°F Sol Reacts Fl P NA (Gas) IP 9.00 eV	VP >1 atm FRZ -229°F UEL ? LEL ?	Alkali metals, water, drying agents such as calcium arsenate [Note: May explode violently on heating, exposure to sunlight, or contact with rough edges such as ground glass]	XAD-2*, CS, GC/FID, III [#2515]
	1 ppm = 1.75 mg/m³				R Gas D: 1.45 Flammable Gas [EXPLOSIVE!]			
Diborane B_2H_6 19287-45-7 HQ9275000	Boroethane, Boron hydride, Diboron hexahydride	NIOSH/OSHA 0.1 ppm (0.1 mg/m³)	15 ppm	Colorless gas with a repulsive, sweet odor [Note: Usually shipped in pressurized cylinders diluted with hydrogen, argon, nitrogen, or helium.]	MW 27.7 BP -135°F Sol Reacts Fl P NA (Gas) IP 11.38 eV	VP (62°F): 39.5 atm FRZ -265°F UEL 88% LEL 0.8%	Water, halogenated compounds, aluminum, lithium, oxidized surfaces, acids [Note: Will ignite spontaneously in moist air at room temperature. Reacts with water to form hydrogen & boric acid]	Filter/ Char*, H₂O₂, PES, III [#6006]
1911 18	1 ppm = 1.15 mg/m³				R Gas D: 0.97 Flammable Gas			
1,2-Dibromo-3-chloro- propane $CH_2BrCHBrCH_2Cl$ 96-12-8 TX8750000	1-Chloro-2,3-dibromo- propane, DBCP, Dibromochloropropane	NIOSH Ca See Appendix A OSHA [1910.1044] 0.001 ppm	Ca [N.D.]	Dense yellow or amber liquid with a pungent odor at high concentra- tions. [pesticide] [Note: A solid below 43°F.]	MW 236.4 BP 384°F Sol: 0.1% Fl P (cc) 170°F IP ?	VP 0.8 mm FRZ 43°F UEL ? LEL ?	Chemically active metals such as aluminum, magnesium & tin alloys [Note: Corrosive to metals]	None available
2872 58	1 ppm = 9.83 mg/m³				Sp Gr: 2.05 Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes; miosis, blurred	Eye:	Eyes, resp sys,
Eyes:	Prevent eye contact		Abs	vision; dizz, conf, weak,	Skin:	CNS, CVS,
Wash skin:	When contam		Ing	convuls; dysp; saliv,	Breath:	blood chol
Remove:	When wet or contam		Con	abdom cramps, nau, vomit	Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Diazinon®]						
Skin:	Frostbite	NIOSH/OSHA	Inh	Irrit eyes, cough, short	Eye:	Eyes, resp sys
Eyes:	Frostbite	2 ppm: SA*/SCBAF	Con	breath, head, fig, flush	Skin:	
Wash skin:	N.R.	5 SCBAF PD, PP/SAF PD, PP ASCBA	(liq)	skin, fever, chest pain,	Breath:	
Remove:	When wet (flamm)	Escape GMFOV/SCBAE		pulm edema, pneumitis,		
Change:	N.R.			asthma, liq: frostbite		
Provide:	Frostbite					
[Diazomethane]						
Skin:	N.R.	NIOSH/OSHA	Inh	Chest tight, precordial	Breath	Resp sys, CNS,
Eyes:	N.R.	1 ppm: SA		pain, short breath, non-	Resp support	liver, kidneys
Wash skin:	N.R.	2.5 ppm: SA CF		productive cough, nau,		
Remove:	N.R.	5 ppm: SAT CF/SCBAF/SAF		head, li-head, verti,		
Change:	N.R.	15 ppm: SA:PD, PP		chills, fever, fig, weak,		
		5 SCBAF PD, PP/SAF PD, PP ASCBA		tremor, musclasc,		
		Escape GMFS/SCBAE		in animals: liver, kidney		
				damage, pulm edema, hemorr		
[Diborane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 SCBAF PD, PP/SAF PD, PP ASCBA	Abs	throat, crow, nau, vomit,	Skin:	CNS, liver, kidneys,
Wash skin:	When contam/Daily	Escape GMFOVH/SCBAE	Ing	pulm edema, liver, kidney	Breath	spleen, repro sys,
Remove:	When wet or contam		Con	in; sterility; [carc]	Swallow	digestive sys
Change:	Daily					[in animals: cancer
Provide:	Eyewash, Quick drench					of the nasal cavity,
						tongue, pharynx,
						lungs, stomach,
						adrenal & mammary
						glands]
[1,2-Dibromo-3-chloropropane]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2-N-Dibutylaminoethanol (C ₈ H ₁₉) ₂ NCH ₂ CH ₂ OH 102-81-8 KK3850000	Dibutylaminoethanol; 2-Dibutylaminoethanol; 2-Di-N-butylaminoethanol; 2-Di-N-butylaminoethyl alcohol; N,N-Dibutylethanolamine	NIOSH 2 ppm (14 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid with a faint, amine-like odor.	MW: 173.3 BP: 446°F Sol: 0.4% Fl.P: 195°F IP: ?	VP: 0.1 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	Sigel; Methanol/ water; GC/FID; III [#2007, Amino- ethanol Compounds]
2873 55	1 ppm = 7.20 mg/m ³				Sp.Gr: 0.86 Class IIIA Combustible Liquid			
Dibutyl phosphate (C ₈ H ₁₉ O) ₂ (OH)PO 107-66-4 TB9605000	Dibutyl acid o-phosphate, di-n-Butyl hydrogen phosphate, Dibutyl phosphoric acid	NIOSH 1 ppm (5 mg/m ³) ST 2 ppm (10 mg/m ³) OSHA† 1 ppm (5 mg/m ³)	30 ppm	Pale amber, odorless liquid	MW 210.2 BP 212°F (Decomposes) Sol: Insoluble Fl.P. ? IP: ?	VP: 1 mm (approx) FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH,CN, GC/FPD, III [#5017]
	1 ppm = 8.74 mg/m ³				Sp Gr: 1.06 Combustible Liquid			
Dibutylphthalate C ₈ H ₁₆ (COOC ₄ H ₉) ₂ 84-74-2 T10875000	DBP, Dibutyl 1,2-benzene- dicarboxylate, Di-n-butyl phthalate	NIOSH/OSHA 5 mg/m ³	4000 mg/m ³	Colorless to faint yellow, oily liquid with a slight, aromatic odor.	MW 278.3 BP 644°F Sol(77°F): 0.001% Fl.P 315°F IP: ?	VP: 0.00007 mm FRZ: -31°F UEL: ? LEL(456°F): 0.5%	Nitrates, strong oxidizers, alkalis & acids, liquid chlorine	Filter; CS, GC/FID, III [#5020]
	1 ppm = 11.57 mg/m ³				Sp Gr: 1.05 Class IIIB Combustible Liquid			
Dichloroacetylene ClC=CCl 7572-29-4 AP1080000	DCA, Dichloroethyne [Note: DCA is a possible decomposition product of trichloroethylene or trichloroethane.]	NIOSH Ca See Appendix A C 0.1 ppm (0.4 mg/m ³) OSHA† none	Ca [N.D.]	Volatile oil with a disagreeable, sweetish odor. [Note: A gas above 90°F. DCA is not produced commercially.]	MW: 94.9 BP: 90°F (Explodes) Sol: ? Fl.P: ? IP: ?	VP: ? FRZ: -58 to -87°F UEL: ? LEL: ?	Oxidizers, heat, shock	None available
	1 ppm = 3.95 mg/m ³				Sp.Gr: 1.26 Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection -- maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	In animals: irrit eyes, skin, nose, derm; skin, com nec; low-wgt	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs		Skin:	Soap flush immed	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[2-N-Dibutylaminoethanol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp	Eye	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm SA	Ing	sys, head	Skin	Soap wash prompt	
Wash skin:	When contam	25 ppm SA CF	Con		Breath	Resp support	
Remove:	When wet or contam	30 ppm: SAT:CF/SCBAF/SAF			Swallow	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Provide:	Quick drench	Escape: GMFOV/HiE/SCBAE					
[Dibutyl phosphate]							
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, upper resp	Eye	Irr immed	Eyes, resp sys, GI tract
Eyes:	Prevent eye contact	50 mg/m ³ DMF	Ing	sys, stomach	Skin	Wash regularly	
Wash skin:	N.R.	125 mg/m ³ SA CF/PP/PRDM ⁴	Con		Breath	Resp support	
Remove:	N.R.	250 mg/m ³ HiEF/SCBAF/SAF			Swallow	Medical attention immed	
Change:	N.R.	4000 mg/m ³ SAF:PD, PP					
		§ SCBAF PD, PP/SAF PD, PP ASCBA					
		Escape: HiEF/SCBAE					
[Dibutyl phthalate]							
Skin:	Prevent skin contact	NIOSH	Inh	Head, loss of appetite, nau,	Eye:	Irr immed	CNS
Eyes:	Prevent eye contact	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	vomit, intense jaw pain;	Skin:	Soap flush immed	[in animals:
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	cranial nerve palsy;	Breath:	Resp support	kidney tumors]
Remove:	When wet (flamm)		Con	in animals: kidney, liver, brain inj; low-wgt; [carc]	Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Dichloroacetylene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
o-Dichlorobenzene <chem>C6H4Cl2</chem> 95-50-1 CZ4500000	o-DCB; 1,2-Dichlorobenzene, ortho-Dichlorobenzene, o-Dichlorobenzol	NIOSH/OSHA C 50 ppm (300 mg/m ³)	200 ppm	Colorless to pale- yellow liquid with a pleasant, aromatic odor. [herbicide]	MW: 147.0 BP: 357°F Sol: 0.01% Fl.P: 151°F IP: 9.06 eV	VP: 1 mm FRZ: 1°F UEL: 9.2% LEL: 2.2%	Strong oxidizers, aluminum, chlorides, acids, acid fumes	Char, CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1591 58	1 ppm = 6.11 mg/m ³				Sp Gr: 1.30 Class IIIA Combustible Liquid			
p-Dichlorobenzene <chem>C6H4Cl2</chem> 106-46-7 CZ4550000	p-DCB; 1,4-Dichlorobenzene, para-Dichlorobenzene, Dichlorocide	NIOSH Ca See Appendix A OSHA† 75 ppm (450 mg/m ³)	Ca [150 ppm]	Colorless or white crystalline solid with a mothball- like odor. [insecticide]	MW: 147.0 BP: 345°F Sol: 0.008% Fl.P: 150°F IP: 8.98 eV	VP: 1.3 mm MLT: 128°F UEL: ? LEL: 2.5%	Strong oxidizers (such as chlorine or permanganate)	Char, CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1592 58	1 ppm = 6.11 mg/m ³				Sp Gr: 1.25 Combustible Solid, but may take some effort to ignite			
3,3'-Dichlorobenzidine (and its salts) <chem>NH2C6H3Cl2C6H3Cl2CNH2</chem> 91-94-1 DD0525000	4,4'-Diamino-3,3'-dichloro- biphenyl; Dichlorobenzidine base, o,o'-Dichlorobenzidine; 3,3'-Dichlorobiphenyl-4,4'- diamine; 3,3'-Dichloro-4,4'-biphenyl- diamine; 3,3'-Dichloro-4,4'-diamino- biphenyl	NIOSH Ca See Appendix A OSHA [1910.1007] See Appendix B	Ca [N.D.]	Gray to purple, crystalline solid	MW: 253.1 BP: 788°F Sol (59°F): 0.07% Fl.P: ? IP: ?	VP: ? MLT: 271°F UEL: ? LEL: ?	None reported	Filter/ Si gel, Reagent, HPLC/UVD, III [#5509]
					Sp Gr: ?			
Dichlorodifluoromethane <chem>CCl2F2</chem> 75-71-8 PA8200000	Difluorodichloromethane, Fluorocarbon 12, Freon® 12, Genetron® 12, Halon® 122, Propellant 12, Refrigerant 12	NIOSH/OSHA 1000 ppm (4950 mg/m ³)	15,000 ppm	Colorless gas with an ether-like odor at extremely high concentrations. [Note: Shipped as a liquefied compressed gas]	MW: 120.9 BP: -22°F Sol (77°F): 0.03% Fl.P: NA IP: 11.75 eV	VP: 5.7 atm FRZ: -252°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char(2), CH,Cl, GC/FID, III [#1018]
1028 12	1 ppm = 5.03 mg/m ³				RGasD: 4.2 Nonflammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 200 ppm: CCRFOV/PAPROV/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrite eyes, nose, liver, kidney damage, skin blisters	Eye Skin Breath Swallow Medical attention immed	Eyes, skin, resp sys liver, kidneys
[o-Dichlorobenzene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Eye irrit, swell periorb, profuse rhinitis; head, anor, nau, vomit, low-wgt, jaun, cirr, in animals liver, kidney inj; [carc]	Eye Skin Breath Swallow Medical attention immed	Liver, resp sys, eyes, kidneys, skin [in animals: liver & kidney cancer]
[p-Dichlorobenzene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH § SCBAF PD, PP/SAF PD, PP ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Skin sens, derm, head, dizz, caustic burns, frequent urination, dysuria, hema, GI upset, upper resp infection; [carc]	Eye Skin Breath Swallow Medical attention immed	Bladder, liver, lung, skin, GI tract [in animals: liver & bladder cancer]
[3,3'-Dichlorobenzidine (and its salts)]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	NIOSH/OSHA 10,000 ppm: SA 15,000 ppm: SA:CF/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Dizz, tremor, asphy, uncon, card arry, card arrest, liq: frostbite	Eye: Skin: Breath: Resp support	CVS, PNS
[Dichlorodifluoromethane]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1,3-Dichloro-5,5- dimethylhydantoin $C_5H_8Cl_2N_2O_2$ 118-52-5 MU0700000	Dactin, DDH, Halane	NIOSH 0.2 mg/m ³ ST 0.4 mg/m ³ OSHA† 0.2 mg/m ³	5 mg/m ³	White powder with a chlorine-like odor	MW 197.0 BP ? Sol 0.2% Fl P 346°F IP ?	VP ? MLT 270°F UEL ? LEL ?	Water, strong acids, easily oxidized materials such as ammonia salts & sulfides	None available
					Sp Gr 1.5 Combustible Solid			
1,1-Dichloroethane $CH_3CH_2Cl_2$ 75-34-3 KI0175000	Asymmetrical dichloroethane, Ethylidene chloride, 1,1-Ethylidene dichloride	NIOSH 100 ppm (400 mg/m ³) See Appendix C (Chloroethanes) OSHA 100 ppm (400 mg/m ³)	3000 ppm	Colorless, oily liquid with a chloroform-like odor	MW 99.0 BP 135°F Sol 0.6% Fl P 2°F IP 11.06 eV	VP: 182 mm FRZ -143°F UEL 11.4% LEL 5.4%	Strong oxidizers, strong caustics	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
2362 27	1 ppm = 4.12 mg/m ³				Sp Gr 1.18 Class IB Flammable Liquid			
1,2-Dichloroethylene $ClCH=CHCl$ 540-59-0 KV9360000	Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene	NIOSH/OSHA 200 ppm (790 mg/m ³)	1000 ppm	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acid, chloroform-like odor	MW 97.0 BP 118-140°F Sol 0.4% Fl P 36-39°F IP 9.65 eV	VP 180-265 mm FRZ -57 to -115°F UEL 12.8% LEL 5.6%	Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymeri- zation.]	Char. CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1150 29	1 ppm = 4.03 mg/m ³				Sp Gr (77°F) 1.27 Class IB Flammable Liquid			
Dichloroethyl ether $(ClCH_2CH_2)_2O$ 111-44-4 KN0875000	bis(2-Chloroethyl)ether, 2,2'-Dichlorodiethyl ether, 2,2'-Dichloroethyl ether	NIOSH Ca See Appendix A 5 ppm (30 mg/m ³) ST 10 ppm (60 mg/m ³) [skin] OSHA† C 15 ppm (90 mg/m ³) [skin]	Ca [100 ppm]	Colorless liquid with a chlorinated solvent-like odor	MW 143.0 BP 352°F Sol 1% Fl P 131°F IP ?	VP 0.7 mm FRZ -58°F UEL ? LEL 2.7%	Strong oxidizers [Note: Decomposes in presence of moisture to form hydrochloric acid]	Char. CS, GC/FID, III [#1004]
1916 55	1 ppm = 5.94 mg/m ³				Sp Gr 1.22 Class II Combustible Liquid			

[illegible]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dichloromonofluoro- methane <chem>CHCl2F</chem> 75-43-4 PA8400000	Dichlorofluoromethane, Fluorodichloromethane, Freon® 21, Genetron® 21, Halon® 112, Refrigerant 21	NIOSH 10 ppm (40 mg/m³) OSHA† 1000 ppm (4200 mg/m³)	5000 ppm	Colorless gas with a slight, ether- like odor [Note: A liquid below 48°F Shipped as a liquefied compressed gas]	MW 102.9 BP 48°F Sol(86°F) 0.7% Fl.P. NA IP 12.39 eV	VP(70°F): 1.6 atm FRZ -211°F UEL NA LEL NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium, acid, acid fumes	Char(2), CS, GC/FID, III [#2516]
1029 12	1 ppm = 4.28 mg/m³				RGasD: 3.57 Nonflammable Gas			
1,1-Dichloro-1-nitro- ethane <chem>CH3CCl2NO2</chem> 594-72-9 K1050000	Dichloronitroethane	NIOSH/OSHA 2 ppm (10 mg/m³) OSHA† C10 ppm (60 mg/m³)	25 ppm	Colorless liquid with an unpleasant odor [fumigant]	MW 143.9 BP 265°F Sol 0.3% Fl.P 136°F IP: ?	VP 15 mm FRZ ? UEL ? LEL ?	Strong oxidizers [Note: Corrosive to iron in presence of moisture]	Char(pet), CS, GC/FID, III [#1501]
2650 57	1 ppm = 5.98 mg/m³				Sp Gr: 1.43 Class II Combustible Liquid			
1,3-Dichloropropene <chem>ClHC=CHCH2Cl</chem> 542-75-6 UC8310000	3-Chloroallyl chloride; DCP; 1,3-Dichloro-1-propene; 1,3-Dichloropropylene; Telone®	NIOSH Ca 1 ppm (5 mg/m³) [skin] See Appendix A OSHA† none	Ca [N.D.]	Colorless to straw- colored liquid with a sharp, sweet, irritating, chloroform-like odor. [insecticide] [Note: Exists as mixture of cis- & trans-isomers.]	MW: 111.0 BP: 226°F Sol: 0.2% Fl.P: 77°F IP: ?	VP: 28 mm FRZ: -119°F UEL: 14.5% LEL: 5.3%	Aluminum, magnesium, halogens, oxidizers [Note: Epichlorohydrin may be added as a stabilizer.]	None available
2047 29	1 ppm = 4.61 mg/m³				Sp.Gr: 1.21 Class IC Flammable Liquid			
2,2-Dichloropropionic acid <chem>CH3CCl2COOH</chem> 75-99-0 UF0690000	Dalapon; 2,2-Dichloropropanoic acid; α,α-Dichloropropionic acid	NIOSH 1 ppm (6 mg/m³) OSHA† none	N.D.	Colorless liquid with an acid odor. [herbicide] [Note: A white to tan powder below 46°F. The sodium salt, a white powder, is often used.]	MW: 143.0 BP: 374°F Sol: 50% Fl.P: NA IP: ?	VP: ? FRZ: 46°F UEL: NA LEL: NA	Metals [Note: Very corrosive to aluminum & copper alloys. Reacts slowly in water to form hydrochloric & pyruvic acids.]	None available
1760 60	1 ppm = 5.24 mg/m³				Sp.Gr: 1.40 Noncombustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Frostbite	NIOSH/OSHA	Inh	Asphy. card arrhy.	Eye:	Frostbite	Resp sys. CVS
Eyes:	Frostbite	100 ppm: SA	Con	card arrest.	Skin:	Frostbite	
Wash skin:	N.R.	250 ppm: SA CF	(liq)	liq: frostbite	Breath	Resp support	
Remove:	N.R.	500 ppm: SCBAF/SAF					
Change:	N.R.	5000 ppm: SA; PD, PP					
Provide:	Frostbite	§ SCBAF PD, PP/SAF PD, PP ASCBA					
		Escape: GMFOV/SCBAE					
[Dichloromono-fluoromethane]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	In animals: irrit eyes.	Eye	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	20 ppm: SA	Inh	skin, liver, heart, kidney	Skin	Soap wash immed	liver, kidneys, CVS
Wash skin:	When contam	25 ppm: SA; CF/SCBAF/SAF	Inh	damage, pulm edema, hemorr	Breath	Resp support	
Remove:	When wet or contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con		Swallow	Medical attention immed	
Change:	N.R.	Escape: GMFOV/SCBAE					
[1,1-Dichloro-1-nitroethane]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	§: SCBAF; PD, PP/SAF; PD, PP; ASCBA	Abs	sys; eye, skin burns; lac;	Skin:	Soap flush immed	CNS, liver, kidneys
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh	head, dizz;	Breath:	Resp support	[in animals:
Remove:	When wet (flamm)		Con	in animals: liver, kidney	Swallow:	Medical attention immed	cancer of the
Change:	N.R.			damage; [carc]			bladder, liver,
Provide:	Eyewash, Quick drench						lung & forestomach]
[1,3-Dichloropropene]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Inh	resp sys; eye, skin burns;	Skin:	Water flush immed	GI tract, CNS
Wash skin:	When contam		Con	lass, loss of appetite,	Breath:	Resp support	
Remove:	When wet or contam			diarr, vomit, slowing of	Swallow:	Medical attention immed	
Change:	N.R.			pulse; CNS depres			
Provide:	Eyewash, Quick drench						
[2,2-Dichloropropionic acid]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dichlorotetrafluoro- ethane CClF ₂ CClF ₂ 76-14-2 K11101000	1,2-Dichlorotetra- fluoroethane, Freon® 114, Genetron® 114; Halon® 242, Refrigerant 114	NIOSH/OSHA 1000 ppm (7000 mg/m ³)	15,000 ppm	Colorless gas with a faint, ether- like odor at high concentrations [Note: A liquid below 38°F Shipped as a liquefied compressed gas.]	MW 170.9 BP 38°F Sol 0.01% Fl.P. NA IP 12.20 eV	VP(70°F): 1.9 atm FRZ -137°F UEL NA LEL NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium, acids acid fumes	Char(2), CH, Cl, GC/FID, III [#1018]
1958 12	1 ppm = 7.10 mg/m ³				RGasD: 5.93 Nonflammable Gas			
Dichlorvos (CH ₃ O) ₂ P(O)OCH=CCl ₂ 62-73-7 TC0350000	DDVP, 2,2-Dichlorovinyl dimethyl phosphate	NIOSH/OSHA 1 mg/m ³ [skin]	100 mg/m ³	Colorless to amber liquid with a mild, chemical odor [Note: Insecticide that may be absorbed on a dry carrier.]	MW 221.0 BP Decomposes Sol 0.5% Fl.P: >175°F IP ?	VP: 0.01 mm FRZ ? UEL ? LEL ?	Strong acids, strong alkalis [Note: Corrosive to iron & mild steel.]	XAD-2, Toluene, GC/FPD, II(S) [P&CAM #295]
2783 55	1 ppm = 9.19 mg/m ³				Sp.Gr(77°F): 1.42 Class III Combustible Liquid			
Dicrotophos C ₈ H ₁₄ NO ₃ P 141-66-2 TC3850000	Bidrin®, Carbicron®, 2-Dimethyl cis-2-dimethyl- carbamoyl-1-methylvinyl- phosphate [(CH ₃ O) ₂ P(O)OC(CH ₃)=CHC(O)- N(CH ₃) ₂]	NIOSH 0.25 mg/m ³ [skin] OSHA† none	N.D.	Yellow-brown liquid with a mild, ester odor. [Insecticide]	MW: 237.2 BP: 752°F Sol: Miscible Fl.P: >200°F IP: ?	VP: 0.0001 mm FRZ: ? UEL: ? LEL: ?	Metals [Note: Corrosive to cast iron, mild steel, brass & stainless steel.]	None available
	1 ppm = 9.86 mg/m ³				Sp.Gr(59°F): 1.22 Class IIIB Combustible Liquid			
Dicyclopentadiene C ₁₀ H ₁₂ 77-73-6 PC1050000	Bicyclopentadiene; DCPD; 1,3-Dicyclopentadiene dimer; 3a,4,7,7a-Tetrahydro-4,7- methanoindene [Note: Exists in two stereoisomeric forms.]	NIOSH 5 ppm (30 mg/m ³) OSHA† none	N.D.	Colorless, crystal- line solid with a disagreeable, camphor-like odor. [Note: A liquid above 90°F.]	MW: 132.2 BP: 342°F Sol: 0.02% Fl.P(oc): 90°F IP: ?	VP: 1.4 mm FRZ: 90°F UEL: 6.3% LEL: 0.8%	Oxidizers [Note: Depolymerizes at boiling point and forms two molecules of cyclopentadiene. Must be inhibited and maintained under an inert atmosphere to prevent polymerization.]	None available
2048 26	1 ppm = 5.50 mg/m ³				Sp.Gr: 0.98 (Liquid at 95°F) Class IC Flammable Liquid Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Frostbite	NIOSH/OSHA 10,000 ppm: SA 15,000 ppm: SA:CF/SCBAF/SAF 5: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh	Irrit resp sys; asphy;	Eye:	Frostbite	Resp sys, CVS
Eyes:	Frostbite		Con	card arrhy, card arrest;	Skin:	Frostbite	
Wash skin:	N.R.		(sq)	liq:frostbite	Breath:	Resp support	
Remove:	N.R.						
Change:	N.R.						
Provide:	Frostbite						
[Dichlorotetrafluoroethane]							
Skin:	Prevent skin contact	NIOSH/OSHA 10 mg/m ³ : SA 25 mg/m ³ : SA:CF 50 mg/m ³ : SA:CF/SCBAF/SAF 100 mg/m ³ : SA:PD,PP 5: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, miosis,	Eye:	Irr immed	Resp sys, CVS, CNS, eyes, skin, blood chol
Eyes:	Prevent eye contact		Abs	ache eyes; rhin, head,	Skin:	Soap wash immed	
Wash skin:	When contam		Ing	chest tight, wheez, lar	Breath:	Resp support	
Remove:	When wet or contam		Con	spasm, saliv, cyan, anor, nau, vomit, diarr; sweat; muscle fasc, para, gidd, ataxia, convuls; lofr BP, card irreg	Swallow:	Medical attention immed	
Change:	N.R.						
[Dichlorvos]							
Skin:	Prevent skin contact	TBAL	Inh	Head, nau, dizz, anxiety,	Eye:	Irr immed	CNS, blood chol
Eyes:	Prevent eye contact		Abs	restless, muscle twitch,	Skin:	Water wash immed	
Wash skin:	When contam		Ing	weak, tremor, inco, vomit,	Breath:	Resp support	
Remove:	When wet or contam		Con	abdom cramps, diarr; saliv, sweat, lac, rhinitis; anor, mal	Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Quick drench						
[Dicrotophos]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys, CNS, kidneys
Eyes:	Prevent eye contact		Ing	throat; inco, head; sneez,	Skin:	Soap flush immed	
Wash skin:	When contam		Con	cough; skin blisters; in animals: kidney, lung damage	Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Dicyclopentadiene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dicyclopentadienyl iron (C ₅ H ₅) ₂ Fe 102-54-5 LK0700000	bis(Cyclopentadienyl)iron, Ferrocene, Iron dicyclopentadienyl	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Orange, crystalline solid with a camphor-like odor.	MW: 186.1 BP: 480°F Sol: Insoluble Fl.P: ? IP: 6.88 eV	VP: ? MLT: 343°F UEL: ? LEL: ?	Ammonium perchlorate, tetranitromethane, mercury(II) nitrate	None available
					Sp.Gr: ? Combustible Solid			
Dieldrin C ₁₂ H ₈ Cl ₆ O 60-57-1 IO1750000	HEOD, 1,2,3,4,10,10-Hexachloro- 6,7-epoxy- 1,4,4a,5,6,7,8,8a- octahydro-1,4-endo,exo- 5,8-dimethanonaphthalene	NIOSH Ca See Appendix A 0.25 mg/m ³ [skin] OSHA 0.25 mg/m ³ [skin]	Ca [50 mg/m ³]	Colorless to light- tan crystals with a mild, chemical odor. [insecticide]	MW 380.9 BP: Decomposes Sol 0.02% Fl.P: NA IP: ?	VP(77°F): 8 x 10 ⁻⁷ mm MLT: 349°F UEL: NA LEL: NA	Strong oxidizers, active metals such as sodium, strong acids, phenols	Filter, Isocane, GC/ECD, II(3) [#S283]
					Sp Gr: 1.75 Noncombustible Solid			
Diesel exhaust	Synonyms vary depending upon the specific diesel exhaust component.	NIOSH Ca See Appendix A OSHA none	Ca [N.D.]	Appearance and odor vary depending upon the specific diesel exhaust component.	Properties vary depending upon the specific diesel exhaust component.		Varies	Varies
Diethanolamine (HOCH ₂ CH ₂) ₂ NH 111-42-2 KL2975000	DEA; Di(2-hydroxyethyl)amine; 2,2-Dihydroxydiethylamine; Diolamine; bis(2-Hydroxyethyl)amine; 2,2'-iminodiethanol	NIOSH 3 ppm (15 mg/m ³) OSHA† none	N.D.	Colorless crystals or a syrupy, white liquid (above 82°F) with a mild, ammonia-like odor.	MW: 105.2 BP: 516°F (Decomposes) Sol: 95% Fl.P: 278°F IP: ? Sp.Gr: 1.10 Class III B Combustible Liquid Combustible Solid	VP: <0.01 mm MLT: 62°F UEL: 9.8% LEL: 1.6%	Oxidizers, strong acids, acid anhydrides, halides [Note: Reacts with CO, in the air. Hygro- scopic (i.e., absorbs moisture from the air). Corrosive to copper, zinc & galvanized iron.]	Imp; Reagent; IC; III [#3509, Amino- ethanol Compounds II]
	1 ppm = 4.37 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: Daily		TBAL	Inh Ing Con	Possible irrit eyes, skin, resp sys; in animals: liver, RBC, testicular changes	Eye: Skin: Breath: Swallow:	Irrimed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, liver, blood, repro sys
[Dicyclopentadienyl iron]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH X: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Head, dizz; nau, vomit, mal, sweat, myoclonic limb jerks: clonic, tonic convuls; coma; [carc]; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irrimed Soap wash Resp support Medical attention immed	CNS, liver, kidneys, skin [in animals: lung, liver, thyroid & adrenal gland tumors]
[Dieldrin]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH X: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOVHIE/SCBAE	Inh Con	Eye irrit, pulm func changes; [carc]	Breath:	Resp support	Eyes, resp sys [in animals: lung tumors]
[Diesel exhaust]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; eye burns, com nec; skin burns; lac, cough, sneez	Eye: Skin: Breath: Swallow:	Irrimed Water flush Resp support Medical attention immed	Eyes, skin, resp sys
[Diethanolamine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Diethylamine (C ₂ H ₅) ₂ NH 109-89-7 HZ8750000	Diethamine, N,N-Diethylamine; N-Ethylethanamine	NIOSH 10 ppm (30 mg/m ³) ST 25 ppm (75 mg/m ³) OSHA† 25 ppm (75 mg/m ³)	200 ppm	Colorless liquid with a fishy, ammonia-like odor.	MW 73.1 BP: 132°F Sol: Miscible Fl.P: -15°F IP: 8.01 eV	VP: 192 mm FRZ: -58°F UEL: 10.1% LEL: 1.8%	Strong oxidizers, strong acids, cellulose nitrate	Sig el, H ₂ SO ₄ / Methanol; GC/FID; III [#2010]
1154 68	1 ppm = 3.04 mg/m ³				Sp.Gr: 0.71 Class IB Flammable Liquid			
2-Diethylaminoethanol (C ₂ H ₅) ₂ NCH ₂ CH ₂ OH 100-37-8 KK5075000	Diethylaminoethanol; 2-Diethylaminoethyl alcohol; N,N-Diethylethanolamine; Diethyl-(2-hydroxyethyl)- amine; 2-Hydroxytriethylamine	NIOSH/OSHA 10 ppm (50 mg/m ³) [skin]	100 ppm	Colorless liquid with a nauseating, ammonia-like odor.	MW 117.2 BP: 325°F Sol: Miscible Fl.P: 126°F IP: ?	VP: 1 mm FRZ: -94°F UEL: ? LEL: ?	Strong oxidizers, strong acids	Sig el, Methanol; GC/FID; III [#2007, Amino- ethanol Com- pounds]
2686 29	1 ppm = 4.87 mg/m ³				Sp.Gr: 0.89 Class II Combustible Liquid			
Diethylenetriamine (NH ₂ CH ₂ CH ₂) ₃ NH 111-40-0 IE1225000	N-(2-Aminoethyl)-1,2- ethanediamine; bis(2-Aminoethyl)amine; DETA; 2,2'-Diaminodiethylamine	NIOSH 1 ppm (4 mg/m ³) [skin] OSHA† none	N.D.	Colorless to yellow liquid with a strong, ammonia-like odor. [Note: Hygroscopic (i.e., absorbs moisture from the air).]	MW: 103.2 BP: 325°F Sol: Miscible Fl.P: 208°F IP: ?	VP: 0.4 mm FRZ: -38°F UEL: 6.7% LEL: 2%	Oxidizers, strong acids, cellulose nitrate [Note: May form explosive complexes with silver, cobalt, or chromium compounds. Corrosive to aluminum, copper, brass & zinc.]	XAD-2; DMF; HPLC/UVD; III [#2540]
2079 29	1 ppm = 4.29 mg/m ³				Sp.Gr: 0.96 Class III Combustible Liquid			
Diethyl ketone CH ₃ CH ₂ COCH ₂ CH ₃ 96-22-0 SA8050000	DEX, Dimethylacetone, Ethyl ketone, Methylacetone, 3-Pentanone, Propione	NIOSH 200 ppm (705 mg/m ³) OSHA† none	N.D.	Colorless liquid with an acetone-like odor.	MW: 86.2 BP: 215°F Sol: 5% FLP(oc): 55°F IP: 9.32 eV	VP(77°F): 35 mm FRZ: -44°F UEL: 6.4% LEL: 1.6%	Strong oxidizers, alkalis, mineral acids, (hydrogen peroxide + nitric acid)	None available
1156 26	1 ppm = 3.58 mg/m ³				Sp.Gr: 0.81 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 5)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash (>0.5%), Quick drench (liq)	NIOSH 200 ppm: SA:CF/PAPRS/CCRFS/ GMFS/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys in animals: myocardial degeneration	Eye Skin Breath Swallow Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS
[Diethylamine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash (>5%), Quick drench	NIOSH/OSHA 100 ppm: CCROV/GMFOV/PAPROV/ SA/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys nausea, vomit	Eye Skin Breath Swallow Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[2-Diethylaminoethanol]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb, upper resp sys; derm, skin sens; eye, skin nec; cough, dysp, pulm sens	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Diethylenetriamine]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. Prevent eye contact Daily When wet (flamm) N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb, resp sys; cough, sneez	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
[Diethylketone]						

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		TBAL	Inh Ing Con	Irrite eyes, skin, nose, throat; head, dizz, nau; lac; possible polyneur, vestibular dysfunc; pain, numb, weak, spasms in arms & legs; in animals: repro effects	Eye: Skin: Breath: Swallow: Irr immed Wash regularly Resp support Medical attention immed	Eyes, skin, resp sys, CNS, PNS, repro sys
[Diethyl phthalate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: N.R. Remove: When wet or contam Change: N.R.		NIOSH/OSHA 1000 ppm: SA 2000 ppm: SA:CF/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals irrit resp sys. CNS symptoms, liver damage	Eye Skin Breath Swallow Irr immed Water flush immed Resp support Medical attention immed	Resp sys, CNS, liver
[Difluorodibromomethane]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrite eyes, skin, resp sys, skin burns, in animals: hemato sys, lung, liver, kidney damage, repro effects, [carc]	Eye Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, repro sys [in animals: skin tumors]
[Diglycidyl ether]						
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH 500 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrite eyes, skin, nose, throat, head, dizz, derm. liver, kidney damage	Eye Skin Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Diisobutyl ketone]						

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Diisopropylamine $[(CH_3)_2CH]_2NH$ 108-18-9 IM4025000	DIPA, N-(1-Methylethyl)-2- propanamine	NIOSH/OSHA 5 ppm (20 mg/m ³) [skin]	200 ppm	Colorless liquid with an ammonia- or fish-like odor	MW 101.2 BP 183°F Sol Miscible F.P. 20°F IP 7.73 eV	VP 70 mm FRZ -141°F UEL 7.1% LEL 1.1%	Strong oxidizers, strong acids	Imp KOH, GC/FID, III(4) [#S141]
1158 68	1 ppm = 4.21 mg/m ³				Sp Gr 0.72 Class IB Flammable Liquid			
Dimethyl acetamide $CH_3CON(CH_3)_2$ 127-19-5 AB7700000	N,N-Dimethyl acetamide, DMAC	NIOSH/OSHA 10 ppm (35 mg/m ³) [skin]	300 ppm	Colorless liquid with a weak, ammonia- or fish- like odor	MW 87.1 BP 329°F Sol Miscible F.P.(oc) 158°F IP 8.81 eV	VP 2 mm FRZ -4°F UEL(32°F) 11.5% LEL(212°F) 1.8%	Carbon tetrachloride, other halogenated compounds when in contact with iron, oxidizers	Si gel, Methanol, GC/FID, III [#2004]
	1 ppm = 3.62 mg/m ³				Sp Gr 0.94 Class IIIA Combustible Liquid			
Dimethylamine $(CH_3)_2NH$ 124-40-3 IP8750000	Dimethylamine (anhydrous), N-Methylmethanamine	NIOSH/OSHA 10 ppm (18 mg/m ³)	500 ppm	Colorless gas with an ammonia- or fish-like odor [Note: A liquid below 44°F Shipped as a liquefied compressed gas]	MW 45.1 BP 44°F Sol(140°F); 24% F.P. NA (Gas) 20°F (Liq) IP 8.24 eV RGasD:1.56 Sp Gr 0.67 (Liquid at 44°F) Flammable Gas/Class IA Flammable Liquid	VP 1.7 atm FRZ -134°F UEL 14.4% LEL 2.8%	Strong oxidizers, chlorine, mercury, acetaldehyde, fluorides, maleic anhydride, aluminum, brass, copper, zinc	Si gel, H ₂ SO ₄ / Methanol, GC/FID, III [#2010]
1032 19 (anhydrous) 1160 26 (solution)	1 ppm = 1.87 mg/m ³							
4-Dimethylamino- azobenzene $C_6H_5NNC_6H_4N(CH_3)_2$ 60-11-7 BX7350000	Butter yellow, DAB, p-Dimethylaminoazobenzene, N,N-Dimethyl-4-aminoazo- benzene, Methyl yellow	NIOSH Ca See Appendix A OSHA(1910.1015) See Appendix B	Ca [N.D.]	Yellow, leaf- shaped crystals	MW 225.3 BP Sublimes Sol: 0.001% F.P. ? IP ?	VP: 0.0000003 mm(est.) MLT 237°F UEL: ? LEL: ?	None reported	G-chrom P, 2-Propanol, GC/FID, III(4) [P&CAM #284]
					Sp Gr ?			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact (>5%) When contam When wet (flamm) N.R. Eyewash (>5%)	NIOSH/OSHA 125 ppm: SA CF/PAPROV ⁴ 200 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Ing Abs Ing Con	Irrit eyes, skin, resp sys, nausea, vomit, head, vis dist	Eye Skin Breath Swallow Irritated Water wash Irritated Resp support Medical attention Irritated	Eyes, skin, resp sys
[Diisopropylamine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH/OSHA 100 ppm: SA 250 ppm: SA CF 300 ppm: SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit skin; jaundice, liver damage, depression, lethargy, hallucinations, delusions	Eye Skin Breath: Swallow Irritated Water flush Irritated Resp support Medical attention Irritated	Skin, liver, CNS
[Dimethyl acetamide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq)/ Frostbite Prevent eye contact (liq)/ Frostbite When contam (liq) When wet (flamm) N.R. Eyewash (liq), Quick drench (liq), Frostbite	NIOSH/OSHA 250 ppm: SA CF ⁴ 500 ppm: SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit nose, throat, sneezing, cough, dyspnea, pulmonary edema, conjunctivitis, dermatitis; liq: frostbite	Eye Skin Breath Irritated (liq)/ Frostbite Water flush Irritated Resp support	Eyes, skin, resp sys
[Dimethylamine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH § SCBAF PD, PP/SAF PD, PP ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Enlarged liver, liver, kidney dysfunction, contact dermatitis, cough, wheezing, dyspnea; bloody sputum, bronchial secretions; frequent urination, hematuria, dysuria; [cancer]	Eye Skin Breath Swallow Irritated Soap wash Irritated Resp support Medical attention Irritated	Skin, resp sys, liver, kidneys, bladder [in animals: liver & bladder tumors]
[4-Dimethylaminoazobenzene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
bis(2-(Dimethylamino)- ethyl)ether $C_8H_{18}N_2O$ 3033-62-3 KR9460000	NIAX® A99; NIAX® Catalyst A1; 2,2'-Oxybis(N,N-dimethyl ethylamine) [(CH ₃) ₂ NCH ₂ CH ₂ OCH ₂ CH ₂ N(CH ₃) ₂] [Note: A component (5%) of NIAX® Catalyst ESN, along with dimethylaminopropio- nitrile (95%).] 1 ppm = 6.67 mg/m ³	NIOSH/OSHA See Appendix C (NIAX® Catalyst ESN)	N.D.	Liquid.	MW: 160.3 BP: 372°F Sol: ? F.P.: ? IP: ? Sp.Gr: ?	VP: ? FRZ: ? UEL: ? LEL: ?	None reported	None available
Dimethylamino- propionitrile $(CH_3)_2NCH_2CH_2CN$ 1738-25-6 UG1575000	3-(Dimethylamino)- propionitrile; N,N-Dimethylamino-3- propionitrile [Note: A component (95%) of NIAX® Catalyst ESN, along with bis(2-(dimethylamino)- ethyl) ether (5%).] 1 ppm = 4.08 mg/m ³	NIOSH/OSHA See Appendix C (NIAX® Catalyst ESN)	N.D.	Colorless liquid.	MW: 98.2 BP: 342°F Sol: Miscible F.P.: 147°F IP: ? Sp.Gr(86°F): 0.86 Class IIIA Combustible Liquid	VP(135°F): 10mm FRZ: -48°F UEL: ? LEL: ?	Oxidizers [Note: Emits toxic oxides of nitrogen and cyanide fumes when heated to decomposition.]	None available
N,N-Dimethylaniline $C_8H_9N(CH_3)_2$ 121-69-7 BX4725000 2253 57	N,N-Dimethylbenzeneamine; N,N-Dimethylphenylamine [Note: Also known as Dimethylaniline which is a correct synonym for Xylidine.] 1 ppm = 5.04 mg/m ³	NIOSH 5 ppm (25 mg/m ³) ST 10 ppm (50 mg/m ³) [skin] OSHA† 5 ppm (25 mg/m ³) [skin]	100 ppm	Pale-yellow, oily liquid with an amine-like odor [Note: A solid below 36°F]	MW 121.2 BP: 378°F Sol: 2% F.P. 142°F IP: 7.14 eV Sp Gr 0.96 Class IIIA Combustible Liquid	VP: 1 mm FRZ: 36°F UEL: ? LEL: ?	Strong oxidizers, strong acids, benzoyl peroxide	Si gel, Ethanol, GC/FID, III [#2002, Aromatic Amines]
Dimethyl carbamoyl chloride $(CH_3)_2NCOCI$ 79-44-7 FD4200000 2262 60	Chloroformic acid dimethylamide; Dimethylcarbamoyl chloride; N,N-Dimethylcarbamoyl chloride; DMCC 1 ppm = 4.47 mg/m ³	NIOSH Ca See Appendix A OSHA none	Ca [N.D.]	Clear, colorless liquid.	MW: 107.6 BP: 329°F Sol: Reacts F.P.: 155°F IP: ? Sp.Gr: 1.17 Class IIIA Combustible Liquid	VP: ? FRZ: -27°F UEL: ? LEL: ?	Acids, water [Note: Rapidly hydrolyzes in water to dimethylamine, carbon dioxide, and hydrogen chloride.]	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH W: SCBAF:PD,PP/SAF:PD,PP:ASCB Escape: GMFOV/SCBAE	Inh Abs Ing Con	Possible urinary dysfunction; neurological disorders; in animals: irritates eyes, skin	Eye: Skin: Breath: Swallow: Irrigated Water flush Irrigated Resp support Medical attention Irrigated	Eyes, skin, urinary tract, PNS
[bis(2-(Dimethylamino)ethyl)ether]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH W: SCBAF:PD,PP/SAF:PD,PP:ASCB Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritates eyes, skin; urinary dysfunction; neurological disorders; pins & needles in hands & feet; muscle weakness, nausea, vomit; decreased nerve conduction in lower legs	Eye: Skin: Breath: Swallow: Irrigated Water flush Irrigated Resp support Medical attention Irrigated	Eyes, skin, urinary tract, PNS
[Dimethylaminopropionitrile]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench	NIOSH/OSHA 50 ppm: SA 100 ppm: SA, CF/SCBAF/SAF S: SCBAF:PD,PP/SAF:PD,PP:ASCB Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia symptoms: cyanosis, weakness, dizziness, ataxia; methemoglobinemia	Eye: Skin: Breath: Swallow: Irrigated Soap wash Irrigated Resp support Medical attention Irrigated	Blood, kidneys, liver, CVS
[N,N-Dimethylaniline]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH W: SCBAF:PD,PP/SAF:PD,PP:ASCB Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritates eyes, skin, nose, throat, respiratory system; eye, skin burns; cough, wheezing, laryngitis, dyspnea; headache, nausea, vomit; liver injury; carcinogenic	Eye: Skin: Breath: Swallow: Irrigated Water flush Irrigated Resp support Medical attention Irrigated	Eyes, skin, respiratory system, liver [in animals: nasal cancer]
[Dimethyl carbamoyl chloride]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, F.P., IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Dimethyl-1,2-dibromo- 2,2-dichloroethyl phosphate (CH ₃ O) ₂ P(O)OCHBrCBrCl ₂ 300-76-5 TB9450000	Dibrom®; 1,2-Dibromo-2,2-dichloro- ethyl dimethyl phosphate, Naled	NIOSH 3 mg/m ³ [skin] OSHA† 3 mg/m ³	200 mg/m ³	Colorless to white solid or straw- colored liquid (above 80°F) with a slightly pungent odor [Insecticide]	MW 290.8 BP Decomposes Sol Insoluble F.P. NA IP ?	VP 0.0002 mm MLT 80°F UEL NA LEL NA	Strong oxidizers, acids, sunlight, water [Note Corrosive to metals Hydrolyzed in presence of water.]	None available
	1 ppm = 15.83 mg/m ³				Sp Gr(77°F) 1.96 Noncombustible Solid			
Dimethylformamide HCON(CH ₃) ₂ 68-12-2 LQ2100000	Dimethyl formamide, N,N-Dimethylformamide, DMF	NIOSH/OSHA 10 ppm (30 mg/m ³) [skin]	500 ppm	Colorless to pale- yellow liquid with a faint, amine- like odor	MW 73.1 BP 307°F Sol Miscible F.P. 136°F IP 9.12 eV	VP 3 mm FRZ -78°F UEL 15.2% LEL(212°F) 2.2%	Carbon tetrachloride, other halogenated compounds when in contact with iron, strong oxidizers, alkyl aluminums, inorganic nitrates	Si gel, Methanol, GC/FID, III [#2004]
	2265 26	1 ppm = 3.04 mg/m ³			Sp Gr. 0.95 Class II Combustible Liquid			
1,1-Dimethylhydrazine (CH ₃) ₂ NNH ₂ 57-14-7 MV2450000	Dimazine, DMH, UDMH, Unsymmetrical dimethyl- hydrazine	NIOSH Ca See Appendix A C 0.6 ppm (0.15 mg/m ³) [2-hr] OSHA 0.5 ppm (1 mg/m ³) [skin]	Ca [15 ppm]	Colorless liquid with an ammonia- or fish-like odor.	MW 50.1 BP 147°F Sol Miscible F.P. 5°F IP 8.05 eV	VP 103 mm FRZ -72°F UEL 95% LEL 2%	Oxidizers, halogens, metallic mercury, fuming nitric acid, hydrogen peroxide [Note May ignite SPONTANEOUSLY in contact with oxidizers.]	Bub., Pho-acid; Vis. III [#S143]
	1163 57	1 ppm = 2.50 mg/m ³			Sp Gr. 0.79 Class IB Flammable Liquid			
Dimethylphthalate C ₆ H ₄ (COOCH ₃) ₂ 131-11-3 TI1575000	Dimethyl ester of 1,2-benzenedicarboxylic acid, DMP	NIOSH/OSHA 5 mg/m ³	2000 mg/m ³	Colorless, oily liquid with a slight, aromatic odor. [Note: A solid below 42°F]	MW 194.2 BP 543°F Sol 0.4% F.P. 295°F IP 9.64 eV	VP 0.01 mm FRZ 42°F UEL ? LEL(358°F) 0.9%	Nitrates, strong oxidizers, alkalis & acids	None available
	9188 31	1 ppm = 8.07 mg/m ³			Sp Gr. 1.19 Class IIIB Combustible Liquid, however, ignition is difficult			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, miosis	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	30 mg/m ³ DMFu/HiE/SA	Abs	fac. head, chest tight,	Skin	CNS, CVS, blood chol
Wash skin:	When contam	75 mg/m ³ SA CF/PAPRDMFu	Ing	wheez, lar spasm, saliv.	Breath	
Remove:	When wet or contam	150 mg/m ³ HiEF/SAT CF/PAPRTHiE/SCBAF/SAF	Con	cyan, anox, nau vomit, abdom cramp, diarr, weak twitch, para, gidd, ataxia, convuls, low BP, card irreg	Swallow	
Change:	Daily	200 mg/m ³ SA:PD,PP				
Provide:	Eyewash	§ SCBAF PD,PP/SAF PD,PP ASCBA Escape: HiEF/SCBAE				
[Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	100 ppm SA*	Abs	nau, vomit, colic, liver	Skin	liver, kidneys, CVS
Wash skin:	When contam	250 ppm SA CF*	Ing	damage, enlarged liver;	Breath	
Remove:	When wet or contam	500 ppm SAT CF/SCBAF/SAF	Con	high BP, face flush, derm, in animals kidney, heart damage	Swallow	
Change:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE				
[Dimethylformamide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, choking,	Eye	CNS, liver, GI
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Abs	chest pain, dysp, leth,	Skin	tract, blood,
Wash skin:	When contam	Escape: GMFS/SCBAE	Ing	nau, anoxia, convuls, liver	Breath	resp sys, eyes,
Remove:	When wet (flamm)		Con	ing: [card]	Swallow	skin
Change:	N.R.					[in animals: tumors of the lungs, liver, blood vessels & intestines]
Provide:	Eyewash, Quick drench					
[1,1-Dimethylhydrazine]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, upper resp sys;	Eye	Eyes, resp sys, GI
Eyes:	Prevent eye contact	50 mg/m ³ DMF	Ing	stomach pain	Skin	tract
Wash skin:	N.R.	125 mg/m ³ SA CF/PAPRDMF	Con		Breath	
Remove:	N.R.	250 mg/m ³ HiEF/SCBAF/SAF			Swallow	
Change:	N.R.	2000 mg/m ³ SAF:PD,PP				
		§ SCBAF PD,PP/SAF PD,PP ASCBA Escape: HiEF/SCBAE				
[Dimethylphthalate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dimethyl sulfate (CH ₃) ₂ SO ₄ 77-78-1 WS8225000	Dimethyl ester of sulfuric acid. Dimethylsulfate. Methyl sulfate	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m ³) [skin] OSHA† 1 ppm (5 mg/m ³) [skin]	Ca [7 ppm]	Colorless, oily liquid with a faint, onion-like odor	MW 126.1 BP: 370°F (Decomposes) Sol (64°F) 3% Fl.P. 182°F IP: ? Sp Gr: 1.33 Class IIIA Combustible Liquid	VP 0.1 mm FRZ: -25°F UEL: ? LEL: ?	Strong oxidizers, ammonia solutions [Note: Decomposes in water to sulfuric acid, corrosive to metals]	Porapak-P Diethyl ether, GC/EConD, III, [#2524]
1595 57	1 ppm = 5.24 mg/m ³							
Dinitolmide (NO ₂) ₂ C ₆ H ₄ (CH ₃)CONH ₂ 148-01-6 XS4200000	3,5-Dinitro-o-toluidide; 2-Methyl-3,5-dinitro- benzamide; Zolene	NIOSH 5 mg/m ³ OSHA† none	N.D.	Yellowish, crystalline solid.	MW: 225.2 BP: ? Sol: Slight Fl.P: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP: ? MLT: 351°F UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
o-Dinitrobenzene C ₆ H ₄ (NO ₂) ₂ 528-29-0 CZ7450000	ortho-Dinitrobenzene; 1,2-Dinitrobenzene	NIOSH/OSHA 1 mg/m ³ [skin]	50 mg/m ³	Pale white or yellow, crystalline solid	MW 168.1 BP: 606°F Sol: 0.05% Fl.P: 302°F IP: 10.71 eV Sp Gr: 1.57 Combustible Solid	VP: ? MLT: 244°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition]	Filter/Bub. Methanol, HPLC/UVD, II(4) [#S214]
1597 56								
m-Dinitrobenzene C ₆ H ₄ (NO ₂) ₂ 99-65-0 CZ7350000	meta-Dinitrobenzene; 1,3-Dinitrobenzene	NIOSH/OSHA 1 mg/m ³ [skin]	50 mg/m ³	Pale white or yellow, crystalline solid	MW 168.1 BP: 572°F Sol: 0.02% Fl.P: 302°F IP: 10.43 eV Sp Gr: 1.58 Combustible Solid	VP: ? MLT: 192°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition]	Filter/Bub. Methanol, HPLC/UVD, II(4) [#S214]
1597 56								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 5)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, head,	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	5 SCBAF PD PP/SAF PD PP ASCBA	Abs	gidd, conj, photo, periorb	Skin	liver, kidneys,
Wash skin:	When contam	Escape GMFS/SCBAE	Inh	edema, dysphonia, aphonia,	Breath	CNS
Remove:	When wet or contam		Ing	dysphagia, productive	Swallow	[in animals:
Change:	N.R.		Con	cough, chest pain, dysp,		nasal & lung cancer]
Provide:	Eyewash, Quick drench			cyan, vomit, diarr, dysuria,		
				analgesia, fever, album,		
				hema, eye, skin burns,		
				delirium, [carc]		
[Dimethyl sulfate]						
Skin:	Prevent skin contact	TBAL	Inh	Contact eczema;	Eye:	Skin, liver, blood
Eyes:	Prevent eye contact		Abs	in animals: methemo, liver	Skin:	
Wash skin:	When contam		Ing	changes	Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	Daily					
[Dinitolmide]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Anoxia, cyan, vis dist,	Eye	Eyes, skin, blood,
Eyes:	Prevent eye contact	5 mg/m ³ DM	Abs	central scotomas, bad	Skin	liver, CVS, CNS
Wash skin:	When contam	10 mg/m ³ DMXSO/HIE/SA	Ing	taste, burning mouth, dry	Breath	
Remove:	When wet or contam	25 mg/m ³ SA CF/PAPRDM	Con	throat, thirst, yellowing	Swallow:	
Change:	Daily	50 mg/m ³ HIEF/SAT CF/PAPRTHIE/		hair, eyes, skin, anemia,		
Provide:	Quick drench	SCBAF/SAF		liver damage		
		5 SCBAF PD PP/SAF PD PP ASCBA				
		Escape: HIEF/SCBAE				
[o-Dinitrobenzene]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Anoxia, cyan, vis dist,	Eye	Eyes, skin, blood,
Eyes:	Prevent eye contact	5 mg/m ³ DM	Abs	central scotomas, bad	Skin	liver, CVS, CNS
Wash skin:	When contam	10 mg/m ³ DMXSO/HIE/SA	Ing	taste, burning mouth, dry	Breath:	
Remove:	When wet or contam	25 mg/m ³ SA CF/PAPRDM	Con	throat, thirst, yellowing	Swallow:	
Change:	Daily	50 mg/m ³ HIEF/SAT CF/PAPRTHIE/		hair, eyes, skin, anemia,		
Provide:	Quick drench	SCBAF/SAF		liver damage		
		5 SCBAF PD PP/SAF PD PP ASCBA				
		Escape: HIEF/SCBAE				
[m-Dinitrobenzene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
p-Dinitrobenzene $C_6H_4(NO_2)_2$ 100-25-4 CZ7525000	para-Dinitrobenzene, 1,4-Dinitrobenzene	NIOSH/OSHA 1 mg/m ³ [skin]	50 mg/m ³	Pale white or yellow, crystalline solid	MW 168.1 BP 570°F Sol 0.01% Fl P ? IP 10 50 eV	VP ? MLT 343°F UEL ? LEL ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition]	Filter/Bub. Methanol HPLC/UVD: III(4) [#S214]
1597 56					Sp Gr. 1.63 Combustible Solid			
Dinitro-o-cresol $CH_3C_6H_3OH(NO_2)_2$ 534-52-1 GO9625000	4,6-Dinitro-o-cresol; 3,5-Dinitro-2-hydroxy- toluene; 4,6-Dinitro-2-methyl phenol; DNC, DNOC	NIOSH/OSHA 0.2 mg/m ³ [skin]	5 mg/m ³	Yellow, odorless solid [insecticide]	MW 198.1 BP 594°F Sol 0.01% Fl P: NA IP: ?	VP: 0.00005 mm MLT: 190°F UEL: NA LEL: NA MEC: 30 g/m ³	Strong oxidizers	Filter/Bub. 2-Propanol, HPLC/UVD: III [#S166]
1598 53					Sp Gr. >1.1 (estimated) Noncombustible Solid			
Dinitrotoluene $C_6H_4CH_3(NO_2)_2$ 25321-14-6 XT1300000	Dinitrotoluol, DNT, Methyldinitrobenzene	NIOSH Ca See Appendix A 1.5 mg/m ³ [skin] OSHA 1.5 mg/m ³ [skin]	Ca [50 mg/m ³]	Orange-yellow crystalline solid with a character- istic odor. [Note: Often shipped molten]	MW 182.2 BP 572°F Sol Insoluble Fl P: 404°F IP: ?	VP: 1 mm MLT: 158°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Commercial grades will decompose at 482°F, with self-sustaining decomposition at 536°F.]	Filter/ Tenax; GC/TEA- EAP; OSHA [#44]
1600 56 (molten) 2038 56 (solid)					Sp Gr. 1.32 Combustible Solid, but difficult to ignite			
Di-sec octyl phthalate $C_{24}H_{40}O_4$ 117-81-7 T10350000	DEHP, Di(2-Ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)- phthalate, Octyl phthalate [$C_8H_{17}(COOCH_2CH(C_2H_5)C_6H_4)_2$]	NIOSH Ca See Appendix A 5 mg/m ³ ST 10 mg/m ³ OSHA† 5 mg/m ³	Ca [5000 mg/m ³]	Colorless, oily liquid with a slight odor.	MW 390.5 BP 727°F Sol (75°F): 0.00003% Fl P (oc): 420°F IP: ?	VP: <0.01 mm FRZ: -58°F UEL: ? LEL (474°F): 0.3%	Nitrates, strong oxidizers, acids & alkalis	Filter, CS, GC/FID: III [#5020, di(2-Ethyl- hexyl) phthalate]
	1 ppm = 16.23 mg/m ³				Sp Gr. 0.99 Class IIIB Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Anoxia, cyan, vis dist,	Eye	Eyes, skin, blood,
Eyes:	Prevent eye contact	5 mg/m ³ DM	Abs	central scotomas, bad	Skin	liver, CVS, CNS
Wash skin:	When contam	10 mg/m ³ DMXSO/HIE/SA	Ing	taste, burning mouth, dry	Breath:	
Remove:	When wet or contam	25 mg/m ³ SA,CF/PAPRDM	Con	throat, thirst; yellowing	Swallow:	
Change:	Daily	50 mg/m ³ HIEF/SAT,CF/PAPRTHIE/SCBAF/SAF		hair, eyes, skin, anemia,		
Provide:	Quick drench	Escape HIEF/SCBAE		liver damage		
[p-Dinitrobenzene]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Sense of well being;	Eye	CVS, endocrine
Eyes:	Prevent eye contact	2 mg/m ³ DMF	Abs	head, fever, lass, profuse	Skin	sys
Wash skin:	When contam/Daily	5 mg/m ³ HIEF/SA,CF/PAPRDM/SCBAF/SAF	Ing	sweat, excess thirst,	Breath:	
Remove:	When wet or contam	Escape HIEF/SCBAE	Con	tacar, hyperpnea, cough,	Swallow:	
Change:	Daily			short breath, coma		
[Dinitro-o-cresol]						
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan; anemia,	Eye	Blood, liver,
Eyes:	Prevent eye contact	W: SCBAF,PD,PP/SAF,PD,PP,ASCBA	Abs	jaun, repro effects;	Skin	CVS, repro sys
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Ing	[carc]	Breath:	[in animals:
Remove:	When wet or contam		Con		Swallow:	liver, skin &
Change:	Daily					kidney tumors]
Provide:	Quick drench					
[Dinitrotoluene]						
Skin:	N.R.	NIOSH	Inh	Irrit eyes, muc memb;	Eye	Eyes, resp sys, CNS,
Eyes:	N.R.	W: SCBAF,PD,PP/SAF,PD,PP,ASCBA	Ing	in animals: liver damage;	Breath:	liver, repro sys,
Wash skin:	N.R.	Escape: HIEF/SCBAE	Con	terato effects; [carc]	Swallow:	GI tract
Remove:	N.R.					[in animals:
Change:	N.R.					liver tumors]
[Di-sec octyl phthalate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Dioxane <chem>C6H10O2</chem> 123-91-1 JG8225000	Diethylene dioxide, Diethylene ether, Dioxan, p-Dioxane, 1,4-Dioxane	NIOSH Ca See Appendix A C 1 ppm (3.6 mg/m ³) [30-min] OSHA† 100 ppm (360 mg/m ³) [skin]	Ca [500 ppm]	Colorless liquid or solid (below 53°F) with a mild, ether-like odor.	MW: 88.1 BP: 214°F Sol: Miscible Fl.P: 55°F IP: 9.13 eV	VP: 29 mm FRZ: 53°F UEL: 22% LEL: 2.0%	Strong oxidizers, decaborane, triethyl aluminum	Char. CS, GC/FID, III [#1602]
1165-26	1 ppm = 3.66 mg/m ³				Sp Gr: 1.03 Class IB Flammable Liquid			
Dioxathion <chem>C6H10O2S2</chem> [SPS(OC ₂ H ₅) ₂] ₂ 78-34-2 TE3350000	DeInav®; p-Dioxane-2,3-diyl ethyl phosphorodithioate; Dioxane phosphate; 2,3-p-Dioxanethiol S,S-bis- (O,O-diethyl phosphoro- dithioate); Navadel®	NIOSH 0.2 mg/m ³ [skin] OSHA† none	N.D.	Viscous, brown, tan, or dark-amber liquid. [insecticide] [Note: Technical product is a mixture of cis- & trans-isomers.]	MW: 456.6 BP: ? Sol: Insoluble Fl.P: NA IP: ?	VP: ? FRZ: -4°F UEL: NA LEL: NA	Alkalis, iron or tin surfaces, heat	None available
	1 ppm = 18.98 mg/m ³				Sp.Gr(79°F): 1.26 Noncombustible Liquid			
Diphenyl <chem>C6H5C6H5</chem> 92-52-4 DU8050000	Biphenyl; Phenyl benzene	NIOSH/OSHA 1 mg/m ³ (0.2 ppm)	100 mg/m ³	Colorless to pale- yellow solid with a pleasant, characteristic odor. [fungicide]	MW: 154.2 BP: 489°F Sol: Insoluble Fl.P: 235°F IP: 7.95 eV	VP: 0.005 mm MLT: 155°F UEL(311°F): 58% LEL(232°F): 0.6%	Oxidizers	Tenax GC; CCI, GC/FID, III [#2530, Biphenyl]
	1 ppm = 6.41 mg/m ³				Sp. Gr: 1.04 Combustible Solid			
Diphenylamine <chem>(C6H5)2NH</chem> 122-39-4 JJ7800000	Anilinobenzene, DPA, Phenylaniline, N-Phenylaniline, N-Phenylbenzenamine [Note: The carcinogen 4-Aminodiphenyl may be present as an impurity in the commercial product.]	NIOSH 10 mg/m ³ OSHA† none	N.D.	Colorless, tan, amber, or brown crystalline solid with a pleasant, floral odor. [fungicide]	MW: 169.2 BP: 576°F Sol: 0.03% Fl.P: 307°F IP: 7.40 eV	VP(227°F): 1 mm MLT: 127°F UEL: ? LEL: ?	Oxidizers, hexachloro- melamine, trichloro- melamine	None available
					Sp.Gr: 1.16 Combustible Solid; explosive if a cloud of dust is exposed to a source of ignition.			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	NIOSH * SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, drow, head nau vomit, liver damage, kidney failure [carc]	Eye Skin Breath Swallow Irr immed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys liver, kidneys [in animals: lung, liver & nasal cavity tumors]
[Dioxane]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin; head, gidd, verti, weak; rhin, chest tight; miosis; nau, vomit, abdom cramps, diarr, saliv; musc fasc; conf, drow	Eye: Skin: Breath: Swallow: Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Dioxathion]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash (molt), Quick drench (molt)	NIOSH/OSHA 10 mg/m ³ CCROVDM/SA 25 mg/m ³ SA:CF*/PAPROVDM* 50 mg/m ³ CCRFOVH/E/GMFOVH/E/ PAPRTOVH/E*/SCBAF/SAF 100 mg/m ³ : SAF;PD,PP § SCBAF PD,PP/SAF PD,PP /ASCBA Escape GMFOVH/E/SCBAE	Inh Abs Ing Con	Irrit eyes, throat, head, nau, fig, numb limbs, liver damage	Eye Skin Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys liver, CNS
[Diphenyl]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; eczema; tacar, hypertension; cough, sneez; methemo; incr BP, heart rate; prot, hema, bladder inj; in animals: terato effects	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CVS, blood, bladder, repro sys
[Diphenylamine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dipropylene glycol methyl ether <chem>CH3OC2H4OC2H4OH</chem> 34590-94-8 JM1575000	Dipropylene glycol monomethyl ether Dowanol® 50B 1 ppm = 6.15 mg/m ³	NIOSH 100 ppm (600 mg/m ³) ST 150 ppm (900 mg/m ³) [skin] OSHA† 100 ppm (600 mg/m ³) [skin]	600 ppm	Colorless liquid with a mild ether-like odor	MW: 148 ? BP: 408°F Sol: Miscible Fl.P: 180°F IP: ? Sp Gr: 0.95 Class IIIA Combustible Liquid	VP: 0.5 mm FRZ: -112°F UEL: 3.0% LEL(392°F): 1.7%	Strong oxidizers	Char; CS; GC/FID II(2) [#S69]
Dipropyl ketone <chem>(CH3CH2CH2)2CO</chem> 123-19-3 MJ5600000	Butyrono, BPK, 4-Heptanone, Heptan-4-one, Propyl ketone 1 ppm = 4.75 mg/m ³	NIOSH 50 ppm (235 mg/m ³) OSHA† none	N.D.	Colorless liquid with a pleasant odor.	MW: 114.2 BP: 291°F Sol: Insoluble Fl.P: 120°F IP: 9.10 eV Sp.Gr: 0.82 Class II Combustible Liquid	VP: 5 mm FRZ: -27°F UEL: ? LEL: ?	Oxidizers	Char; CS; GC/FID; OSHA [Adapt #7]
2710 26 Diquat (Diquat dibromide) <chem>C12H14N2Br2</chem> 85-00-7 JM5690000 2781 55 (solid) 2782 28 (liquid)	Diquat dibromide; 1,1'-Ethylene-2,2'- bipyridylium dibromide [Note: Diquat is a cation: (C ₁₂ H ₁₄ N ₂) ²⁺ ; 1,1'- Ethylene-2,2'-bipyridyl- litionium]. Various diquat salts are commercially available.]	NIOSH 0.5 mg/m ³ OSHA† none	N.D.	Dibromide salt; Yellow crystals. [herbicide] [Note: Commercial product may be found in a liquid concentrate or a solution.]	MW: 344.1 BP: Decomposes Sol: 70% Fl.P: ? IP: ? Sp.Gr: 1.22-1.27 Combustible Solid, but does not readily ignite and burns with difficulty.	VP: <0.00001 mm MLT: 635°F UEL: ? LEL: ?	Alkalis, UV light, basic solutions [Note: Concentrated diquat solutions corrode aluminum.]	None available
Disulfiram <chem>[(C2H5)2NCS]2S2</chem> 97-77-8 JO1225000	Antabuse®, bis[Diethylthiocarbamoyl] disulfide, Ro-Sulfiram®, TETD, Tetraethylthiuram disulfide	NIOSH 2 mg/m ³ [Precautions should be taken to avoid concurrent exposure to ethylene dibromide.] OSHA† none	N.D.	White, yellowish, or light-gray powder with a slight odor. [fungicide]	MW: 296.6 BP: ? Sol: 0.02% Fl.P: NA IP: ? Sp.Gr: 1.30 Noncombustible Solid	VP: ? MLT: 158°F UEL: NA LEL: NA	None reported	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	NIOSH/OSHA 600 ppm: SA/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVH/SCBAE	Inh	Irritation nose throat;	Eye:	Irr immed	Eyes resp sys
Eyes:	N.R.		Abs	weak li-head head	Skin:	Water wash prompt	CNS
Wash skin:	N.R.		Inh		Breath:	Resp support	
Remove:	N.R.		Con		Swallow:	Medical attention immed	
Change:	N.R.						
[Dipropylene glycol methyl ether]							
Skin:	Prevent skin contact	TBAL	Inh	Irritation eyes, skin; CNS	Eye:	Irr immed	Eyes, skin, CNS,
Eyes:	Prevent eye contact		Inh	depress, dizz, som, decr	Skin:	Soap wash	liver
Wash skin:	Daily		Inh	breath;	Breath:	Resp support	
Remove:	When wet or contam		Con	in animals: liver inj; narco	Swallow:	Medical attention immed	
Change:	N.R.						
[Dipropyl ketone]							
Skin:	Prevent skin contact	TBAL	Inh	Irritation eyes, skin, muc memb,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	resp sys; rhin, epis; skin	Skin:	Water flush immed	kidneys, liver, CNS
Wash skin:	When contam		Inh	burns; nau, vomit, diarr,	Breath:	Resp support	
Remove:	When wet or contam		Con	mal; kidney, liver inj;	Swallow:	Medical attention immed	
Change:	Daily			cough, chest pain, dysp,			
Provide:	Quick drench			pulmedema; tremor, convuls;			
				delayed healing of wounds			
[Diquat (Diquat bromide)]							
Skin:	Prevent skin contact	TBAL	Inh	Irritation eyes, skin, resp sys;	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Inh	sens derm; lass, ftg,	Skin:	Soap wash immed	CNS, PNS, liver
Wash skin:	When contam		Inh	tremor, restless, head,	Breath:	Resp support	
Remove:	When wet or contam		Con	dizz; metallic taste;	Swallow:	Medical attention immed	
Change:	Daily			per neur; liver damage			
[Disulfiram]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Disulfoton $C_4H_{10}O_2PS_2$ 298-04-4 TD9275000	O,O-Diethyl S-2-(ethylthio)- ethyl phosphorodithioate; Di-Syston®; Thiodemeton [(C_2H_5O),P(S)($CH_2CH_2SC_2H_5$)]	NIOSH 0.1 mg/m³ [skin] OSHA† none	N.D.	Oily, colorless to yellow liquid with a characteristic sulfur odor. [insecticide] [Note: Technical product is a brown liquid.]	MW: 274.4 BP: ? Sol: 73°F) 0.003% Fl.P: >180°F IP: ? Sp.Gr: 1.14 Combustible Liquid, but will not ignite easily.	VP: 0.0002 mm FRZ: >-13°F UEL: ? LEL: ?	Alkalies	None available
2783 55 2,6-Di-tert-butyl- p-cresol [$C(CH_3)_3$] ₂ CH ₂ C ₆ H ₄ OH 128-37-0 GO7875000	BHT; Butylated hydroxytoluene; Dibutylated hydroxytoluene; 4-Methyl-2,6-di-tert-butyl phenol	NIOSH 10 mg/m³ OSHA† none	N.D.	White to pale- yellow, crystalline solid with a slight, phenolic odor. [food preservative]	MW: 220.4 BP: 509°F Sol: 0.00004% Fl.P: 261°F IP: ? Sp.Gr: 1.05 Class IIIB Combustible Liquid	VP: 0.01 mm MLT: 158°F UEL: ? LEL: ?	Oxidizers	Sig el: Methanol/ CS; GC/FID; IK(1) [P&CAM #226]
Diuron $C_6H_8Cl_2NHCON(CH_3)_2$ 330-54-1 YS8525000	3-(3,4-Dichlorophenyl)- 1,1-dimethylurea; Direx®; Kamex®	NIOSH 10 mg/m³ OSHA† none	N.D.	White, odorless, crystalline solid. [herbicide]	MW: 233.1 BP: 356°F (Decomposes) Sol: 0.004% Fl.P: NA IP: ? Sp.Gr: ? Noncombustible Liquid	VP: 0.000000002 mm MLT: 316°F UEL: NA LEL: NA	Strong acids	Filter; none; Grav; III [#0500 Nuisance Dust (total)]
Divinyl benzene $C_6H_8(HC=CH_2)_2$ 1321-74-0 (mixed isomers) CZ9370000	Diethyl benzene, DVB, Vinylstyrene [Note: Commercial product contains all 3 isomers, but m-isomer predominates. Usually contains an inhibitor to prevent polymerization.] 1 ppm = 5.41 mg/m³	NIOSH 10 ppm (50 mg/m³) OSHA† none	N.D.	Pale, straw-colored liquid.	MW: 130.2 BP: 392°F Sol: 0.005% Fl.P(oc): 169°F IP: ? Sp.Gr: 0.93 Class IIIA Combustible Liquid	VP: 0.7 mm FRZ: -88°F UEL: 6.2% LEL: 1.1%	None reported	Char; Toluene; GC/FID; OSHA [#89]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh Abs Ing Con	Irrit eyes, skin; nau, vomit, abdom cramps, diarr, saliv; head, gidd, vert; weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chl
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Disulfoton]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin; in animals: decr growth rate, incr liver weight	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Fresh air Medical attention immed	Eyes, skin
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	Daily						
[2,6-Di-tert-butyl-p-cresol]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; in animals: anemia, methemo	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, blood
Eyes:	Prevent eye contact						
Wash skin:	Daily						
Remove:	N.R.						
Change:	Daily						
[Diuron]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; skin burns; in animals: CNS depres	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Divinyl benzene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
1-Dodecanethiol $\text{CH}_3(\text{CH}_2)_{11}\text{SH}$ 112-55-0 JR3155000	Dodecyl mercaptan, 1-Dodecyl mercaptan, n-Dodecyl mercaptan, Lauryl mercaptan, n-Lauryl mercaptan, 1-Mercaptododecane	NIOSH C 0.5 ppm (4.1 mg/m ³) [15-min] OSHA none	N.D.	Colorless, water white, or pale- yellow, oily liquid with a mild, skunk- like odor. [Note: A solid below 15°F.]	MW: 202.4 BP: 441-478°F Sol: Insoluble Fl.P (oc): 190°F IP: ?	VP (77°F): 3 mm FRZ: 15°F UEL: ? LEL: ?	Strong oxidizers & acids, strong bases, reducing agents, alkali metals, water, steam	None available
1 ppm = 8.41 mg/m ³					Sp.Gr: 0.85 Class IIIA Combustible Liquid			
Emery Al_2O_3 12415-34-8 (emery) 1302-74-5 (corundum) JY3000000 (emery) GN0231000 (corundum)	Aluminum oxide, Aluminum trioxide, Corundum, Impure corundum, Natural - γ -aluminum oxide [Note: Emery is an impure variety of Al_2O_3 which may contain small impurities of iron, magnesium & silica. Corundum is natural Al_2O_3 .]	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, white, crystalline powder.	See α -Alumina for physical & chemical properties.		Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]	
Endosulfan $\text{C}_8\text{H}_4\text{Cl}_2\text{O}_6\text{S}$ 115-29-7 RB9275000	Benzoepin; Endosulphan; 6,7,8,3,1'-Hexachloro- 1,5,5a,6,9,9a-hexahydro- 6,9-methano-2,4,3-benzo- dioxathiepin-3-oxide; Thiodan®	NIOSH 0.1 mg/m ³ [skin] OSHA† none	N.D.	Brown crystals with a slight, sulfur dioxide odor. [insecticide] [Note: Technical product is a tan, waxy, isomer mixture.]	MW: 406.9 BP: Decomposes Sol: 0.00001% Fl.P: NA IP: ?	VP (77°F): 0.00001 mm MLT: 223°F UEL: NA LEL: NA	Alkalis, acids, water [Note: Corrosive to iron. Hydrolyzes slowly on contact with water or decomposes in presence of alkalis and acids to form sulfur dioxide.]	None available
2761 55					Sp.Gr: 1.74 Noncombustible Solid, but may be dissolved in flammable liquids.			
Endrin $\text{C}_{12}\text{H}_4\text{Cl}_6\text{O}$ 72-20-8 101575000	1,2,3,4,10,10-Hexachloro- 6,7-epoxy- 1,4,4a,5,6,7,8,8a- octahydro-1,4-endo,endo- 5,8-dimethanonaphthalene. Hexadrin®	NIOSH/OSHA 0.1 mg/m ³ [skin]	2 mg/m ³	Colorless to tan, crystalline solid with a mild, chemical odor [insecticide]	MW 380.9 BP Decomposes Sol Insoluble Fl.P NA IP ?	VP Low MLT 392°F (Decomposes) UEL NA LEL NA	Strong oxidizers, strong acids, paraffin [Note: May emit hydrogen chloride & phosgene when heated or burned.]	Filter/ Chrom-102, Toluene, GC/ECD, III [#5519]
2761 55					Sp.Gr: 1.70 Noncombustible Solid, but may be dissolved in flammable liquids			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	ing	cough; dizz, dysp, weak,	Skin:	Soap wash immed	CNS, blood
Wash skin:	When contam	12.5 ppm: SA:CF/PAPROV	Con	conf, cyan; abdom pain,	Breath:	Resp support	
Remove:	When wet or contam	25 ppm: CCRFOV/GMFOV/PAPRTQV/		nau; skinsens	Swallow:	Medical attention	
Change:	N.R.	SCBAF/SAF				immed	
Provide:	Eyewash	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
[1-Dodecanethiol]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	N.R.		ing		Breath:	Fresh air	
Wash skin:	N.R.		Con		Swallow:	Medical attention	
Remove:	N.R.					immed	
Change:	N.R.						
[Emery]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit skin; nau, conf,	Eye:	Irr immed	Skin, CNS, liver,
Eyes:	Prevent eye contact		Abs	agitation, flushing, dry	Skin:	Soap flush immed	kidneys, repro sys
Wash skin:	When contam		ing	mouth, tremor, convuls,	Breath:	Resp support	
Remove:	When wet or contam		Con	head;	Swallow:	Medical attention	
Change:	Daily			in animals: kidney, liver		immed	
Provide:	Eyewash, Quick drench			inj; decr testis weight			
[Endosulfan]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Epilep convuls; stupor,	Eye:	Immed	CNS, liver
Eyes:	Prevent eye contact	1 mg/m ³ : CCROVDMFu/SA	Abs	head, dizz; abdom	Skin:	Soap wash immed	
Wash skin:	When contam	2 mg/m ³ : SA:CF/PAPROVDMFu/	ing	discomfort, nau, vomit,	Breath:	Resp support	
Remove:	When wet or contam	CCRFOVHIE/GMFOVHIE/	Con	insom; aggressiveness,	Swallow:	Medical attention	
Change:	Daily	SCBAF/SAF		conf, leth, weak; anor,		immed	
Provide:	Eyewash, Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		in animals: liver damage			
		Escape: GMFOVHIE/SCBAE					
[Endrin]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Enflurane <chem>CHF2OCF2CHClF</chem> 13838-16-9 KN6800000	2-Chloro-1-(difluoro- methoxy)-1,1,2-trifluoro- ethane; 2-Chloro-1,1,2-trifluoro- ethyl difluoromethyl ether; Ethrane®	NIOSH* C 2 ppm (15.1 mg/m³) [60-min] [*Note: REL for exposure to waste anesthetic gas.]	N.D.	Clear, colorless liquid with a mild, sweet odor. [Inhalation anesthetic]	MW: 184.5 BP: 134°F Sol: Low Fl, P: NA IP: ?	VP: 175 mm FRZ: 7 UEL: NA LEL: NA	None reported	Char(2); CS; GC/FID; OSHA [#29]
	1 ppm = 7.67 mg/m³	OSHA none			Sp. Gr(77°F): 1.52 Noncombustible Liquid			
Epichlorohydrin <chem>C2H3OCl</chem> 106-89-8 TX4900000	1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; gamma-Chloropropylene oxide	NIOSH Ca See Appendix A OSHA† 5 ppm (19 mg/m³) [skin]	Ca [75 ppm]	Colorless liquid with a slightly irritating, chloroform-like odor.	MW: 92.5 BP: 242°F Sol: 7% Fl P: 93°F IP: 10.60 eV	VP: 13 mm FRZ: -54°F UEL: 21.0% LEL: 3.8%	Strong oxidizers, strong acids, certain salts, caustics, zinc, aluminum, water [Note: May polymerize in presence of strong acids and bases, particularly when hot.]	Char; CS; GC/FID; III [#1010]
2023 30	1 ppm = 3.85 mg/m³				Sp. Gr: 1.18 Class IC Flammable Liquid			
EPN <chem>C14H10O4NSP</chem> 2104-64-5 TB1925000	Ethyl p-nitrophenyl benzenethionophosphonate, O-Ethyl O-(4-nitrophenyl) phenylphosphonothioate [<chem>C2H5O(C6H4)P(S)(OC6H4NO2)</chem>]	NIOSH/OSHA 0.5 mg/m³ [skin]	5 mg/m³	Yellow solid with an aromatic odor. [pesticide] [Note: A brown liquid above 97°F.]	MW: 323.3 BP: ? Sol: Insoluble Fl P: NA IP: ?	VP(212°F): 0.0003 mm MLT: 97°F UEL: NA LEL: NA	Strong oxidizers	Filter; Isocdane; GC/FPD; III [#5012]
					Sp. Gr(77°F): 1.27 Noncombustible Solid			
Ethanolamine <chem>NH2CH2CH2OH</chem> 141-43-5 KJ5775000	2-Aminoethanol, β-Aminoethyl alcohol, Ethylamine, 2-Hydroxyethylamine, Monoethanolamine	NIOSH 3 ppm (8 mg/m³) ST 6 ppm (15 mg/m³) OSHA† 3 ppm (6 mg/m³)	30 ppm	Colorless, viscous liquid or solid (below 51°F) with an unpleasant, ammonia-like odor.	MW: 61.1 BP: 339°F Sol: Miscible Fl P: 186°F IP: 8.96 eV	VP: 0.4 mm FRZ: 51°F UEL: 23.5% LEL(284°F): 3.0%	Strong oxidizers, strong acids, iron [Note: May attack copper, brass, and rubber.]	Si gel, Methanol/ Water; GC/FID; III [#2007, Amino- ethanol Compounds]
2491 60	1 ppm = 2.54 mg/m³				Sp. Gr: 1.02 Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh	Irrit eyes; CNS depres,	Eye:	Irr immed	Eyes, CNS
Eyes:	Prevent eye contact		Ing	analgesia, anes, sez,	Skin:	Soap wash	
Wash skin:	N.R.		Con	resp depres	Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention	
Change:	N.R.					immed	
[Enflurane]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin with deep	Eye	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	§ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	pain, nau, vomit, abdom	Skin:	Soap wash immed	kidneys, liver,
Wash skin:	When contam	Escape: GMFOVAG/SCBAE	Ing	pain, resp distress, cough,	Breath:	Resp support	repro sys
Remove:	When wet (flamm)		Con	cyan, repro effects; [carc]	Swallow	Medical attention	[in animals:
Change:	N.R.					immed	nasal cancer]
Provide:	Eyewash, Quick drench						
[Epichlorohydrin]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, miosis,	Eye	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 mg/m ³ : SA/SCBAF	Abs	lac, rhin, head, chest	Skin:	Soap wash immed	CVS, CNS, blood chol
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Ing	tight, wheez, lar spasm;	Breath:	Resp support	
Remove:	When wet or contam	Escape: GMFOVH/E/SCBAE	Con	salv, cyan, anox, nau,	Swallow:	Medical attention	
Change:	Daily			abdom cramps, diarr, para,		immed	
Provide:	Eyewash, Quick drench			convuls; low BP, card irreg			
[EPN]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	30 ppm: CCRS*/GMFS/PAPRS*/SA*/	Ing	sys, leth	Skin:	Water flush prompt	CNS
Wash skin:	When contam	SCBAF	Con		Breath:	Resp support	
Remove:	When wet or contam	§ SCBAF PD, PP/SAF PD, PP ASCBA			Swallow:	Medical attention	
Change:	Daily	Escape: GMFS/SCBAE				immed	
Provide:	Eyewash						
[Ethanolamine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Ethion [(C ₂ H ₅ O) ₂ P(S)S] ₂ CH ₃ 563-12-2 TE4550000	O,O,O',O'-Tetraethyl S,S'- methylene di(phosphoro- dithioate)	NIOSH 0.4 mg/m ³ [skin] OSHA† none	N.D.	Colorless to amber- colored, odorless liquid. [insecticide] [Note: A solid below 10°F. The techni- cal product has a very disagreeable odor.]	MW: 384.5 BP: >302°F (Decomposes) Sol: 0.0001% F.P.: 349°F IP: ? Sp.Gr: 1.22 Class III B Combustible Liquid	VP: 0.0000015 mm FRZ: 10°F UEL: ? LEL: ?	Acids, alkalis	None available
2783 55	1 ppm = 16.0 mg/m ³							
2-Ethoxyethanol C ₂ H ₅ OCH ₂ CH ₂ OH 110-80-5 KK8050000	Cellosolve®, EGEE, Ethylene glycol monoethyl ether	NIOSH 0.5 ppm (1.8 mg/m ³) [skin] OSHA 200 ppm (740 mg/m ³) [skin]	500 ppm	Colorless liquid with a sweet, pleasant, ether- like odor.	MW 90.1 BP: 275°F Sol: Miscible F.P. 110°F IP: ?	VP: 4 mm FRZ: -130°F UEL(200°F): 15.5% LEL(200°F): 1.7%	Strong oxidizers	Char/ CH ₂ Cl ₂ ; Methanol, GC/FID; III [#1403, Alcohols IV]
1171 26	1 ppm = 3.75 mg/m ³							
2-Ethoxyethyl acetate CH ₃ COOCH ₂ CH ₂ OC ₂ H ₅ 111-15-9 KK8225000	Cellosolve® acetate, EGEEA, Ethylene glycol monoethyl ether acetate, Glycol monoethyl ether acetate	NIOSH 0.5 ppm (2.7 mg/m ³) [skin] OSHA 100 ppm (540 mg/m ³) [skin]	500 ppm	Colorless liq- uid with a mild odor.	MW: 132.2 BP: 313°F Sol: 23% F.P.: 124°F IP: ?	VP: 2 mm FRZ: -79°F UEL: ? LEL: 1.7%	Nitrates; strong oxidizers alkalis & acids	Char; CS; GC/FID; III [#1450, Esters I]
1172 26	1 ppm = 5.49 mg/m ³							
Ethyl acetate CH ₃ COOC ₂ H ₅ 141-78-6 AH5425000	Acetic ester, Acetic ether, Ethyl ester of acetic acid, Ethyl ethanoate	NIOSH/OSHA 400 ppm (1400 mg/m ³) [LEL]	2000 ppm [LEL]	Colorless liquid with an ether- like, fruity odor.	MW: 88.1 BP: 171°F Sol(77°F): 10% F.P.: 24°F IP: 10.01 eV	VP: 73 mm FRZ: -117°F UEL: 11.5% LEL: 2.0%	Nitrates; strong oxidizers, alkalis & acids	Char; CS; GC/FID; III [#S49]
1173 26	1 ppm = 3.66 mg/m ³							
					Sp.Gr: 0.90 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irritates eyes, skin; nau, vomit, abdom cramps, diarr, saliv; head, gicd, verti, weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow: Irritated Soap wash immediately Resp support Medical attention	Eyes, skin, resp sys, CNS, CVS, blood chol
[Ethion]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 5 ppm: SA* 12.5 ppm: SA:CF* 25 ppm: SCBAF/SAF 500 ppm: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals irritates resp sys; blood changes liver, kidney, lung damage, repro, terato effects	Eye: Skin: Breath: Swallow: Irritated Water flush promptly Resp support Medical attention	Eyes, resp sys, blood, kidneys liver, repro sys, hematosys
[2-Ethoxyethanol]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 5 ppm: CCROV*/SA* 12.5 ppm: SA:CF*/PAPROV* 25 ppm: CCROV/GMFOV/PAPRTOV*/SCBAF/SAF 500 ppm: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritates eyes, nose, vomit, kidney damage, para, in animals: repro, terato effects	Eye: Skin: Breath: Swallow: Irritated Water flush promptly Resp support Medical attention	Eyes, resp sys, GI tract, repro sys, hematosys
[2-Ethoxyethyl acetate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: SA:CF*/PAPROV*/CCRFQV/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irritates eyes, skin, nose, throat, narco, derm	Eye: Skin: Breath: Swallow: Irritated Water flush promptly Resp support Medical attention	Eyes, skin, resp sys
[Ethyl acetate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ethyl acrylate $\text{CH}_2=\text{CHCOOC}_2\text{H}_5$ 140-88-5 AT0700000	Ethyl acrylate (inhibited), Ethyl ester of acrylic acid, Ethyl propenoate	NIOSH Ca See Appendix A OSHA† 25 ppm (100 mg/m³) [skin]	Ca [300 ppm]	Colorless liquid with an acid odor.	MW 100.1 BP 211°F Sol: 2% Fl P 48°F IP: 10.30 eV	VP 29 mm FRZ -96°F UEL 14% LEL 1.4%	Oxidizers, peroxides, polymerizers, strong alkalis, moisture, chlorosulfonic acid [Note: Polymerizes readily unless an inhibitor such as hydroquinone is added.]	Char; CS; GC/FID; III [#1450, Esters I]
1917 27 (inhibited)	1 ppm = 4.16 mg/m³				Sp Gr: 0.92 Class IB Flammable Liquid			
Ethyl alcohol $\text{CH}_3\text{CH}_2\text{OH}$ 64-17-5 KQ6300000	Alcohol, Cologne spirit, Ethanol, EtOH, Grain alcohol	NIOSH/OSHA 1000 ppm (1900 mg/m³)	3300 ppm [LEL]	Clear, colorless liquid with a weak, ethereal, vinous odor.	MW: 46.1 BP: 173°F Sol: Miscible Fl.P: 55°F IP: 2.51 eV	VP: 44 mm FRZ: -173°F UEL: 19% LEL: 3.3%	Strong oxidizers, potassium dioxide, bromine pentafluoride, acetyl bromide, acetyl chloride, platinum, sodium	Char; 2-Butanol/ CS; GC/FID; III [#1400, Alcohols I]
1170 26	1 ppm = 1.92 mg/m³				Sp.Gr: 0.79 Class IB Flammable Liquid			
Ethylamine $\text{CH}_3\text{CH}_2\text{NH}_2$ 75-04-7 KH2100000	Aminoethane, Ethylamine (anhydrous), Monoethylamine	NIOSH/OSHA 10 ppm (18 mg/m³)	600 ppm	Colorless gas or water-white liquid (below 62°F) with an ammonia-like odor. [Note: Shipped as a liquefied compressed gas.]	MW 45.1 BP 62°F Sol: Miscible Fl P 1°F IP 8.86 eV RGasD: 1.61 Sp Gr: 0.69 (Liquid) Flammable Gas Class IA Flammable Liquid	VP 874 mm FRZ -114°F UEL 14.0% LEL 3.5%	Strong acids, strong oxidizers, copper, tin & zinc in presence of moisture, cellulose nitrate, chlorine; hypochlorites	Sr gel, H₂SO₄ GC/FID; II(3) [#S144]
1036 68	1 ppm = 1.87 mg/m³							
Ethyl benzene $\text{CH}_3\text{CH}_2\text{C}_6\text{H}_5$ 100-41-4 DA0700000	Ethylbenzol, Phenylethane	NIOSH 100 ppm (435 mg/m³) ST 125 ppm (545 mg/m³) OSHA† 100 ppm (435 mg/m³)	800 ppm	Colorless liquid with an aromatic odor.	MW 106.2 BP: 277°F Sol: 0.01% Fl P 55°F IP: 8.76 eV	VP: 7 mm FRZ -139°F UEL 6.7% LEL 0.8%	Strong oxidizers	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]
1175 26	1 ppm = 4.41 mg/m³				Sp Gr: 0.87 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys.	Eye	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	§ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	[carc]	Skin	Water flush immed	[in animals: tumor of the
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh		Breath	Reso support	forestomach]
Remove:	When wet (flamm)		Ing		Swallow	Medical attention immed	
Change:	N.R.		Con				
Provide:	Eyewash, Quick drench						
[Ethyl acrylate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose;	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	3300 ppm: SA/SCBAF	Ing	head, drow, ffg, narco;	Skin:	Water flush prompt	CNS, liver, blood,
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con	cough; liver damage;	Breath:	Fresh air	repro sys
Remove:	When wet (flamm)	Escape: SCBAE		anemia; repro, terato effects	Swallow:	Medical attention immed	
Change:	N.R.						
[Ethyl alcohol]							
Skin:	Prevent skin contact (liq)	NIOSH/OSHA	Inh	Irrit eyes, skin, resp	Eye	Irr immed (liq)	Eyes, skin, resp sys
Eyes:	Prevent eye contact (liq)	250 ppm: SA CF/PAPRS [†]	Abs	sys, skin burns, derm	Skin	Water flush immed (liq)	
Wash skin:	When contam (liq)	500 ppm: CCRFS/GMFS/SCBAF/SAF	(liq)		Breath	Resp support	
Remove:	When wet or contam (liq)	600 ppm: SAF PD, PP	Ing		Swallow:	Medical attention immed (liq)	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con				
Provide:	Eyewash (liq), Quick drench (liq)	Escape: GMFS/SCBAE	(liq)				
[Ethylamine]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb.	Eye	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	800 ppm: GCROV*/GMFOV/PAPROV*/	Ing	head, derm, narco, coma	Skin	Water flush prompt	CNS
Wash skin:	When contam	SA*/SCBAF	Con		Breath:	Resp support	
Remove:	When wet (flamm)	§ SCBAF PD, PP/SAF PD, PP ASCBA			Swallow:	Medical attention immed	
Change:	N.R.	Escape: GMFOV/SCBAE					
[Ethyl benzene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ethyl bromide <chem>CH3CH2Br</chem> 74-96-4 KH6475000	Bromoethane. Monobromoethane	NIOSH See Appendix D OSHA† 200 ppm (890 mg/m³)	2000 ppm	Colorless to yellow liquid with an ether-like odor [Note: A gas above 101°F]	MW 109.0 BP 101°F Sol 0.9% Fl P <4°F IP 10.29 eV	VP 375 mm FRZ -182°F UEL 8.0% LEL 6.8%	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char. 2-Propanol/ GC/FID, III [#1011]
1891 58	1 ppm = 4.53 mg/m³				Sp Gr 1.46 Class IB Flammable Liquid			
Ethyl butyl ketone <chem>CH3CH2CO(CH2)3CH3</chem> 106-35-4 MJ5250000	Butyl ethyl ketone. 3-Heptanone	NIOSH/OSHA 50 ppm (230 mg/m³)	1000 ppm	Colorless liquid with a powerful, fruity odor	MW 114.2 BP 298°F Sol 1% Fl P (oc) 115°F IP 9.02 eV	VP 4 mm FRZ -38°F UEL ? LEL ?	Oxidizers, acetaldehyde, perchloric acid	Char. Methanol/ CS, GC/FID, III [#1301, Ketones II]
	1 ppm = 4.75 mg/m³				Sp Gr 0.82 Class II Combustible Liquid			
Ethyl chloride <chem>CH3CH2Cl</chem> 75-00-3 KH7525000	Chloroethane. Hydrochloric ether. Monochloroethane. Muriatic ether	NIOSH Handle with caution in the workplace See Appendix C (Chloroethanes) OSHA 1000 ppm (2600 mg/m³)	3800 ppm [LEL]	Colorless gas or liquid (below 54°F) with a pungent, ether- like odor [Note: Shipped as a liquefied compressed gas]	MW 64.5 BP 54°F Sol 0.6% Fl P, NA (Gas) -58°F (Liq) IP 10.97 eV RGasD: 2.23 Sp Gr 0.92 (Liquid at 32°F) Flammable Gas Class IA Flammable Liquid	VP 1000 mm FRZ -218°F UEL 15.4% LEL 3.8%	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium, oxidizers, water or steam [Note: Reacts with water to form hydrochloric acid]	Char(2). CS, GC/FID, III [#2519]
Ethylene chlorohydrin <chem>CH2ClCH2OH</chem> 107-07-3 KK0875000	2-Chloroethanol. 2-Chloroethyl alcohol. Ethylene chlorohydrin	NIOSH C 1 ppm (3 mg/m³) [skin] OSHA† 5 ppm (16 mg/m³) [skin]	7 ppm	Colorless liquid with a faint, ether-like odor	MW 80.5 BP 262°F Sol Miscible Fl P 140°F IP 10.90 eV	VP 5 mm FRZ -90°F UEL 15.9% LEL 4.9%	Strong oxidizers, strong caustics, water or steam	Char(pet). 2-Propanol/ CS, GC/FID, III [#2513]
1135 55	1 ppm = 3.35 mg/m³				Sp Gr 1.20 Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	OSHA 2000 ppm: SA/SCBAF § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; CNS depres, pulm edema; liver, kidney disease, card arrhy, card arrest	Eye Skin Breath: Swallow: Irr immed Soap flush prompt Resp support Medical attention immed	Eyes, skin, resp sys; liver, kidneys, CVS, CNS
[Ethyl bromide]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 500 ppm: CCROV*/SA* 1000 ppm: SA:CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; head, narco, coma, derm	Eye Skin Breath: Swallow: Irr immed Water flush Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Ethyl butyl ketone]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact (liq) Prevent eye contact (liq) N.R. When wet (flamm) N.R.	OSHA 3800 ppm: SA*/SCBAF § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs (liq) Ing (liq) Con	Inco, inebri, abdom cramps; card arrhy, card arrest, liver, kidney damage	Eye Skin: Breath: Swallow: Irr immed (liq) Water flush prompt (liq) Resp support Medical attention immed (liq)	Liver, kidneys, resp sys, CVS, CNS
[Ethyl chloride]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH 7 ppm: SA*/SCBAF § SCBAF:PD,PP/SAF:PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit muc memb; nau, vomit; verti, inco, numb; vis dist, head, thirst; delirium, low BP, collapse, shock, coma, liver, kidney damage	Eye Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Resp sys, liver, kidneys, CNS, CVS, eyes
[Ethylene chlorohydrin]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ethylenediamine <chem>NH2CH2CH2NH2</chem> 107-15-3 KH8575000	1,2-Diaminoethane; 1,2-Ethanediamine; Ethylenediamine (anhydrous)	NIOSH/OSHA 10 ppm (25 mg/m ³)	1000 ppm	Colorless, viscous liquid with an ammonia-like odor. [fungicide] [Note: A solid below 47°F.]	MW 60.1 BP 241°F Sol: Miscible Fl P 93°F IP 8.60 eV	VP 11 mm FRZ 47°F UEL(212°F): 12% LEL(212°F): 2.5%	Strong acids & oxidizers, carbon tetrachloride & other chlorinated organic compounds, carbon disulfide [Note: Corrosive to metals.]	XAD-2*, DMF, HPLC/UVD; III [#2540]
1604 29	1 ppm = 2.50 mg/m ³				Sp Gr 0.91 Class IC Flammable Liquid			
Ethylene dibromide <chem>BrCH2CH2Br</chem> 106-93-4 KH9275000	1,2-Dibromoethane; Ethylene bromide; Glycol dibromide	NIOSH Ca See Appendix A 0.045 ppm C 0.13 ppm [15-min] OSHA 20 ppm C 30 ppm 50 ppm [5-min max peak]	Ca [100 ppm]	Colorless liquid or solid (below 50°F) with a sweet odor. [fumigant]	MW 187.9 BP 268°F Sol 0.4% Fl P: NA IP: 9.45 eV	VP 12 mm FRZ 50°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium, calcium, hot aluminum & magnesium; liquid ammonia; strong oxidizers	Char, Benzene/ Methanol; GC/ECD, III [#1008]
1605 55	1 ppm = 7.81 mg/m ³				Sp Gr 2.17 Noncombustible Liquid			
Ethylene dichloride <chem>ClCH2CH2Cl</chem> 107-06-2 KI0525000	1,2-Dichloroethane; Ethylene chloride; Glycol dichloride	NIOSH Ca See Appendix A, C (Chloroethanes) 1 ppm (4 mg/m ³) ST 2 ppm (8 mg/m ³) OSHA† 50 ppm C 100 ppm 200 ppm (5-min max peak in any 3 hrs)	Ca [50 ppm]	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.]	MW 99.0 BP 182°F Sol 0.9% Fl P 56°F IP 11.05 eV	VP 64 mm FRZ -32°F UEL 16% LEL 6.2%	Strong oxidizers & caustics; chemically- active metals such as magnesium or aluminum powder, sodium & potassium; liquid ammonia [Note: Decomposes to vinyl chloride & HCl above 1112°F.]	Char, CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
1184 26	1 ppm = 4.11 mg/m ³				Sp Gr 1.24 Class IB Flammable Liquid			
Ethylene glycol <chem>HOCH2CH2OH</chem> 107-21-1 KW2975000	1,2-Dihydroxyethane; 1,2-Ethanediol; Glycol; Glycol alcohol; Monoethylene glycol	NIOSH See Appendix D OSHA† none	N.D.	Clear, colorless, syrupy, odorless liquid. [antifreeze] [Note: A solid below 9°F.]	MW: 62.1 BP: 388°F Sol: Miscible Fl P: 232°F IP: ?	VP: 0.06 mm FRZ: 9°F UEL: 15.3% LEL: 3.2%	Strong oxidizers, chromium trioxide, potassium permanganate, 2-Propanol/ sodium peroxide [Note: Hygroscopic (i.e., absorbs moisture from the air).]	Filter/ Si gel; 2-Propanol/ water; GC/FID; III [#5500]
	1 ppm = 2.58 mg/m ³				Sp Gr 1.11 Class III B Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit nose, resp sys	Eye	Irr immed	Skin, resp sys.
Eyes:	Prevent eye contact	250 ppm: SA, CF ⁴ /PAPRS ⁴	Abs	sens derm, asthma, liver,	Skin	Water flush immed	liver, kidneys
Wash skin:	When contam/Daily	500 ppm: CCRFS/GMFS/PAPRTS ⁴ / SCBAF/SAF	Ing	kidney damage	Breath	Resp support	
Remove:	When wet (flamm)	1000 ppm: SAF;PD,PP	Con		Swallow	Medical attention immed	
Change:	Daily	§ SCBAF PD,PP/SAF PD,PP ASCBA					
Provide:	Eyewash (>5%), Quick drench	Escape: GMFS/SCBAE					
[Ethylenediamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys,	Eye	Irr immed	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Abs	derm with vesic, liver,	Skin	Soap wash immed	liver, kidneys,
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	heart, spleen, kidney	Breath	Resp support	repro sys
Remove:	When wet or contam		Con	damage; repro effects; [carc]	Swallow	Medical attention immed	[in animals: skin & lung tumors]
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Ethylene dibromide]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, corn opac;	Eye	Irr immed	Eyes, skin, kidneys,
Eyes:	Prevent eye contact	§ SCBAF PD,PP/SAF PD,PP ASCBA	Abs	CNS depres, nau, vomit,	Skin	Soap wash prompt	liver, CNS, CVS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	derm, liver, kidney,	Breath	Resp support	[in animals: forestomach,
Remove:	When wet (flamm)		Con	CVS damage; [carc]	Swallow	Medical attention immed	mammary gland & circulatory sys cancer]
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Ethylene dichloride]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	throat; nau, vomit, abdom	Skin:	Water wash immed	CNS
Wash skin:	When contam		Con	pain, weak; dizz, stupor,	Breath:	Resp support	
Remove:	When wet or contam			convul's, CNS depres; skin	Swallow:	Medical attention immed	
Change:	Daily			sens			
[Ethylene glycol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ethylene glycol dinitrate <chem>O2NOCH2CH2ONO2</chem> 628-96-G KW5600000	EGDN, 1,2-Ethanediol dinitrate, Ethylene dinitrate, Ethylene nitrate, Glycol dinitrate, Nitroglycol 1 ppm = 6.12 mg/m ³	NIOSH ST 0.1 mg/m ³ [skin] OSHA† C 0.2 ppm (1 mg/m ³) [skin]	75 mg/m ³	Colorless to yellow, oily, odorless liquid. [Note: An explo- sive ingredient (60-80%) in dynamite along with nitrogly- cerine (40-20%).]	MW 152.1 BP 387°F Sol Insoluble Fl.P. 419°F IP: ? Sp Gr 1.49 Explosive Liquid	VP 0.05 mm FRZ -8°F UEL: ? LEL: ?	Acids, alkalis	Tenax GC, Ethanol, GC/ECD, III [#2507]
Ethyleneimine <chem>C2H5N</chem> 151-56-4 KX5075000	Aminoethylene, Azirane, Aziridine, Dimethylenimine, Dimethylenimine, Ethyleneimine, Ethylimine 1 ppm = 1.79 mg/m ³	NIOSH Ca See Appendix A OSHA(1910.1012) See Appendix B	Ca [100 ppm]	Colorless liquid with an ammonia- like odor. [Note: Usually contains inhibi- tors to prevent polymerization.]	MW 43.1 BP 133°F Sol Miscible Fl.P. 12°F IP: 9.20 eV Sp Gr: 0.83 Class IB Flammable Liquid	VP 160 mm FRZ -97°F UEL: 54.8% LEL 3.3%	Polymerizes explosively in presence of acids [Note: Explosive silver derivatives may be formed with silver alloys (e.g. silver solder).]	Bub: CHCl, HPLC/UVD, III [P&CAM #300]
Ethylene oxide <chem>C2H4O</chem> 75-21-8 KX2450000	Dimethylene oxide, 1,2-Epoxy ethane, Oxirane 1 ppm = 1.83 mg/m ³	NIOSH Ca See Appendix A <0.1 ppm (<0.18 mg/m ³) C 5 ppm (9 mg/m ³) [10-min/day] OSHA(1910.1047) 1 ppm 5 ppm [15-min Excursion]	Ca [800 ppm]	Colorless gas or liquid (below 51°F) with an ether-like odor.	MW 44.1 BP 51°F Sol Miscible Fl.P. NA (Gas) -20°F (Liq) IP: 10.56 eV RGSD: 1.49 Sp Gr: 0.82 (Liquid at 50°F) Flammable Gas Class IA Flammable Liquid	VP: 1.46 atm FRZ -171°F UEL: 100% LEL 3.0%	Strong acids, alkalis & oxidizers; chlorides of iron, aluminum & tin, oxides of iron & aluminum; water	Char(pet)*, DMF, GC/ECD, III [#1614]
Ethylene thiourea <chem>C2H4N2S</chem> 96-45-7 NI9625000	1,3-Ethylene-2-thiourea; N,N-Ethylenethiourea; ETU; 2-midazolidine-2-thione OSHA none	NIOSH Ca See Appendix A Use encapsulated form.	Ca [N.D.]	White to pale-green, crystalline solid with a faint, amine odor. [Note: Used as an accelerator in the curing of poly- chloroprene & other elastomers.]	MW: 102.2 BP: 446-595°F Sol(86°F): 2% Fl.P: 486°F IP: 8.15 eV Sp.Gr: 7 Combustible Solid	VP: 16 mm MLT: 392°F UEL: ? LEL: ?	Acrolein	Filter; water; Vis; III [#5011]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Throb head, dizz, nau	Eye	Skin, CVS, blood
Eyes:	Prevent eye contact	1 mg/m ³ SA*	Abs	vomit, abdom pain,	Skin	liver, kidneys
Wash skin:	When contam	2.5 mg/m ³ SA CF*	Inh	hypotension, flush, palp,	Breath	
Remove:	When wet (flamm)	5 mg/m ³ SAT CF*/SCBAF/SAF	Ing	angina, methemo, delirium,	Swallow	
Change:	Daily	75 mg/m ³ SAF:PD,PP	Con	CNS depres, irrit skin,		
Provide:	Quick drench	§ SCBAF PD PP/SAF PD,PP ASCBA		in animals anemia,		
		Escape GMFOVHIE/SCBAE		liver, kidney damage		
[Ethylene glycol dinitrate]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin,
Eyes:	Prevent eye contact	§ SCBAF PD PP/SAF PD,PP ASCBA	Abs	throat, nau, vomit, head,	Skin	resp sys, liver,
Wash skin:	When contam/Daily	Escape GMFOV/SCBAE	Ing	dizz, pulm edema, liver,	Breath	kidneys
Remove:	When wet or contam		Con	kidney damage, eye burns,	Swallow	[in animals:
Change:	Daily			skin sens, [carc]		lung & liver
Provide:	Eyewash, Quick drench					tumors]
[Ethyleneimine]						
Skin:	Prevent skin contact (liq)	NIOSH	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact (liq)	5 ppm GMFS*/SCBAF/SAF	Ing	throat, peculiar taste,	Skin	liver, CNS, blood,
Wash skin:	When contam (liq)	§ SCBAF PD,PP/SAF PD,PP ASCBA	(liq)	head, nau, vomit, diarr,	Breath	kidneys, repro sys
Remove:	When wet (flamm)	Escape GMFS*/SCBAE	Con	dysp, cyan, pulm edema,	Swallow	[peritoneal cancer,
Change:	N.R.			draw, inco, EKG abnor; eye,		leukemia]
Provide:	Quick drench (liq)			skin burns (liq or high		
				vap conc); liq, frostbite,		
				repro effects; [carc]		
				in animals convuls,		
				liver, kidney damage		
[Ethylene oxide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes;	Eye:	Eyes, skin, thyroid,
Eyes:	Prevent eye contact	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Ing	in animals: thickening of	Skin:	repro sys
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Con	the skin; goiter; terato	Breath:	[in animals: liver,
Remove:	When wet or contam			effects; [carc]	Swallow:	thyroid & lymphatic
Change:	Daily					sys tumors]
[Ethylene thiourea]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl, P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Ethyl ether $C_2H_5OC_2H_5$ 60-29-7 K15775000	Diethyl ether, Diethyl oxide, Ether, Ethyl oxide, Solvent ether	NIOSH See Appendix D OSHA† 400 ppm (1200 mg/m³)	1900 ppm [LEL]	Colorless liquid with a pungent, sweetish odor. [Note: A gas above 94°F.]	MW 74.1 BP 94°F Sol 8% Fl P -49°F IP 9.53 eV	VP 440 mm FRZ -177°F UEL 3.6 0% LEL 1.9%	Strong oxidizers, halogens, sulfur, sulfur compounds. [Note: Tends to form explosive peroxides under influence of air and light.]	Char. Ethyl acetate. GC/FID III [#1610]
1155 26	1 ppm = 3.08 mg/m³				Sp Gr 0.71 Class IA Flammable Liquid			
Ethyl formate CH_3CH_2OCHO 109-94-4 LQ8400000	Ethyl ester of formic acid, Ethyl methanoate	NIOSH/OSHA 100 ppm (300 mg/m³)	1500 ppm	Colorless liquid with a fruity odor	MW 74.1 BP 130°F Sol(64°F) 9% Fl P -4°F IP 10.61 eV	VP 200 mm FRZ -113°F UEL 16.0% LEL 2.8%	Nitrates, strong oxidizers, alkalis & acids [Note: Decomposes slowly in water to form ethyl alcohol and formic acid.]	Char. CS, GC/FID III [#1452]
1190 26	1 ppm = 3.08 mg/m³				Sp Gr 0.92 Class IB Flammable Liquid			
Ethylidenenorbornene C_6H_{10} 16219-75-3 RB9450000	ENB, 5-Ethylidenebicyclo(2.2.1)- hept-2-ene, 5-Ethylidene-2-norbornene [Note: Due to its reactivity, ENB may be stabilized with tert-butyl catechol.]	NIOSH C5 ppm (25 mg/m³) OSHA† none	N.D.	Colorless to white liquid with a turpentine-like odor.	MW: 120.2 BP: 298°F Sol: ? FLP(oc): 101°F IP: ?	VP: 4 mm FRZ: -112°F UEL: ? LEL: ?	Oxygen [Note: ENB should be stored in a nitrogen atmosphere since it reacts with oxygen.]	None available
	1 ppm = 5.00 mg/m³				Sp. Gr: 0.90 Class II Combustible Liquid			
Ethyl mercaptan CH_3CH_2SH 75-08-1 K19625000	Ethanethiol, Ethyl sulfhydrate, Mercaptoethane	NIOSH C 0.5 ppm (1.3 mg/m³) [15-min] OSHA† C 10 ppm (25 mg/m³)	500 ppm	Colorless liquid with a strong, skunk-like odor. [Note: A gas above 95°F.]	MW 62.1 BP 95°F Sol 0.7% Fl P -55°F IP 9.29 eV	VP 442 mm FRZ -228°F UEL 18.0% LEL 2.8%	Strong oxidizers [Note: Reacts violently with calcium hypochlorite.]	Filter; HCl/DCE; GC/FPD; III [#2542]
2363 27	1 ppm = 2.58 mg/m³				Sp Gr 0.84 Class IA Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	OSHA	Inh Ing Con	Irrit eyes, skin, upper resp sys, dizz, drow, head, excited, narco, nau, vomit	Eye Skin Breath Swallow	Irrimmed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	1900 ppm: CCROV*/GMFOV/PAPROV*/SA*/SCBAF					
Wash skin:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Remove:	When wet (flamm)	Escape: GMFOV/SCBAE					
Change:	N.R.						
[Ethyl ether]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh Ing Con	Irrit eyes, upper resp sys, in animals: narco	Eye Skin Breath Swallow	Irrimmed Water flush immed Resp support Medical attention immed	Eyes, resp sys, CNS
Eyes:	Prevent eye contact	1500 ppm: SA, CF*/PAPROV*/CCRFOV/GMFOV/SCBAF/SAF					
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Remove:	When wet (flamm)	Escape: GMFOV/SCBAE					
Change:	N.R.						
[Ethyl formate]							
Skin:	Prevent skin contact	TBAL	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; head; cough, dysp; nau, vomit; olfactory, taste changes; chemical pneu (aspirin); in animals: liver, kidney, urogenital inj; bone marrow effects	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, urogenital sys, bone marrow
Eyes:	Prevent eye contact						
Wash skin:	Daily						
Remove:	When wet or contam						
Change:	N.R.						
[Ethylidene norbornene]							
Skin:	Prevent skin contact	NIOSH	Inh Ing Con	Irrit muc memb, head, nau; in animals: inco, weak, liver, kidney damage, damage, cyan, narco	Eye Skin Breath Swallow	Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, liver, kidneys, blood
Eyes:	Prevent eye contact	5 ppm: CCROV/SA					
Wash skin:	When contam	12.5 ppm: SA, CF/PAPROV					
Remove:	When wet (flamm)	25 ppm: CCRFOV/GMFOV/SAT, CF*/PAPRTOV/SCBAF/SAF					
Change:	N.R.	500 ppm: SA PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE					
[Ethyl mercaptan]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
N-Ethylmorpholine <chem>C6H9ONCH2CH3</chem> 100-74-3 QE4025000	4-Ethylmorpholine	NIOSH 5 ppm (23 mg/m ³) [skin] OSHA† 20 ppm (94 mg/m ³) [skin]	100 ppm	Colorless liquid with an ammonia- like odor	MW 115.2 BP 281°F Sol. Miscible Fl P (oc) 90°F IP ?	VP 6 mm FRZ -81°F UEL ? LEL ?	Strong acids, strong oxidizers	Sig el, H ₂ SO ₄ GC/FID, II(3) [#S146]
	1 ppm = 4.79 mg/m ³				Sp Gr. 0.90 Class IC Flammable Liquid			
Ethyl silicate <chem>(C2H5)2SiO2</chem> 78-10-4 VV9450000	Ethyl orthosilicate, Ethyl silicate (condensed), Tetraethoxysilane, Tetraethyl orthosilicate, Tetraethyl silicate	NIOSH 10 ppm (85 mg/m ³) OSHA† 100 ppm (850 mg/m ³)	700 ppm	Colorless liquid with a sharp, alcohol-like odor.	MW 208.3 BP 336°F Sol. Reacts Fl P 99°F IP 9.77 eV	VP 1 mm FRZ -117°F UEL ? LEL ?	Strong oxidizers, water [Note: Reacts with water to form a silicone adhesive (a milky-white mass).]	XAD-2, CS, GC/FID II(3) [#S264]
1292 29	1 ppm = 6.66 mg/m ³				Sp Gr. 0.93 Class IC Flammable Liquid			
Fenamiphos <chem>C11H13NO3PS</chem> 22224-92-6 TB3675000	Ethyl 3-methyl-4-(methyl- thio)phenyl-(1-methyl- ethyl)phosphoramidate, Nemacur®, Phenamiphos	NIOSH 0.1 mg/m ³ [skin] OSHA† none	N.D.	Off-white to tan, waxy solid. [insecticide] [Note: Found commercially as a granular ingredient (5-15%) or in an emulsifiable concentrate (400 g/l).]	MW: 303.4 BP: ? Sol: 0.03% Fl.P: ? IP: ?	VP: 0.00005 mm MLT: 121°F UEL: ? LEL: ?	None reported [Note: May hydrolyze under alkaline conditions.]	None available
					Sp.Gr: 1.14			
Fensulfothion <chem>C11H11O4PS2</chem> 115-90-2 TF3850000	Dasanit®, O,O-Diethyl O-[p-methyl- sulfonyl]phenyl- phosphorothioate; Terracur P® [(C ₂ H ₅ O) ₂ P(S)OC ₆ H ₄ S(O)CH ₃]	NIOSH 0.1 mg/m ³ OSHA† none	N.D.	Brown liquid or yellow oil. [pesticide]	MW: 308.4 BP: ? Sol(77°F): 0.2% Fl.P: ? IP: ?	VP: ? FRZ: ? UEL: ? LEL: ?	Alkalis	None available
	1 ppm = 12.82 mg/m ³				Sp.Gr: 1.20 Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection -- maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye:	Eyes, resp sys
Eyes:	Prevent eye contact	50 ppm: CCROV*/SA*	Abs	vis dist; corn edema,	Skin:	
Wash skin:	When contam	100 ppm: SA:CF*/PAPROV*/CCRF OV/	Ing	blue-gray vision, colored	Breath:	
Remove:	When wet (flamm)	GMFOV/SCBAF/SAF	Con	haloes	Swallow:	
Change:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				
Provide:	Eyewash (>15%), Quick drench	Escape: GMFOV/SCBAE				
[N-Ethylmorpholine]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose,	Eye:	Eyes, resp sys, Eyes
Eyes:	Prevent eye contact	100 ppm: SA*	Ing	in animals: lac, dysp,	Skin:	liver, kidneys,
Wash skin:	When contam	250 ppm: SA:CF*	Con	pulm edema, tremor, narco,	Breath:	blood, skin
Remove:	When wet (flamm)	500 ppm: SCBAF/SAF		liver, kidney damage,	Swallow:	
Change:	N.R.	700 ppm: SAF:PD,PP		anemia		
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Ethyl silicate]						
Skin:	Prevent skin contact	TBAL	Inh	Nau, vomit, abdom cramps,	Eye:	Resp sys, CNS, CVS,
Eyes:	Prevent eye contact		Abs	diarr, saliv; head, gidd,	Skin:	blood chol
Wash skin:	When contam/Daily		Ing	verti, weak; rhin, chest	Breath:	
Remove:	When wet or contam		Con	tight; blurred vision,	Swallow:	
Change:	Daily			miosis; card irreg; musc		
Provide:	Quick drench			fasc; dysp		
[Fenamiphos]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit skin; nau, vomit,	Eye:	Skin, resp sys, CNS,
Eyes:	Prevent eye contact		Abs	abdom cramps, diarr, saliv;	Skin:	CVS, blood chol
Wash skin:	When contam		Ing	head, gidd, verti, weak;	Breath:	
Remove:	When wet or contam		Con	rhin, chest tight; blurred	Swallow:	
Change:	N.R.			vision, miosis; card		
Provide:	Eyewash, Quick drench			irreg; musc fasc; dysp		
[Fensulfothion]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Fenthion $C_{11}H_{19}O_3PS$ 55-38-9 TF9624C00	Baytex®; Entex®; O,O-Dimethyl O-3-methyl-4- methylthiophenyl phosphorothioate [(CH ₃ O) ₂ P(S)OC ₆ H ₄ (CH ₃)SCH ₃]	NIOSH See Appendix D OSHA† none	N.D.	Colorless to brown liquid with a slight, garlic-like odor. [insecticide]	MW: 278.3 BP: ? Sol: 0.006% Fl.P: NA IP: ?	VP: 0.00003 mm FRZ: 43°F UEL: NA LEL: NA	Oxidizers	None available
1 ppm = 11.57 mg/m³					Sp.Gr: 1.25 Noncombustible Liquid			
Ferbam [(CH ₃) ₂ NCS] ₂ Fe 14484-64-1 NO8750000	tris(Dimethyldithio- carbamato)iron, Ferric dimethyl dithio- carbamate	NIOSH 10 mg/m³ OSHA† 15 mg/m³	800 mg/m³	Dark brown to black, odorless solid. [fungicide]	MW: 416.5 BP: Decomposes Sol: 0.01% Fl.P: ? IP: 7.72 eV	VP: 0 mm (approx) MLT: >356°F (Decomposes) UEL: ? LEL: ? MEC: 55 g/m³	Strong oxidizers, moisture	None available
					Sp.Gr: ? Combustible Solid			
Ferrovanadium dust FeV 12604-58-9 LK2900000	Ferrovanadium	NIOSH* 1 mg/m³ ST 3 mg/m³ [*Note: The REL also applies to Vanadium metal and Vanadium carbide.] OSHA† 1 mg/m³	500 mg/m³	Dark, odorless particulate dispersed in air. [Note: Ferro- vanadium metal is an alloy usually contain- ing 50-80% vanadium.]	MW: 106.8 BP: ? Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 2696- 2768°F UEL: NA LEL: NA MEC: 1.3 g/m³	Strong oxidizers	Filter; Acid; AAS; OSHA [#ID121, #ID125G]
					Sp.Gr: ? Metal: Noncombustible Solid, but dust may be an explosion hazard			
Fibrous glass dust LK3651000	Fiber glass®, Fiberglass, Glass fibers, Glass wool [Note: Usually produced from borosilicate & low alkali silicate glasses.]	NIOSH 3 fibers/cm² (fibers ≤ 3.5 µm in diameter & ≥ 10 µm in length) 5 mg/m³ (total) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Typically, glass filaments >3 µm in diameter or glass "wool" with diameters down to 0.05 µm & >1 µm in length.	MW: NA BP: NA Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; II [#0500, Nuisance Dust (total)] [Also #7400]
					Sp.Gr: 2.5 Noncombustible Fibers			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	Nau, vomit, abdom cramps, diarr, saliv; head, gidd, vert, weak; rhin, chest tight; blurred vision, miosis; card irregularities; muscfasc; dysp	Eye: Skin: Breath: Swallow: Irr immed Soap flush immed Resp support Medical attention immed	Resp sys, CNS, CVS, plasma chol
[Fenthion]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 50 mg/m ³ : D 100 mg/m ³ : DXSQ*/HIE*/SA* 250 mg/m ³ : SA CF*/PAPRD* 500 mg/m ³ : HIEF/SAT:CF*/PAPRTHIE*/SCBAF/SAF 800 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, resp tract, derm, GI dist	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, GI tract
[Ferbam]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 5 mg/m ³ : DM* 10 mg/m ³ : DMXSQ*/SA* 25 mg/m ³ : SA:CF*/PAPRDM* 50 mg/m ³ : HIEF/SAT:CF*/PAPRTHIE*/SCBAF/SAF 500 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, resp sys, in animals: bron, pneumitis	Eye: Breath: Irr immed Resp support	Eyes, resp sys
[Ferrovanadium dust]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	NIOSH 5X REL: D 10X REL: DXSQ/HIE/SA 25X REL: SA:CF/PAPRD 50X REL: HIEF/PAPRTHIE/SCBAF/SAF 1000X REL: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin, nose, throat; dysp	Eye: Breath: Irr immed Fresh air	Eyes, skin, resp sys
[Fibrous glass dust]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Fluorine F_2 7782-41-4 LM6475000 9192 25 (cryogenic liquid) 1045 20 (compressed)	Fluorine-19 1 ppm = 1.58 mg/m ³	NIOSH/OSHA 0.1 ppm (0.2 mg/m ³)	25 ppm	Pale-yellow to greenish gas with a pungent, irritating odor.	MW: 38.0 BP: -307°F Sol: Reacts Fl, P: NA IP: 15.70 eV RGasD: 1.31 Nonflammable Gas, but an extremely strong oxidizer	VP: >1 atm FRZ: -363°F UEL: NA LEL: NA	Water, nitric acid, oxidizers, organic compounds [Note: Reacts violently with all combustible materials, except the metal containers in which it is shipped. Reacts with H ₂ O to form hydrofluoric acid.]	None available
Fluorotrichloromethane CF_3Cl 75-69-4 PB6125000	Freon® 11, Monofluorotrichloromethane, Refrigerant 11, Trichlorofluoromethane, Trichloromonofluoromethane 1 ppm = 5.71 mg/m ³	NIOSH C 1000 ppm (5600 mg/m ³) OSHA† 1000 ppm (5600 mg/m ³)	2000 ppm	Colorless to water-white, nearly odorless liquid or gas (above 75°F)	MW: 137.4 BP: 75°F Sol(75°F): 0.1% Fl, P: NA IP: 11.77 eV Sp, Gr: 1.47 (Liquid at 75°F) RGasD: 4.74 Noncombustible Liquid Nonflammable Gas	VP: 690 mm FRZ: -168°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc, magnesium & lithium shavings, granular barium	Char. CS, GC/FID, III [#1006, Trichloro- fluoro- methane]
Fluoroxene $CF_3CH_2OCH=CH_2$ 406-90-6 KO4250000	2,2,2-Trifluoroethoxy- ethene; 2,2,2-Trifluoroethyl vinyl ether 1 ppm = 5.24 mg/m ³	NIOSH* C2 ppm (10.3 mg/m ³) [60-min] [*Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Liquid. [Inhalation anesthetic] [Note: A gas above 109°F.]	MW: 126.1 BP: 109°F Sol: ? Fl, P: ? IP: ? Sp, Gr: 1.14 Combustible Liquid [potentially EXPLOSIVE].	VP: 286 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
Fonofos $C_{10}H_{11}OPS_2$ 944-22-9 TA5950000	Dyfonate®, Dyphonate, O-Ethyl-S-phenyl ethyl- phosphorothioate, Fonophos 1 ppm = 10.24 mg/m ³	NIOSH 0.1 mg/m ³ [skin] OSHA† none	N.D.	Light-yellow liquid with an aromatic odor. [insecticide]	MW: 246.3 BP: ? Sol: 0.001% Fl, P: >201°F IP: ? Sp, Gr: 1.15 Class IIIB Combustible Liquid	VP(77°F): 0.0002 mm FRZ: ? UEL: ? LEL: ?	None reported	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact (liq)	NIOSH/OSHA	Inh	Irrit eyes, nose, resp sys;	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm SA*	Con	lar spasm, bron spasm,	Skin	liver, kidneys
Wash skin:	When contam (liq)	2.5 ppm SA CF*		pulm edema, eye, skin burns,	Breath	
Remove:	When wet or contam (liq)	5 ppm SCBAF/SAF		in animals liver kidney	Irr immed	
Change:	N.R.	25 ppm SAF PD, PP		damage	Water flush immed	
Provide:	Eyewash (liq), Quick drench (liq)	5 SCBAF PD, PP/SAF PD, PP ASCBA			Resp support	
		Escape GMFS/SCBAE				
[Fluorine]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Inco, tremor, derm, card	Eye	Skin resp sys, CVS
Eyes:	Prevent eye contact	2000 ppm SA/SCBAF	Inh	arry, card arrest, asphy;	Skin	
Wash skin:	N.R.	5 SCBAF PD, PP/SAF PD, PP ASCBA	Ing	liq: frostbite	Breath	
Remove:	When wet or contam	Escape GMFOV/SCBAE	Con		Swallow	
Change:	N.R.				Medical attention immed	
Provide:	Eyewash, Quick drench					
[Fluorotrichloromethane]						
Skin:	N.R.	TBAL	Inh	Irrit eyes; CNS depres,	Eye:	Eyes, CNS
Eyes:	Prevent eye contact		Ing	analgesia, anes, sez,	Skin:	
Wash skin:	N.R.		Con	resp depres	Breath:	
Remove:	N.R.				Swallow:	
Change:	N.R.				Irr immed	
					Soap wash	
					Resp support	
					Medical attention immed	
[Fluoroxene]						
Skin:	Prevent skin contact	TBAL	Inh	Nau, vomit, abdom cramps,	Eye:	Resp sys, CNS, CVS,
Eyes:	Prevent eye contact		Abs	diarr, saliv; head, gidd,	Skin:	blood chol
Wash skin:	When contam		Ing	verti, weak; rhin, chest	Breath:	
Remove:	When wet or contam		Con	tight; blurred vision,	Swallow:	
Change:	Daily			miosis; card irreg; musc		
Provide:	Eyewash, Quick drench			fasc; dysp		
[Fonofos]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Formaldehyde HCHO 50-00-0 LP8925000	Methanal, Methyl aldehyde, Methylene oxide 1 ppm = 1.25 mg/m ³	NIOSH Ca See Appendix A 0.016 ppm C 0.1 ppm [15-min] OSHA [1910.1048] 0.75 ppm ST 2 ppm	Ca [20 ppm]	Nearly colorless gas with a pungent, suffocating odor. [Note: Often used in an aqueous solution (see specific listing for Formalin).]	MW: 30.0 BP: -6°F Sol: Miscible Fl.P: NA (Gas) IP: 10.88 eV RGA/D: 1.04 Flammable Gas	VP: > 1 atm FRZ: -134°F UEL: 73% LEL: 7.0% [Note: Pure formaldehyde has a tendency to polymerize. Reacts with HCl to form bis-chloromethyl ether.]	Strong oxidizers, alkalis & acids, phenols, urea [Note: Pure formaldehyde has a tendency to polymerize. Reacts with HCl to form bis-chloromethyl ether.]	Filter/Imp(2); none; Vis; III [#3500] [Note: Also XAD-2; Toluene; GC/FID; #2541.]
Formalin (as formaldehyde) 1198 29 2209 29	Formaldehyde solution [Note: Formalin is an aqueous solution that is 37% formaldehyde by weight; inhibited solutions contain 6-12% methyl alcohol. Also see specific listings for Formaldehyde and Methyl alcohol.]	NIOSH Ca See Appendix A 0.016 ppm C 0.1 ppm [15-min] OSHA [1910.1048] 0.75 ppm ST 2 ppm	Ca [20 ppm]	Colorless liquid with a pungent odor.	MW: Varies BP: 214°F Sol: Miscible FLP: 185°F IP: ? Sp.Gr: 1.08 Class IIIA Combustible Liquid	VP: 1 mm FRZ: ? UEL: 73% LEL: 7% [Note: Also XAD-2; Toluene; GC/FID; #2541.]	Strong oxidizers, alkalis & acids; phenols; urea; oxides; isocyanates; caustics; anhydrides	Filter/Imp(2); none; Vis; III [#3500] [Note: Also XAD-2; Toluene; GC/FID; #2541.]
Formamide HCONH ₂ 75-12-7 LQ0525000	Carbamaldehyde, Metanamide 1 ppm = 1.87 mg/m ³	NIOSH 10 ppm (15 mg/m ³) [skin] OSHA† none	N.D.	Colorless, oily liquid. [Note: A solid below 37°F.]	MW: 45.1 BP: 411°F (Decomposes) Sol: Miscible Fl.P(oc): 310°F IP: 10.20 eV Sp.Gr: 1.13 Class IIIB Combustible Liquid	VP(86°F): 0.1 mm FRZ: 37°F UEL: ? LEL: ? [Note: Hygroscopic (i.e., absorbs moisture from the air).]	Oxidizers, iodine, pyridine, sulfur trioxide, copper, brass, lead [Note: Hygroscopic (i.e., absorbs moisture from the air).]	None available
Formic acid HCOOH 64-18-6 LQ4900000 1779 60	Formic acid (85-95% in aqueous solution); Hydrogen carboxylic acid; Methanoic acid 1 ppm = 1.91 mg/m ³	NIOSH/OSHA 5 ppm (15 mg/m ³)	30 ppm	Colorless liquid with a pungent, penetrating odor. [Note: Often used in an aqueous solution.]	MW: 46.0 BP: 224°F (90% soln.) Sol: Miscible Fl.P(oc): 122°F (90% soln.) IP: 11.05 eV Sp.Gr: 1.22 (90% solution) Class II Combustible Liquid (90% solution)	VP: 35 mm FRZ: 20°F (90% soln.) UEL: 57% (90% soln.) LEL: 18% (90% soln.)	Strong oxidizers, strong caustics, concentrated sulfuric acid [Note: Corrosive to metals.]	Sigal*; Water IC; III [#1616]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFS/SCBAE	Inh	Irrit eyes, nose, throat; resp sys; lac, cough; bron spasm, [canc]	Eye	Irr immed Resp support	Eyes, resp sys [nasal cancer]
Eyes:	Prevent eye contact		Con		Breath		
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Formaldehyde]							
Skin:	Prevent skin contact	NIOSH ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFS/SCBAE	Inh	Irrit eyes, nose, throat; resp sys, lac, cough; bron spasm; derm; [canc]	Eye	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys [nasal cancer]
Eyes:	Prevent eye contact		Inh		Skin		
Wash skin:	When contam		Con		Breath:		
Remove:	When wet or contam				Swallow		
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Formalin (as formaldehyde)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb; drow, ffg; nau, acidosis; skin eruptions; in animals: repro effects	Eye:	Irr immed Water wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, repro sys
Eyes:	Prevent eye contact		Inh		Skin:		
Wash skin:	N.R.		Con		Breath:		
Remove:	N.R.				Swallow:		
Change:	N.R.						
[Formamide]							
Skin:	Prevent skin contact	NIOSH/OSHA 30 ppm SA/SCBAF ✓ SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVH/E/SCBAE	Inh	Irrit eyes, skin, throat; skin burns, derm, lac; rhin; cough, dysp, nau	Eye	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Inh		Skin		
Wash skin:	When contam		Con		Breath		
Remove:	When wet or contam				Swallow		
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Formic acid]							

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Furfural $C_5H_4O_2$ 98-01-1 LT7000000	Fural, 2-Furancarboxaldehyde, Furfuraldehyde, 2-Furfuraldehyde	NIOSH See Appendix D OSHA† 5 ppm (20 mg/m³) [skin]	100 ppm	Colorless to amber liquid with an almond-like odor [Note: Darkens in light and air.]	MW: 96.1 BP: 323°F Sol: 8% Fl.P: 140°F IP: 9.21 eV	VP: 2 mm FRZ: -34°F UEL: 19.3% LEL: 2.1%	Strong acids oxidizers, strong alkalis [Note: May polymerize on contact with strong acids or strong alkalis.]	XAD-2*, Toluene, GC/FID, III [#2529]
199 29	1 ppm = 3.99 mg/m³				Sp Gr 1.16 Class IIIA Combustible Liquid			
Furfuryl alcohol $C_5H_6O_3$ 98-00-0 LU9100000	2-Furylmethanol, 2-Hydroxymethylfuran	NIOSH 10 ppm (40 mg/m³) ST 15 ppm (60 mg/m³) [skin] OSHA† 50 ppm (200 mg/m³)	75 ppm	Colorless to amber liquid with a faint, burning odor [Note: Darkens on exposure to light.]	MW: 98.1 BP: 338°F Sol: Miscible Fl.P: 149°F IP: ?	VP(77°F): 0.6 mm FRZ: 6°F UEL: 16.3% LEL: 1.8%	Strong oxidizers & acids [Note: Contact with organic acids may lead to polymerization.]	Porapak-Q, Acetone, GC/FID, III [#2505]
2874 55	1 ppm = 4.08 mg/m³				Sp Gr 1.13 Class IIIA Combustible Liquid			
Gasoline 8006-61-9 LX3300000	Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins & aromatics).]	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Clear liquid with a characteristic odor.	MW: 72 (approx) BP: 102°F Sol: Insoluble Fl.P: -45°F IP: ?	VP: 38-300 mm FRZ: ? UEL: 7.6% LEL: 1.4%	Strong oxidizers such as peroxides, nitric acid & perchlorates	None available
1203 27	1 ppm = 3.00 mg/m³ (approx)				Class IB Flammable Liquid			
Germanium tetrahydride GeH_4 7782-65-2 LY4900000	Germane, Germanium hydride, Germanomethane, Monogermene [Note: Used chiefly for the production of high purity germanium for use in semiconductors.]	NIOSH 0.2 ppm (0.6 mg/m³) OSHA† none	N.D.	Colorless gas with a pungent odor. [Note: Shipped as a compressed gas.]	MW: 76.6 BP: -127°F Sol: Insoluble Fl.P: NA (Gas) IP: 11.34 eV	VP: >1 atm FRZ: -267°F UEL: ? LEL: ?	Bromine	None available
2192 18	1 ppm = 3.18 mg/m³				RGasD: 2.65 Flammable Gas (may ignite SPONTANEOUSLY in air).			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	Prevent skin contact	OSHA 50 ppm: CCROV*/SA* 100 ppm: SA:CF*/CCRF OV/PAPROV*/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, upper	Eye	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	resp sys, head, derm	Skin	Water flush prompt	
Wash skin:	When contam		Ing		Breath	Resp support	
Remove:	When wet or contam		Con		Swallow	Medical attention immed	
Change:	N.R.						
[Furfural]							
Skin:	Prevent skin contact	NIOSH/OSHA 75 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, muc memb; dizz;	Eye	Irr immed	Eyes, skin, resp sys CNS
Eyes:	Prevent eye contact		Abs	nau, diarr, diuresis, resp,	Skin	Water flush immed	
Wash skin:	When contam		Ing	body temperature depres,	Breath:	Resp support	
Remove:	When wet or contam		Con	vomit, derm	Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Quick drench						
[Furfuryl alcohol]							
Skin:	Prevent skin contact	NIOSH § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, muc memb;	Eye:	Irr immed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: liver & kidney cancer]
Eyes:	Prevent eye contact		Abs	derm; head, ftg, blurred	Skin:	Soap flush immed	
Wash skin:	When contam		Ing	vision, dizz, slurred	Breath:	Resp support	
Remove:	When wet (flamm)		Con	speech, conf, convuls; chemical pneu (aspir); possible liver, kidney damage; [carc]	Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Gasoline]							
Skin:	N.R.	TDAL	Inh	Mal, head, gidd, fainting; dysp; nau, vomit; kidney inj; hemolytic effects	Breath:	Resp support	CNS, kidneys, blood
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Germanium tetrahydride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Glutaraldehyde <chem>OCH(CH2)3CHO</chem> 111-30-8 MA2450000	Glutaric dialdehyde; 1,5-Pentanedial	NIOSH C 0.2 ppm (0.8 mg/m ³) See Appendix C (Aldehydes) OSHA† none	N.D.	Colorless liquid with a pungent odor.	MW: 100.1 BP: 212°F Sol: Miscible Fl.P.: NA IP: ? Sp.Gr: 1.10 Noncombustible Liquid	VP: 17 mm FRZ: 7°F UEL: NA LEL: NA	Strong oxidizers, strong bases [Note: Alkaline solutions of glutaraldehyde (i.e., activated glutaraldehyde) react with alcohol, ketones, amines, hydrazines & proteins.]	XAD-2*; Toluene; GC/FID; III [#2531]
Glycerin (mist) <chem>HOCH2CH(OH)CH2OH</chem> 56-81-5 MA8050000	Glycerin (anhydrous); Glycerol; Glycyl alcohol; 1,2,3-Propanetriol; Trihydroxypropane	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Clear, colorless, odorless, syrupy liquid or solid (below 64°F). [Note: The solid form melts above 64°F but the liq- uid form freezes at a much lower temperature.]	MW: 92.1 BP: 554°F (Decomposes) Sol: Miscible Fl.P.: 320°F IP: ? Sp.Gr: 1.26 Class IIIB Combustible Liquid	VP(122°F): 0.003 mm MLT: 64°F UEL: ? LEL: ?	Strong oxidizers (e.g., chromium trioxide, potassium chlorate, potassium perman- ganate) [Note: hygroscopic (i.e., absorbs moisture from the air).]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Glycidol <chem>C2H4O2</chem> 556-52-5 UB4375000	2,3-Epoxy-1-propanol, Epoxypropyl alcohol, Glycidol; Hydroxymethyl ethylene oxide, 2-Hydroxymethyl oxiran, 3-Hydroxypropylene oxide	NIOSH 25 ppm (75 mg/m ³) OSHA† 50 ppm (150 mg/m ³)	150 ppm	Colorless liquid	MW 74.1 BP 320°F (Decomposes) Sol. Miscible Fl.P. 162°F IP ? Sp Gr. 1.12 Class IIIA Combustible Liquid	VP(77°F) 0.9 mm FRZ -49°F UEL ? LEL ?	Strong oxidizers, nitrates	Char. THF GC/FID. III [#1608]
Glycolonitrile <chem>HOCH2CN</chem> 107-16-4 AM0350000	Cyanomethanol, Formaldehyde cyanohydrin, Glycolic nitrile, Glyconitrile, Hydroxyacetonitrile	NIOSH C 2 ppm (5 mg/m ³) [15-min] OSHA none	N.D.	Colorless, odorless, oily liquid. [Note: Forms cyanide in the body.]	MW: 57.1 BP: 361°F (Decomposes) Sol: Soluble Fl.P.: ? IP: ? Sp.Gr(66°F): 1.10 Combustible Liquid	VP(145°F): 1 mm FRZ: <-98°F UEL: ? LEL: ?	Traces of alkalis (promote violent polymerization)	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection -- maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irr ite eyes, skin, resp sys; derm, sens skin; cough, asthma; nau, vomit	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Glutaraldehyde]					
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	TBAL	Inh Con	Irr ite eyes, skin, resp sys; head, nau, vomit; kidney inj	Eye: Irr immed Skin: Water wash Breath: Fresh air	Eyes, skin, resp sys, kidneys
[Glycerin (mist)]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH 150 ppm: SA*/SCBAF § SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irr ite eyes, skin, nose, throat, narco	Eye: Irr immed Skin: Water wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
[Glycidol]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH 20 ppm: SA 50 ppm: SA:CF 100 ppm: SCBAF/SAF 250 ppm: SAF: PD, PP §: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irr ite eyes, skin, resp sys; head, dizz, weak, gidd, conf, convuls; dysp; abdom pain, nau, vomit	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, CVS
[Glycolonitrile]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Grain dust (oat, wheat, barley) MD7900000	None [Note: Grain dust consists of 60-75% organic materials (cereal grains) & 25-40% inorganic materials (soil), and includes fertilizers, pesticides & microorganisms.]	NIOSH 4 mg/m ³ OSHA 10 mg/m ³	N.D.	Mixture of grain and all the other substances asso- ciated with its cultivation & harvesting.	Properties depend upon the specific component of the grain dust.		None reported	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Graphite (natural) C 7782-42-5 MD3659600	Black lead, Mineral carbon, Plumbago, Silver graphite, Stove black [Note: Also see specific listing for Graphite (synthetic).]	NIOSH 2.5 mg/m ³ (resp) OSHA† 15 mppcf	1250 mg/m ³	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble Fl.P: NA IP: NA Sp Gr: 2.0-2.25 Combustible Solid	VP: 0 mm (approx) MLT: 5602°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter, none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Graphite (synthetic) C 7440-44-0 FF5250100 1362 32 (carbon, activated)	Activated carbon [Note: Also see specific listing for Graphite (natural).]	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 1.5-1.8 Combustible Solid	VP: 0 mm (approx) MLT: 6602°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Gypsum CaSO ₄ ·2H ₂ O 13397-24-5 MG2360000	Calcium (II) sulfate dihydrate, Gypsum stone, Hydrated calcium sulfate, Mineral white [Note: Gypsum is the dihydrate form of calcium sulfate; Plaster of Paris is the hemihydrate form.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White or nearly white, odorless, crystalline solid.	MW: 172.2 BP: ? Sol (77°F): 0.2% Fl.P: NA IP: NA Sp.Gr: 2.32 Noncombustible Solid	VP: 0 mm (approx) MLT: 262-325°F (Loose H ₂ O) UEL: NA LEL: NA	Aluminum (at high temperatures), diazomethane	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh Con	Irrite eyes, skin, upper resp sys; cough, dysp, wheez, asthma, bron, chronic obstructive pulm disease; conj, dem, rhinitis, grain fever	Eye: Breath:	Irr immed Fresh air	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	Daily						
[Grain dust (oat, wheat, barley)]							
Skin:	N.R.	NIOSH 12.5 mg/m³: D 25 mg/m³: DXSQ/SA 62.5 mg/m³: PAPRD/SA:CF 125 mg/m³: HIEF/PAPRTHIE/SAT:CF/ SCBAF/SAF 1250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Cough, dysp, black sputum, decr pulm func, lung fib	Eye: Breath:	Irr immed Fresh air	Resp sys, CVS
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Graphite (natural)]							
Skin:	N.R.	TBAL	Inh Con	Cough, dysp, black sputum, decr pulm func, lung fib	Eye: Breath:	Irr immed Fresh air	Resp sys, CVS
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Graphite (synthetic)]							
Skin:	N.R.	TBAL	Inh Con	Irrite eyes, skin, muc memb; upper resp sys; cough, sneez, rin	Eye: Breath:	Irr immed Fresh air	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Gypsum]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Hafnium Hf 7440-58-6 MG4600000 2545 40 (powder, dry) 1326 32 (powder, wet)	Celtium, Elemental hafnium, Hafnium metal	NIOSH*OSHA* 0.5 mg/m ³ [*Note: The REL and PEL also apply to other hafnium compounds (as Hf).]	50 mg/m ³ (as Hf)	Highly lustrous, ductile, grayish solid.	MW 178.5 BP 8316°F Sol: Insoluble Fl.P: NA IP: NA Sp Gr: 13.31 Explosive in powder form (either dry or with <25% water), finely divided powder can be ignited by static electricity or even SPONTANEOUSLY.	VP: 0 mm (approx) MLT: 4041°F UEL: NA LEL: NA	Strong oxidizers, chlorine	Filter; Acid; PES; II(5) [#S194]
Halothane CF ₃ CHBrCl 151-67-7 KH6550000	1-Bromo-1-chloro-2,2,2- trifluoroethane; 2-Bromo-2-chloro-1,1,1- trifluoroethane; 1,1,1-Trifluoro-2-bromo- 2-chloroethane; 2,2,2-Trifluoro-1-bromo- 1-chloroethane 1 ppm = 8.20 mg/m ³	NIOSH* C 2 ppm (16.2 mg/m ³) [60-min] [*Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Clear, colorless liquid with a sweetish, pleasant odor. [Inhalation anesthetic] [Note: May be stabilized with 0.01% thymol.]	MW: 197.4 BP: 122°F Sol: 0.3% Fl.P: NA IP: ? Sp.Gr: 1.87 Noncombustible Liquid	VP: 243 mm FRZ: -180°F UEL: NA LEL: NA	May attack rubber & some plastics; sensitive to light.	Char(2); CS; GC/FID; OSHA [#29]
Heptachlor C ₁₀ H ₅ Cl ₇ 76-44-8 PC0700000 2761 55 (organochlorine pesticide, solid, n.o.s.)	1,4,5,6,7,8,8-Heptachloro- 3a,4,7,7a-tetrahydro- 4,7-methanoindene	NIOSH Ca See Appendix A 0.5 mg/m ³ [skin] OSHA 0.5 mg/m ³ [skin]	Ca [35 mg/m ³]	White to light tan crystals with a camphor-like odor. [insecticide]	MW 373.4 BP: 293°F (Decomposes) Sol: 0.0006% Fl.P: NA IP: ? Sp.Gr: 1.66 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(77°F): 0.0003 mm MLT: 203°F UEL: NA LEL: NA	Iron, rust	Chrom-102, Toluene, GC/ECD; II(5) [#S287]
n-Heptane CH ₃ (CH ₂) ₅ CH ₃ 142-82-5 MI7700000 1206 27	Heptane, normal-Heptane 1 ppm = 4.17 mg/m ³	NIOSH 85 ppm (350 mg/m ³) C 440 ppm (1800 mg/m ³) [15-min] OSHA† 500 ppm (2000 mg/m ³)	750 ppm	Colorless liquid with a gasoline- like odor.	MW 100.2 BP: 209°F Sol: 0.0003% Fl.P: 25°F IP: 9.90 eV Sp.Gr: 0.68 Class IB Flammable Liquid	VP(72°F): 40 mm FRZ: -131°F UEL: 6.7% LEL: 1.05%	Strong oxidizers	Char; CS; GC/FID; III [#1500; Hydro- carbons]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection— maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH/OSHA 2.5 mg/m ³ : DM 5 mg/m ³ : DMXSQ/SA 12.5 mg/m ³ : SA/CF*/PAP/RDM* 25 mg/m ³ : H/EF/SAT/CF*/PAPRTH/E/ SCBAF/SAF 50 mg/m ³ : SAF/PD,PP §: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: H/EF/SCBAE	Inh Ing Con	In animals: irrit eyes, skin, muc memb; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, muc memb, liver
[Hafnium]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash	TBAL	Inh Abs Ing Con	Irr: eyes, skin, resp sys; conf, drow, dizz, nau, analgesia, anes; card arrhy; liver, kidney damage; decr audio-visual performance; in animals: repro effects	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CVS, CNS, liver, kidneys, repro sys
[Halothane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH §: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOVH/SCBAE	Inh Abs Ing Con	In animals: tremor, convuls; liver damage, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, liver [in animals: liver cancer]
[Heptachlor]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 750 ppm: CCROV/GMFOV/PAPROV/ SA/SCBAF §: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	LI-head, gidd, stupor, verti, Inco; loss of appetite, nau; dcm; chemical pneu (aspir liq); uncon	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, resp sys, CNS
[n-Heptane]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1-Heptanethiol <chem>CH3(CH2)5SH</chem> 1639-09-4 MJ1400000	Heptylmercaptan, n-Heptyl mercaptan	NIOSH C 0.5 ppm (2.7 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with a strong odor.	MW: 132.3 BP: 351°F Sol: Insoluble Fl.P: 115°F IP: ?	VP: ? FRZ: -46°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
	1 ppm = 5.50 mg/m ³				Sp.Gr: 0.84 Class II Combustible Liquid			
Hexachlorobutadiene <chem>Cl2C=CClCCl=CCl2</chem> 87-68-3 EJ0700000	HCB ₂ D; Hexachloro-1,3-butadiene; 1,3-Hexachlorobutadiene; Perchlorobutadiene	NIOSH Ca See Appendix A 0.02 ppm (0.24 mg/m ³) [skin] OSHA† none	Ca [N.D.]	Clear, colorless liquid with a mild, turpentine- like odor.	MW: 260.7 BP: 419°F Sol: Insoluble Fl.P: ? IP: ?	VP: 0.2 mm FRZ: -6°F UEL: ? LEL: ?	Oxidizers	XAD-2; Hexane; GC/ECD; III [P&CAM #307]
2279 55	1 ppm = 10.84 mg/m ³				Sp.Gr: 1.55 Combustible Liquid			
Hexachlorocyclo- pentadiene <chem>C6Cl6</chem> 77-47-4 GY1225000	HCCPD; Hexachloro-1,3-cyclo- pentadiene; 1,2,3,4,5,5-Hexachloro- 1,3-cyclopentadiene; Perchlorocyclopentadiene	NIOSH 0.01 ppm (0.1 mg/m ³) OSHA† none	N.D.	Pale-yellow to amber-colored liquid with a pungent, unpleasant odor. [Note: A solid below 16°F.]	MW: 272.8 BP: 462°F Sol(77°F): 0.0002% (Reacts) Fl.P: NA IP: ?	VP(77°F): 0.08 mm FRZ: 16°F UEL: NA LEL: NA	Water, light [Note: Reacts slowly with water to form hydrochloric acid; will corrode iron & most metals in presence of moisture. Explosive hydrogen gas may collect in enclosed spaces in the presence of moisture.]	Porapak; Hexane; GC/ECD; III [#2518]
2646 55	1 ppm = 11.34 mg/m ³				Sp.Gr: 1.71 Noncombustible Liquid			
Hexachloroethane <chem>Cl3CCCl3</chem> 67-72-1 KI4025000	Carbon hexachloride, Ethane hexachloride, Perchloroethane	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 1 ppm (10 mg/m ³) [skin] OSHA 1 ppm (10 mg/m ³) [skin]	Ca [300 ppm]	Colorless crystals with a camphor- like odor.	MW: 236.7 BP: Sublimes Sol(72°F): 0.005% Fl.P: NA IP: 11.22 eV	VP: 0.2 mm MLT: 368°F (Sublimes) UEL: NA LEL: NA	Alkalis; metals such as zinc, cadmium, aluminum, hot iron & mercury	Char; CS; GC/FID; III [#1003, Haloge- nated Hydro- carbons]
9037 53	1 ppm = 9.84 mg/m ³				Sp.Gr: 2.09 Noncombustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	ing	throat; weak, cyan, incr	Skin:	CNS, blood
Wash skin:	When contam	12.5 ppm: SA:CP/PAPROV	Con	respiration, nau, drow,	Breath:	
Remove:	When wet or contam	25 ppm: CCROV: GMFOV/PAPRTOV/		head, vomit	Swallow:	
Change:	N.R.	SCBAF:SAF			Irr immed	
		5: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Soap wash	
		Escape: GMFOV/SCBAE			Resp support	
					Medical attention	
					immed	
[1-Heptanethiol]						
Skin:	Prevent skin contact	NIOSH	Inh	In animals: irrit eyes,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	skin, resp sys; kidney	Skin:	kidneys
Wash skin:	When contam	Escape: GMFOV/SCBAE	ing	damage: [carc]	Breath:	[in animals: kidney
Remove:	When wet or contam		Con		Swallow:	tumors]
Change:	N.R.				Medical attention	
Provide:	Eyewash, Quick drench				immed	
[Hexachlorobutadiene]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	eye, skin burns; lac; sneez,	Skin:	liver, kidneys
Wash skin:	When contam		ing	cough, dysp, salv, pulm	Breath:	
Remove:	When wet or contam		Con	edema; nau, vomit, diarr;	Swallow:	
Change:	N.R.			in animals: liver, kidney inj	Medical attention	
Provide:	Eyewash, Quick drench				immed	
[Hexachlorocyclopentadiene]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	in animals: kidney	Skin:	kidneys
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	ing	damage; [carc]	Breath:	[in animals:
Remove:	When wet or contam		Con		Swallow:	liver cancer]
Change:	Daily				Medical attention	
Provide:	Eyewash, Quick drench				immed	
[Hexachloroethane]						

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Hexachloronaphthalene $C_{10}H_2Cl_6$ 1335-87-1 QJ7350000	Halowax® 1014	NIOSH/OSHA 0.2 mg/m ³ [skin]	2 mg/m ³	White to light- yellow solid with an aromatic odor.	MW: 334.9 BP: 650-730°F Sol: Insoluble Fl.P: NA IP: ? Sp Gr: 1.78 Noncombustible Solid	VP: <1 mm MLT: 279°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/ECD; II(2) [#S100]
1-Hexadecanethiol $CH_3(CH_2)_{14}SH$ 2917-26-2	Cetyl mercaptan, Hexadecanethiol-1, n-Hexadecanethiol, Hexadecyl mercaptan	NIOSH C 0.5 ppm (5.3 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid or solid (below 64-68°F) with a strong odor.	MW: 258.5 BP: ? Sol: Insoluble Fl.P: 215°F IP: ? Sp.Gr: 0.85 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: 64-68°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, reducing agents	None available
Hexafluoroacetone $(CF_3)_2CO$ 684-16-2 UC2450000	Hexafluoro-2-propanone; 1,1,1,3,3,3-Hexafluoro- 2-propanone; HFA; Perfluoroacetone	NIOSH 0.1 ppm (0.7 mg/m ³) [skin] OSHA† none	N.D.	Colorless gas with a musty odor. [Note: Shipped as a liquefied compressed gas.]	MW: 166.0 BP: -18°F Sol: Reacts Fl.P: NA IP: 11.81 eV RGasD: 5.76 Nonflammable Gas, but highly reactive with water & other substances, releasing heat.	VP: 5.8 atm FRZ: -188°F UEL: NA LEL: NA	Water, acids [Note: Hygroscopic (i.e., absorbs moisture from the air); reacts with moisture to form a highly acidic sesquihydrate.]	None available
Hexamethylene diisocyanate $OCN(CH_2)_6NCO$ 822-06-0 MO1740000	1,6-Diisocyanato-hexane; HDI; Hexamethylene- 1,6-diisocyanate; 1,6-Hexamethylene diisocyanate; HMDI	NIOSH 0.005 ppm (35 µg/m ³) C 0.020 ppm (140 µg/m ³) [10-min] OSHA none	N.D.	Clear, colorless to slightly yellow liquid with a sharp, pungent odor.	MW: 168.2 BP: 415°F Sol: Low (Reacts) Fl.P: 284°F IP: ? Sp.Gr(77°F): 1.04 Class IIIB Combustible Liquid	VP(77°F): 0.5 mm FRZ: -89°F UEL: ? LEL: ?	Water, alcohols, strong bases, amines, carboxylic acids, organotin catalysts [Note: Reacts slowly with water to form carbon dioxide. Avoid heating above 392°F (polymerizes).]	Imp; Reagent; HPLC/UVD; III [#5521, Isocya- nates]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	NIOSH/OSHA 2 mg/m ³ SA*/SCBAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Acne-form derm. nau. conf. jaun. coma	Eye Skin: Breath: Swallow	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, liver
[Hexachloronaphthalene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, dizz, weak, cyan, nau, convuls	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[1-Hexadecanethiol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact/ Frostbite Prevent eye contact/ Frostbite N.R. N.R. N.R. Frostbite	TBAL	Inh Abs Con	Irrit eyes, skin, muc memb, resp sys; pulm edema; liq; frostbite; in animals: terato, repro effects, kidney inj	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys, kidneys, repro sys
[Hexafluoroacetone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH 0.05 ppm: SA* 0.125 ppm: SA:CF* 0.25 ppm: SCBAF/SAF 1 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; cough, dysp, bron, wheez, pulm edema, asthma; com damage, skin blisters	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Hexamethylene diisocyanate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Hexamethyl phosphoramide [(CH ₃) ₆ N] ₂ PO 680-31-9 TD0875000	Hexamethylphosphoric triamide, Hexamethylphosphoro- triamide, HMPA, Tris(dimethylamino)- phosphine oxide	NIOSH Ca See Appendix A OSHA none	N.D.	Clear, colorless liquid with an aromatic or mild, amine-like odor. [Note: A solid below 43°F.]	MW: 179.2 BP: 451°F Sol: Miscible Fl.P: 222°F IP: ?	VP: 0.03 mm FRZ: 43°F UEL: ? LEL: ?	Oxidizers, strong acids, chemically-active metals (e.g., potassium, sodium, magnesium, zinc)	None available
	1 ppm = 7.45 mg/m ³				Sp.Gr: 1.03 Class III B Combustible Liquid			
n-Hexane CH ₃ (CH ₂) ₄ CH ₃ 110-54-3 MN9275000	Hexane, Hexyl hydride, normal-Hexane	NIOSH 50 ppm (180 mg/m ³) OSHA† 500 ppm (1800 mg/m ³)	1100 ppm [LEL]	Colorless liquid with a gasoline- like odor.	MW: 86.2 BP: 156°F Sol: 0.002% Fl.P: -7°F IP: 10.15 eV	VP: 124 mm FRZ: -219°F UEL: 7.5% LEL: 1.1%	Strong oxidizers	Char. CS, GC/FID, III [#1500, Hydro- carbons]
1208 27	1 ppm = 3.58 mg/m ³				Sp.Gr: 0.66 Class IB Flammable Liquid			
Hexane isomers (excluding n-Hexane) C ₆ H ₁₄	Diethylmethylmethane; Diisopropyl; 2,2-Dimethylbutane; 2,3-Dimethylbutane; Isohexane; 2-Methylpentane; 3-Methylpentane; [Note: Also see specific listing for n-Hexane.]	NIOSH 100 ppm (350 mg/m ³) C 510 ppm (1800 mg/m ³) [15-min] OSHA† none	N.D.	Clear liquids with mild, gasoline-like odors. [Note: Includes all the isomers of hexane except n-hexane.]	MW: 86.2 BP: 122-145°F Sol: Insoluble Fl.P: -54 to 19°F IP: ?	VP: ? FRZ: -245 to -148°F UEL: ? LEL: ?	Strong oxidizers	None available
1208 27	1 ppm = 3.58 mg/m ³				Sp.Gr: 0.65-0.66 Class IB Flammable Liquids			
n-Hexanethiol CH ₃ (CH ₂) ₄ SH 111-31-9 MO4550000	1-Hexanethiol, Hexyl mercaptan, n-Hexyl mercaptan, n-Hexylthiol	NIOSH C 0.5 ppm (2.7 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with an unpleasant odor.	MW: 118.2 BP: 304°F Sol: Insoluble Fl.P: 68°F IP: ?	VP: ? FRZ: -113°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
	1 ppm = 4.91 mg/m ³				Sp.Gr: 0.84 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	W: SCBAF:PD,PP/SAF:PD,PP:ASC3A	Abs	dysp; abdom pain; [carc]	Skin:	CNS, GI tract
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh		Breath:	[in animals: cancer
Remove:	When wet or contam		Ing		Swallow:	of the nasal
Change:	N.R.		Con		Immed	cavity]
Provide:	Eyewash, Quick drench					
[Hexamethylphosphoramide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, nose, li-head,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	500 ppm: SA*	Ing	head, head; peri neur numb	Skin:	CNS, PNS
Wash skin:	When contam	1100 ppm: SA:CF*/SCBAF/SAF	Con	extremities, musc weak;	Breath:	
Remove:	When wet (flamm)	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		derm; gidd, chemical pneu	Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE		(aspir liq)	Immed	
[n-Hexane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: SA*	Ing	head, gidd, dizz, li-head;	Skin:	CNS
Wash skin:	When contam	2500 ppm: SA:CF*	Con	nau; chemical pneu (aspir	Breath:	
Remove:	When wet (flamm)	5000 ppm: SAT:CF*/SCBAF/SAF		liq); derm	Swallow:	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Immed	
		Escape: GMFOV/SCBAE				
[Hexane isomers (excluding n-Hexane)]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Ing	throat; weak, cyan, incr	Skin:	CNS, blood
Wash skin:	When contam	12.5 ppm: SA:CF/PAPROV	Con	respiration, nau, drow,	Breath:	
Remove:	When wet (flamm)	25 ppm: CCRFOV/GMFOV/PAPRTOV/		head, vomit	Swallow:	
Change:	N.R.	SCBAF/SAF			Immed	
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[n-Hexanethiol]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2-Hexanone <chem>CH3CO(CH2)3CH3</chem> 591-78-6 MP1400000	Butyl methyl ketone, MBK, Methyl butyl ketone, Methyl n-butyl ketone	NIOSH 1 ppm (4 mg/m ³) OSHA† 100 ppm (410 mg/m ³)	1600 ppm	Colorless liquid with an acetone- like odor	MW 100.2 BP 262°F Sol 2% Fl.P 77°F IP 9.34 eV	VP 11 mm FRZ -71°F UEL 8% LEL ?	Strong oxidizers	Char. CS, GC/FID, III [#1300, Ketones I]
	1 ppm = 4.17 mg/m ³				Sp Gr 0.81 Class IC Flammable Liquid			
Hexone <chem>CH3COCH2CH(CH3)2</chem> 108-10-1 SA9275000	Isobutyl methyl ketone, Methyl isobutyl ketone, 4-Methyl 2-pentanone, MIBK	NIOSH 50 ppm (205 mg/m ³) ST 75 ppm (300 mg/m ³) OSHA† 100 ppm (410 mg/m ³)	500 ppm	Colorless liquid with a pleasant odor.	MW 100.2 BP 242°F Sol 2% Fl.P 64°F IP 9.30 eV	VP 16 mm FRZ -120°F UEL(200°F) 8.0% LEL(200°F) 12%	Strong oxidizers, potassium ter- butoxide	Char. CS, GC/FID, III [#1300, Ketones I]
1245 26	1 ppm = 4.17 mg/m ³				Sp Gr 0.80 Class IB Flammable Liquid			
sec-Hexyl acetate <chem>C6H14O2</chem> 108-84-9 SA7525000	1,3-Dimethylbutyl acetate, Methylisoamyl acetate [<chem>CH3COOCH(CH3)CH2CH(CH3)2</chem>]	NIOSH/OSHA 50 ppm (300 mg/m ³)	500 ppm	Colorless liquid with a mild, pleasant, fruity odor.	MW 144.2 BP 297°F Sol 0.08% Fl.P 113°F IP ?	VP 3 mm FRZ -83°F UEL ? LEL ?	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1450, Esters I]
1233 26	1 ppm = 5.99 mg/m ³				Sp Gr 0.86 Class II Combustible Liquid			
Hexylene glycol <chem>(CH2)4COHCH2CHOHCH3</chem> 107-41-5 SA0810000	2,4-Dihydroxy-2-methyl- pentane; 2-Methyl-2,4-pentanediol; 4-Methyl-2,4-pentanediol; 2-Methylpentane-2,4-diol	NIOSH C 25 ppm (125 mg/m ³) OSHA† none	N.D.	Colorless liquid with a mild, sweetish odor.	MW: 118.2 BP: 388°F Sol: Miscible Fl.P: 209°F IP: ?	VP: 0.05 mm FRZ: -58°F (Sets to glass) UEL(est): 7.4% LEL(calc): 1.3%	Strong oxidizers, strong acids [Note: Hygroscopic (i.e., absorbs moisture from the air).]	None available
	1 ppm = 4.91 mg/m ³				Sp.Gr: 0.92 Class IIIB Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Route	Symptoms (See Table 5)	Health hazards		
					First aid (See Table 6)	Target organs (See Table 5)	
Skin:	Prevent skin contact	NIOSH 10 ppm: SA 25 ppm: SA, CF 50 ppm: SAT, CF/SCBAF/SAF 1600 ppm: SAF, PD, PP §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, nose; peri neur: weak, pares; derm; head, drow	Eye Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, PNS
Eyes:	Prevent eye contact		Abs				
Wash skin:	When contam		Inh				
Remove:	When wet (flamm)		Ing				
Change:	N.R.		Con				
[2-Hexanone]							
Skin:	Prevent skin contact	NIOSH 500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, muc memb, head, narco, coma, derm, in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys CNS, liver, kidneys
Eyes:	Prevent eye contact		Ing				
Wash skin:	When contam		Con				
Remove:	When wet (flamm)						
Change:	N.R.						
[Hexone]							
Skin:	Prevent skin contact	NIOSH/OSHA 500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, nose, throat; head; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Ing				
Wash skin:	When contam		Con				
Remove:	When wet or contam						
Change:	N.R.						
[sec-Hexyl acetate]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys; head, dizz, nau, inco, CNS depres; derm, skin sens	Eye: Skin: Breath: Swallow:	Irr immed Water wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Ing				
Wash skin:	When contam		Con				
Remove:	When wet or contam						
Change:	N.R.						
Provide:	Eyewash						
[Hexylene glycol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, FI, P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Hydrazine H_2NNH_2 302-01-2 MU7175000	Diamine, Hydrazine (anhydrous), Hydrazine base	NIOSH Ca See Appendix A C 0.03 ppm (0.04 mg/m ³) [2-hr] OSHA† 1 ppm (1.3 mg/m ³) [skin]	Ca [50 ppm]	Colorless, fuming, oily liquid with an ammonia-like odor. [Note: A solid below 36°F.]	MW: 32.1 BP: 236°F Sol: Miscible FI, P: 99°F IP: 8.93 eV	VP: 10 mm FRZ: 36°F UEL: 98% LEL: 2.9%	Oxidizers, hydrogen peroxide, nitric acid, metallic oxides, acids. [Note: Can ignite SPONTANEOUSLY on contact with oxidizers or porous materials such as earth, wood & cloth.]	Bub. Reagent; Vis; III [#3503]
2030 59 (64% soln.) 2029 28 (>64% soln.)	1 ppm = 1.33 mg/m ³				Sp Gr 1.01 Class IC Flammable Liquid			
Hydrogenated terphenyls ($C_{18}H_{14}$) 61788-32-7 WZ6535000	Hydrogenated diphenyl- benzenes, Hydrogenated phenyl- biphenyls, Hydrogenated triphenyls [Note: Complex mixture of terphenyl isomers that are partially hydrogenated.]	NIOSH 0.5 ppm (5 mg/m ³) OSHA† none	N.D.	Clear, oily, pale- yellow liquids with a faint odor. [plasticizer/heat transfer media]	MW: 298 (40% hydro- genated) BP: 644°F (40%) Sol: Insoluble FI, P: 315°F (40%) IP: ?	VP(77°F): 0.1 mm (40%) FRZ: ? UEL: ? LEL: ?	None reported [Note: When heated, irritating vapors will be released.]	None available
	1 ppm = 12.39 mg/m ³ (40% hydrogenated)				Sp.Gr(77°F): 1.003-1.009 (40% hydrogenated) Class IIIB Combustible Liquids			
Hydrogen bromide HBr 10035-10-6 MW3850000	Anhydrous hydrogen bromide; Aqueous hydrogen bromide (i.e., Hydrobromic acid)	NIOSH C 3 ppm (10 mg/m ³) OSHA† 3 ppm (10 mg/m ³)	30 ppm	Colorless gas with a sharp, irritating odor. [Note: Shipped as an liquefied compressed gas. Often used in an aqueous solution.]	MW: 80.9 BP: -88°F Sol: 49% FI, P: NA IP: 11.62 eV	VP: 20 atm FRZ: -124°F UEL: NA LEL: NA	Strong oxidizers, strong caustics, moisture, copper, brass, zinc. [Note: Hydrobromic acid is highly corrosive to most metals.]	Si gel; NaHCO ₃ / Na ₂ CO ₃ ; IC; III [#7903, Inorganic Acids]
1048 15 (anhydrous) 1788 60 (solution)	1 ppm = 3.36 mg/m ³				RGasD: 2.81 Nonflammable Gas			
Hydrogen chloride HCl 7647-01-0 MW4025000	Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) [Note: Often used in an aqueous solution.]	NIOSH/OSHA C 5 ppm (7 mg/m ³)	50 ppm	Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as an liquefied compressed gas.]	MW: 36.5 BP: -121°F Sol(86°F): 67% FI, P: NA IP: 12.74 eV	VP: 40.5 atm FRZ: -174°F UEL: NA LEL: NA	Hydroxides, amines, alkalis, copper, brass, zinc. [Note: Hydrochloric acid is highly corrosive to most metals.]	Si gel; NaHCO ₃ / Na ₂ CO ₃ ; IC; III [#7903, Inorganic Acids]
1050 15 (anhydrous) 1789 60 (solution)	1 ppm = 1.52 mg/m ³				RGasD: 1.27 Nonflammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irritates eyes, skin, nose,	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	4. SCBAF:PD,PP/SAF:PD,PP ASCBA	Abs	throat; temporary blindness,	Skin:	CNS, liver, kidneys
Wash skin:	When contam	Escape: SCBAE	Ing	dizz, nau, derm, eye, skin	Breath:	[in animals:
Remove:	When wet (flamm)		Con	burns,	Swallow:	tumors of the
Change:	N.R.			in animals: bron, pulm		lungs, liver,
Provide:	Eyewash, Quick drench			edema, liver, kidney		blood vessels
				damage, convuls, [carc]		& intestine]
[Hydrazine]						
Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	liver, kidney, hemato	Skin:	liver, kidneys,
Wash skin:	When contam		Con	damage	Breath:	hemato sys
Remove:	When wet or contam				Swallow:	
Change:	Daily					
[Hydrogenated terphenyls]						
Skin:	Prevent skin contact (soln)/Frostbite	NIOSH/OSHA	Inh	Irritates eyes, skin, nose,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact (soln)/Frostbite	30 ppm: SA:CF/PAPRAG/GMFAG/	Ing	throat; soln: eye, skin	Skin:	
Wash skin:	When contam (soln)	SCBAF/SAF	(soln)	burns, liq: frostbite		
Remove:	When wet or contam (soln)	5. SCBAF:PD,PP/SAF:PD,PP ASCBA	Con		Breath:	
Change:	N.R.	Escape: GMFAG/SCBAE			Swallow:	
Provide:	Eyewash (soln), Quick drench (soln), Frostbite					
[Hydrogen bromide]						
Skin:	Prevent skin contact (soln)/Frostbite	NIOSH/OSHA	Inh	Irritates nose, throat, larynx;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact/Frostbite	50 ppm: CCRS*/GMFS/PAPRS*/	Ing	cough, choking; derm;	Skin:	
Wash skin:	When contam (soln)	SA*/SCBAF	(soln)	soln: eye, skin burns;		
Remove:	When wet or contam	5. SCBAF:PD,PP/SAF:PD,PP ASCBA	Con	liq: frostbite;	Breath:	
Change:	N.R.	Escape: GMFAG/SCBAE		in animals: lar spasm; pulm	Swallow:	
Provide:	Eyewash (soln), Quick drench (soln), Frostbite			edema		
[Hydrogen chloride]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Hydrogen cyanide HCN 74-90-8 MW6825000	Formonitria, Hydrocyanic acid, Prussic acid	NIOSH ST 4.7 ppm (5 mg/m ³) [skin] OSHA† 10 ppm (11 mg/m ³) [skin]	50 ppm	Colorless or pale- blue liquid or gas (above 78°F) with a bitter, almond- like odor [Note: Often used as a 96% solution in water.]	MW 27.0 BP 78°F (96%) Sol Miscible Fl.P 0°F (96%) IP 13.60 eV	VP: 630 mm FRZ 7°F (96%) UEL 40.0% LEL 5.6%	Amines, oxidizers, acids, sodium hydroxide, calcium hydroxide, sodium carbonate, water, caustics, ammonia [Note: Can polymerize at 122-140°F.]	Soda lime, Water, Vis. III [#6010]
1051 13 (anhydrous) 1613 55 (solution)	1 ppm = 1.12 mg/m ³				Sp Gr 0.69 Class IA Flammable Liquid Flammable Gas			
Hydrogen fluoride (as F) HF 7664-39-3 MW7875000	Anhydrous hydrogen fluoride, Aqueous hydrogen fluoride (i.e., Hydrofluoric acid), HF-A	NIOSH 3 ppm (2.5 mg/m ³) C 6 ppm (5 mg/m ³) [15-min] OSHA† 3 ppm	30 ppm	Colorless gas or fuming liquid (below 67°F) with a strong, irritating odor. [Note: Shipped in cylinders.]	MW 20.0 BP 67°F Sol Miscible Fl.P NA IP 15.98 eV	VP 783 mm FRZ -118°F UEL NA LEL NA	Metals, water or steam [Note: Corrosive to metals. Will attack glass and concrete.]	Si gel*, NaHCO ₃ / Na ₂ CO ₃ , IC, III [#7903, Inorganic Acids] [Also #7902.]
1052 15 (anhydrous) 1790 59 (solution)	1 ppm = 0.83 mg/m ³				RGasD: 1.86 Sp Gr 1.00 (Liquid at 67°F) Nonflammable Gas			
Hydrogen peroxide H ₂ O ₂ 7722-84-1 MX0900000	High-strength hydrogen peroxide, Hydrogen dioxide, Hydrogen peroxide (aqueous), Hydroperoxide, Peroxide	NIOSH/OSHA 1 ppm (1.4 mg/m ³)	75 ppm	Colorless liquid with a slightly sharp odor. [Note: The pure compound is a crystalline solid below 12°F. Often used in an aqueous solution.]	MW 34.0 BP 286°F Sol Miscible Fl.P NA IP 10.54 eV	VP (66°F): 5 mm FRZ 12°F UEL NA LEL NA	Oxidizable materials, iron, copper, brass, bronze, chromium, zinc, lead, silver, manganese [Note: Contact with combustible material may result in SPONTANEOUS combustion.]	None available
2984 60 (8-20% soln.) 2014 45 (20-52% soln.) 2015 47 (>52% soln.)	1 ppm = 1.41 mg/m ³				Sp Gr 1.39 Noncombustible Liquid, but a powerful oxidizer.			
Hydrogen selenide (as Se) H ₂ Se 7783-07-5 MX1050000	Selenium dihydride, Selenium hydride	NIOSH/OSHA 0.05 ppm (0.2 mg/m ³)	1 ppm	Colorless gas with an odor resembling decayed horse radish [Note: Shipped as a liquefied compressed gas.]	MW 81.0 BP -42°F Sol (73°F): 0.9% Fl.P NA (Gas) IP 9.88 eV	VP (70°F): 9.5 atm FRZ -87°F UEL ? LEL ?	Strong oxidizers, acids, water, halogenated hydrocarbons	None available
2202 13 (anhydrous)	1 ppm = 3.37 mg/m ³				RGasD: 2.80 Flammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH: SA	Inh	Asphy, weak, head, conf:	Eye	CNS, CVS, thyroid, blood
Eyes:	Prevent eye contact	47 ppm: SA	Abs	nau, vomit, incr rate and	Skin:	
Wash skin:	When contam	50 ppm: SA, CF/SCBAF/SAF	Ing	depth of respiration or	Breath:	
Remove:	When wet (flamm)	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Con	respiration slow and	Swallow:	
Change:	N.R.	Escape: GMFS/SCBAE		gaspings; thyroid, blood changes		
Provide:	Eyewash, Quick drench					
[Hydrogen cyanide]						
Skin:	Prevent skin contact (liq)	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys, bones
Eyes:	Prevent eye contact (liq)	30 ppm: CCRS*/PAPRS*/GMFS/	Abs	throat, pulm edema; eye,	Skin:	
Wash skin:	When contam (liq)	SA*/SCBAF	(liq)	skin burns; rhinitis; bron;	Breath:	
Remove:	When wet or contam (liq)	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Ing	bone changes	Swallow:	
Change:	N.R.	Escape: GMFS/SCBAE	(soln)			
Provide:	Eyewash (liq), Quick drench (liq)		Con			
[Hydrogen fluoride (as F)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, nose, throat;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm: SA*	Ing	throat, pulm edema; eye,	Skin:	
Wash skin:	When contam	25 ppm: SA, CF*	Con	skin; bleaching hair	Breath:	
Remove:	When wet or contam	50 ppm: SCBAF/SAF			Swallow:	
Change:	N.R.	75 ppm: SAF, PD, PP				
Provide:	Eyewash, Quick drench	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA				
		Escape: GMFS/SCBAE				
[Hydrogen peroxide]						
Skin:	Frostbite	NIOSH/OSHA	Inh	Irrit eyes, nose, throat;	Eye:	Eyes, resp sys, liver
Eyes:	Frostbite	0.5 ppm: SA	Con	nau, vomit, diarr; metallic	Skin:	
Wash skin:	N.R.	1 ppm: SA, CF*/SCBAF/SAF		taste, garlic breath; dizz,	Breath:	
Remove:	When wet (flamm)	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA		lass, fig; liq: frostbite;		
Change:	N.R.	Escape: GMFS/SCBAE		in animals: pneumitis; liver damage		
Provide:	Frostbite					
[Hydrogen selenide (as Se)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Hydrogen sulfide H_2S 7783-06-4 MX1225000	Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen	NIOSH C 10 ppm (15 mg/m ³) [10-min] OSHA† C 20 ppm 50 ppm (10-min max peak)	100 ppm	Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H_2S . Shipped as a liquefied compressed gas.]	MW: 34.1 BP: -77°F Sol: 0.4% Fl.P: NA (Gas) IP: 10.46 eV	VP: 17.6 atm FRZ: -122°F UEL: 44.0% LEL: 4.0%	Strong oxidizers, strong nitric acid, metals	Char; NH_4OH/H_2O_2 ; IC; III [#6013]
1053 13	1 ppm = 1.42 mg/m ³					RGasD: 1.19 Flammable Gas		
Hydroquinone $C_6H_4(OH)_2$ 123-31-9 MX3500000	p-Benzenediol; 1,4-Benzenediol; Dihydroxybenzene; 1,4-Dihydroxybenzene; Quinol	NIOSH C 2 mg/m ³ [15-min] OSHA 2 mg/m ³	50 mg/m ³	Light-tan, light- gray, or colorless crystals.	MW 110.1 BP: 545°F Sol: 7% Fl.P: 329°F (Molten) IP: 7.95 eV	VP: 0.00001 mm MLT: 338°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; CH ₃ COOH, HPLC/UVD; III [#5004]
2662 53					Sp.Gr: 1.33 Combustible Solid; dust cloud may explode if ignited in an enclosed area.			
2-Hydroxypropyl acrylate $CH_2=CHCOOCH_2CH(OH)CH_3$ 999-61-1 AT1925000	HPA, B-Hydroxypropyl acrylate, Propylene glycol monoacrylate	NIOSH 0.5 ppm (3 mg/m ³) [skin] OSHA† none	N.D.	Clear to light- yellow liquid with a sweetish, solvent odor.	MW: 130.2 BP: 376°F Sol: ? Fl.P: 149°F IP: ?	VP: ? FRZ: ? UEL: ? LEL: 1.8%	Water [Note: Can become unstable at high temperatures & pressures or may react with water with some release of energy, but not violently.]	None available
	1 ppm = 5.41 mg/m ³				Sp.Gr: 1.05 Class IIIA Combustible Liquid			
Indene C_9H_8 95-13-6 NK8225000	Indonaphthene	NIOSH 10 ppm (45 mg/m ³) OSHA† none	N.D.	Colorless liquid. [Note: A solid below 29°F.]	MW: 116.2 BP: 359°F Sol: Insoluble Fl.P: 173°F IP: 8.81 eV	VP: ? FRZ: 29°F UEL: ? LEL: ?	None reported [Note: Polymerizes & oxidizes on standing. It has exploded during nitration with $H_2SO_4 + HNO_3$.]	None available
	1 ppm = 4.83 mg/m ³				Sp.Gr: 0.997 Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	NIOSH 100 ppm: PAPRS/GMFS/SA*/SCBAF S: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, resp sys; apnea, coma, convuls; conj, eye pain, lac, photo, corn vesic; dizz, head, fig, irrit, insom; GI dist	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, resp sys, CNS
[Hydrogen sulfide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash (>7%)	NIOSH/OSHA 50 mg/m ³ : PAPRD*/HIEF/SAT:CF*/ N.R. S: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, conj, kera, CNS excitement; colored urine, nau, dizz, suffocation, rapid breath; musc twitch, delirium; collapse; skin Irrit, sens, derm	Eye: Skin: Breath: Swallow:	Irrimed Water flush Resp support Medical attention imed	Eyes, skin, resp sys, CNS
[Hydroquinone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; cough, dysp	Eye: Skin: Breath: Swallow:	Irrimed Skin: Resp support Medical attention imed	Eyes, skin, resp sys
[2-Hydroxypropyl acrylate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam N.R.	TBAL	Inh Ing Con	In animals: Irrit eyes, skin, muc memb; derm, skin sens; chemical pneu (aspir liq); liver, kidney, spleen inj	Eye: Skin: Breath: Swallow:	Irrimed Soap wash Resp support Medical attention imed	Eyes, skin, resp sys, liver, kidneys, spleen
[Indene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Indium In 7440-74-6 NL1050000	Indium metal	NIOSH* 0.1 mg/m ³ [*Note: The REL also applies to other Indium compounds (as In).] OSHA† none	N.D.	Ductile, shiny, silver-white metal that is softer than lead.	MW: 114.8 BP: 3767°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 7.31 Noncombustible Solid in bulk form, but may ignite in powdered or dust form.	VP: 0 mm (approx) MLT: 314°F UEL: NA LEL: NA	(Dinitrogen tetroxide + acetonitrile), mercury(II) bromide (at 662°F), sulfur (mixtures ignite when heated) [Note: oxidizes readily at higher temperatures.]	Filter; Acid; AA; II(S) [P&CAM #173]
Iodine I ₂ 7553-56-2 NN1575000	Iodine crystals, Molecular iodine 1 ppm = 10.55 mg/m ³	NIOSH/OSHA C 0.1 ppm (1 mg/m ³) OSHA† none	2 ppm	Violet solid with a sharp, characteristic odor.	MW: 253.8 BP: 365°F Sol: 0.01% Fl.P: NA IP: 9.31 eV Sp.Gr: 4.93 Noncombustible Solid	VP(77°F): 0.3 mm MLT: 236°F UEL: NA LEL: NA	Ammonia, acetylene, acetaldehyde, powdered aluminum, active metals, liquid chlorine	Char*; Na ₂ CO ₃ ; IC; III [#6005]
Iodoform CHI ₃ 75-47-8 PB7000000	Triiodomethane 1 ppm = 16.34 mg/m ³	NIOSH 0.6 ppm (10 mg/m ³) OSHA† none	N.D.	Yellow to greenish- yellow powder or crystalline solid with a pungent, disagreeable odor. [antiseptic for external use]	MW: 393.7 BP: 410°F (Decomposes) Sol: 0.01% Fl.P: NA IP: ? Sp.Gr: 4.01 Noncombustible Solid	VP: ? MLT: 246°F UEL: NA LEL: NA	Strong oxidizers, lithium, metallic salts (e.g., mercuric oxide, silver nitrate), strong bases, calomel, tannin	None available
Iron oxide dust and fume (as Fe) Fe ₂ O ₃ 1309-37-1 NO7400000 NO7525000 (fume) 1376 37	Ferric oxide, Iron(III) oxide	NIOSH 5 mg/m ³ OSHA 10 mg/m ³	2500 mg/m ³ (as Fe)	Reddish-brown solid. [Note: Exposure to fume may occur during the arc-welding of iron.]	MW: 159.7 BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2664°F UEL: NA LEL: NA	Calcium hypochlorite	Filter; none; XRF; III [#7200, Welding & Brazing Fume]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh	Irritation eyes, skin, resp	Eye:	Irr	Eyes, skin, resp sys,
Eyes:	N.R.		ing	sys; possible liver,	Skin:	immed	liver, kidneys
Wash skin:	N.R.		Con	kidney, heart, blood	Breath:	Resp support	heart, blood
Remove:	N.R.			effects; pulmedema	Swallow:	Medical attention	
Change:	N.R.				immed		
[Indium]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritation eyes, skin, nose,	Eye:	Irr	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm: SA*	ing	lac, head, chest tight;	Skin:	immed	CNS, CVS
Wash skin:	When contam	2 ppm: SA:CF*/SCBAF/SAF	Con	skin burns, rash,	Breath:	Soap wash immed	
Remove:	When wet or contam	5: SCBAF:PD,PP/SAF:PD,PP:ASCBA		cutaneous hypersensitivity	Swallow:	Resp support	
Change:	Daily	Escape: GMFAGHIE/SCBAE				Medical attention	
Provide:	Eyewash (>7%), Quick drench (>7%)					immed	
[Iodine]							
Skin:	Prevent skin contact	TBAL	Inh	Irritation eyes, skin; li-head,	Eye:	Irr	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	dizz, nau, lnc, CNS	Skin:	immed	liver, kidneys,
Wash skin:	When contam		ing	depress; dysp; liver,	Breath:	Soap wash immed	heart
Remove:	When wet or contam		Con	kidney, heart damage;	Swallow:	Resp support	
Change:	Daily			vis dist		Medical attention	
						immed	
[Iodoform]							
Skin:	N.R.	NIOSH	Inh	Benign pneumoconiosis	Breath:	Resp support	Resp sys
Eyes:	N.R.	50 mg/m ³ : DMFu/SA		with X-ray shadows			
Wash skin:	N.R.	125 mg/m ³ : SA:CF/PAPRDMFu		indistinguishable from			
Remove:	N.R.	250 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/		fibrotic pneumoconiosis			
Change:	N.R.	SCBAF/SAF		(siderosis)			
		2500 mg/m ³ : SA:PD,PP					
		5: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: HIEF/SCBAE					
[Iron oxide dust and fume (as Fe)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Iron pentacarbonyl (as Fe) Fe(CO) ₅ 13463-40-6 NO4900000	Iron carbonyl, Pentacarbonyliron	NIOSH 0.1 ppm (0.8 mg/m ³) ST 0.2 ppm (1.6 mg/m ³) OSHA† none	N.D.	Colorless to yellow to dark-red, oily liquid.	MW: 195.9 BP(749 mm): 217°F Sol: Insoluble Fl.P: 5°F IP: ? Sp.Gr: 1.46-1.52 Class IB Flammable Liquid	VP(87°F): 40 mm FRZ: -6°F UEL: ? LEL: ?	Oxidizers, nitrogen oxide, (zinc + cobalt halides) [Note: Pyrophoric (i.e., ignites spontaneously in air). Decomposed by light or air, releasing carbon monoxide.]	None available
1994 57	1 ppm = 8.14 mg/m ³							
Iron salts (soluble, as Fe)	FeSO ₄ : Ferrous sulfate, Iron(II) sulfate FeCl ₂ : Ferrous chloride, Iron(II) chloride Fe(NO ₃) ₃ : Ferric nitrate, Iron(III) nitrate Fe(SO ₄) ₃ : Ferric sulfate, Iron(III) sulfate FeCl ₃ : Ferric chloride, Iron(III) chloride	NIOSH 1 mg/m ³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific soluble iron salt.	Properties vary depending upon the specific soluble iron salt. Noncombustible Solids		Varies	Filter; Acid; ICP; III [#7300, Elements]
Isoamyl acetate CH ₃ COOCH ₂ CH ₂ CH(CH ₃) ₂ 123-92-2 NS9800000	Banana oil, Isopentyl acetate, 3-Methyl-1-butanol acetate, 3-Methylbutyl ester of acetic acid, 3-Methylbutyl ethanoate	NIOSH/OSHA 100 ppm (525 mg/m ³) OSHA† 100 ppm (360 mg/m ³)	1000 ppm	Colorless liquid with a banana- like odor.	MW 130.2 BP: 288°F Sol: 0.3% Fl.P: 77°F IP: ? Sp Gr: 0.87 Class IC Flammable Liquid	VP: 4 mm FRZ: -109°F UEL: 7.5% LEL(212°F) 10%	Nitrates: strong oxidizers, alkalis & acids	Char. CS; GC/FID; III [#1450, Esters I]
Isoamyl alcohol (primary) (CH ₃) ₂ CHCH ₂ CH ₂ OH 123-51-3 EL5425000	Fermentation amyl alcohol, Fusel oil, Isobutyl carbinol, Isopentyl alcohol, 3-Methyl-1-butanol, Primary isoamyl alcohol	NIOSH 100 ppm (360 mg/m ³) ST 125 ppm (450 mg/m ³) OSHA† 100 ppm (360 mg/m ³)	500 ppm	Colorless liquid with a disagreeable odor.	MW 88.2 BP: 270°F Sol(57°F): 2% Fl.P: 109°F IP: ? Sp Gr(57°F): 0.81 Class II Combustible Liquid	VP: 28 mm FRZ: -179°F UEL(212°F) 9.0% LEL: 1.2%	Strong oxidizers	Char. 2-Propanol/ CS; GC/FID; III [#1402, Alcohols III]
1105 26	1 ppm = 3.67 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, muc memb, resp sys; head, dizz, nau, vomit; fever, cyan, cough, dysp; liver, kidney, lung inj; degenerative changes in CNS	Eye: Skin: Breath: Swallow:	Eye: resp sys, CNS, liver, kidneys
Eyes:	Prevent eye contact		Abs			
Wash skin:	When contam		Ing			
Remove:	When wet (flamm)		Con			
Change:	N.R.					
Provide:	Quick drench					
[Iron pentacarbonyl (as Fe)]						
Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin, muc memb; abdom pain, diarr, vomit; possible liver damage	Eye: Skin: Breath: Swallow:	Eye, skin, resp sys, liver, GI tract
Eyes:	Prevent eye contact		Ing			
Wash skin:	Daily		Con			
Remove:	N.R.					
Change:	Daily					
[Iron salts (soluble, as Fe)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates eyes, skin, nose, throat, derm, in animals: narco	Eye: Skin: Breath: Swallow:	Eye, skin, resp sys, CNS
Eyes:	Prevent eye contact	1000 ppm: CCROV//PAPROV/GMFOV/SA/SCBAF	Ing			
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP, ASCBA	Con			
Remove:	When wet (flamm)	Escape: GMFOV/SCBAE				
Change:	N.R.					
[Isoamyl acetate]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates eyes, skin, nose, throat, head, dizz, cough, dysp, nau, vomit, diarr, skin cracking, in animals: narco	Eye: Skin: Breath: Swallow:	Eye, skin, resp sys, CNS
Eyes:	Prevent eye contact	500 ppm: SA:CF//CCRFOV/GMFOV/PAPROV/SCBAF/SAF	Ing			
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP, ASCBA	Con			
Remove:	When wet or contam	Escape: GMFOV/SCBAE				
Change:	N.R.					
[Isoamyl alcohol (primary)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Isoamyl alcohol (secondary) $(\text{CH}_3)_2\text{CHCH}(\text{OH})\text{CH}_3$ 528-75-4	3-Methyl-2-butanol, Secondary isoamyl alcohol	NIOSH 100 ppm (360 mg/m ³) ST 125 ppm (450 mg/m ³) OSHA† 100 ppm (360 mg/m ³)	500 ppm	Colorless liquid with a disagreeable odor.	MW: 88.2 BP: 234°F Sol: ? Fl P(oc): 95°F IP: ?	VP: 1 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char. 2-Propanol/ CS; GC/FID, III [#1402, Alcohols III]
1105 26	1 ppm = 3.67 mg/m ³				Sp Gr: 0.82 Class IC Flammable Liquid			
Isobutane $\text{CH}_3\text{CH}(\text{CH}_3)_2$ 75-28-5 TZ4300000	2-Methylpropane [Note: Also see specific listing for n-Butane.]	NIOSH 800 ppm (1900 mg/m ³) OSHA† none	N.D.	Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 11°F]	MW: 58.1 BP: 11°F Sol: Slight Fl P: NA (Gas) IP: 10.74 eV RGasD: 2.06 Flammable Gas Class IA Flammable Liquid	VP(70°F): 3.1 atm FRZ: -255°F UEL: 8.4% LEL: 1.6%	Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, (nickel carbonyl + oxygen)	None available
1011 22	1 ppm = 2.42 mg/m ³							
Isobutyl acetate $\text{CH}_3\text{COOCH}_2\text{CH}(\text{CH}_3)_2$ 110-19-0 AI4025000	Isobutyl ester of acetic acid, 2-Methylpropyl acetate, 2-Methylpropyl ester of acetic acid, β-Methylpropyl ethanoate	NIOSH/OSHA 150 ppm (700 mg/m ³) OSHA† none	1300 ppm [LEL]	Colorless liquid with a fruity, floral odor.	MW: 116.2 BP: 243°F Sol(77°F): 0.6% Fl P: 64°F IP: 9.97 eV	VP: 13 mm FRZ: -145°F UEL: 10.5% LEL: 1.3%	Nitrates: strong oxidizers, alkalis & acids	Char. CS; GC/FID, III [#1450, Esters I]
1213 26	1 ppm = 4.83 mg/m ³				Sp Gr: 0.87 Class IB Flammable Liquid			
Isobutyl alcohol $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$ 78-83-1 NP9625000	IBA, Isobutanol, Isopropylcarbinol, 2-Methyl-1-propanol	NIOSH 50 ppm (150 mg/m ³) OSHA† 100 ppm (300 mg/m ³)	1600 ppm	Colorless, oily liquid with a sweet, musty odor.	MW: 74.1 BP: 227°F Sol: 10% Fl P: 82°F IP: 10.12 eV	VP: 9 mm FRZ: -162°F UEL(202°F): 10.6% LEL(123°F): 1.7%	Strong oxidizers	Char. 2-Propanol/ CS; GC/FID, III [#1401, Alcohols II]
1212 26	1 ppm = 3.08 mg/m ³				Sp Gr: 0.80			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 500 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, head, dizz: cough, dysp, nau, vomit, diarr; skin cracking; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Isomyl alcohol (secondary)]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	TBAL	Inh Ing (liq)	Drow, narco, asphy; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	CNS
[Isobutane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1300 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys; head, drow, anes; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Skin, eyes, resp sys, CNS
[Isobutyl acetate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 500 ppm: CCROV/SA* 1250 ppm: SA:CP/PAPROV* 1600 ppm: CCRFOV/GMFOV/ PAPROV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, throat; head, drow; skin cracking; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Isobutyl alcohol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Isobutyronitrile (CH ₃) ₂ CHCN 78-82-0 TZ4900000	Isopropyl cyanide, 2-Methylpropanenitrile, 2-Methylpropionitrile	NIOSH 8 ppm (22 mg/m ³) OSHA none	N.D.	Colorless liquid with an almond-like odor. [Note: Forms cyanide in the body.]	MW: 69.1 BP: 219°F Sol: Slight FLP: 47°F IP: ?	VP(130°F): 100 mm FRZ: -97°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases	Char; Benzene; GC/FID; III [Adapt #1606]
2284 28	1 ppm = 2.87 mg/m ³				Sp.Gr: 0.76 Class IB Flammable Liquid			
Isooctyl alcohol C ₈ H ₁₈ CH ₂ OH 26952-21-6 NS7700000	Isooctanol, Oxoocetyl alcohol [Notes: A mixture of closely related isomeric, primary alcohols with branched chains such as 2-Ethyl- hexanol, CH ₃ (CH ₂) ₅ CH(CH ₂ CH ₃)CH ₂ OH.]	NIOSH 50 ppm (270 mg/m ³) [skin] OSHA† none	N.D.	Clear, colorless liquid.	MW: 130.3 BP: 367°F Sol: Insoluble FLP(oc): 180°F IP: ?	VP: 0.4 mm FRZ: <-105°F UEL(est.): 57% LEL(calc.): 0.9%	None reported	None available
	1 ppm = 5.41 mg/m ³				Sp.Gr: 0.83 Class IIIA Combustible Liquid			
Isophorone C ₈ H ₁₆ O 78-59-1 GW7700000	Isoacetophorone, 3,5,5-Trimethyl-2-cyclo- hexenone, 3,5,5-Trimethyl-2-cyclo- hexen-1-one	NIOSH 4 ppm (23 mg/m ³) OSHA† 25 ppm (140 mg/m ³)	200 ppm	Colorless to white liquid with a peppermint-like odor.	MW: 138.2 BP: 419°F Sol: 1% FLP: 184°F IP: 9.07 eV	VP: 0.3 mm FRZ: 17°F UEL: 3.8% LEL: 0.8%	Oxidizers, strong alkalis, amines	Char(pet); CS; GC/FID; III [#2508]
1993 27 (combustible liquid, n.o.s.)	1 ppm = 5.74 mg/m ³				Sp.Gr: 0.92 Class IIIA Combustible Liquid			
Isophorone diisocyanate C ₁₂ H ₁₈ N ₂ O ₂ 4098-71-9 NQ9370000	IPDI; 3-Isocyanatomethyl-3,5,5- trimethylcyclohexyl- isocyanate; Isophorone diamine diisocyanate	NIOSH 0.005 ppm (0.045 mg/m ³) ST 0.02 ppm (0.180 mg/m ³) [skin] OSHA† none	N.D.	Colorless to slightly yellow liquid with a pungent odor.	MW: 222.3 BP: ? Sol: Decomposes FLP: 311°F IP: ?	VP: 0.0003 mm FRZ: -76°F UEL: ? LEL: ?	Water, alcohols, phenols, amines, mercaptans, amides, urethanes, ureas [Note: Reacts with water to form carbon dioxide.]	None available
2290 55	1 ppm = 9.24 mg/m ³				Sp.Gr: 1.06 Class IIIB Combustible Liquid			

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench	NIOSH 80 ppm: CCROV/SA 200 ppm: SA:CF/PAPROV 400 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 1000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; head, dizz, weak, gidd, conf, convuls; dysp; abdompain, nau, vomit	Eye: Skin: Breath: Swallow: Irr: Immed Soap flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, CVS
[Isobutyronitrile]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: N.R. Provide: Eyewash	TBAL	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; eye, skin burns	Eye: Skin: Breath: Swallow: Irr: Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys
[Isocetyl alcohol]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash	NIOSH 40 ppm: CCROV/SA* 100 ppm: SA:CF*/PAPROV* 200 ppm: CCRFOV/GMFOV/PAPRTOV*/ SAT:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat, head, nau, dizz, ftg, mal, narco, dem, In animals: kidney, liver damage	Eye: Skin: Breath: Swallow: Irr: Immed Soap wash prompt Resp support Medical attention Immed	Eyes, skin, resp sys CNS, liver, kidneys
[Isophorone]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Quickdrench	NIOSH 0.05 ppm: SA* 0.125 ppm: SA:CF* 0.25 ppm: SCBAF/SAF 1 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; chest tight, dysp, cough, sore throat; bron, wheez, pulmedema; possible resp sens, asthma	Eye: Skin: Breath: Swallow: Irr: Immed Water flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys
[Isophorone diisocyanate]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2-Isopropoxyethanol (CH ₃) ₂ CHOCH ₂ CH ₂ OH 109-59-1 KL5075000	Ethylene glycol isopropyl ether, 1-Hydroxyethyl isopropyl ether, Isopropyl Cellosolve®, Isopropyl glycol	NIOSH See Appendix D OSHA† none	N.D.	Colorless liquid with a mild, ethereal odor.	MW: 104.2 BP: 283°F Sol: Miscible Fl.P(oc): 92°F IP: ?	VP: 3 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
	1 ppm = 4.33 mg/m ³				Sp.Gr: 0.90 Class IC Flammable Liquid			
Isopropyl acetate CH ₃ COOCH(CH ₃) ₂ 108-21-4 AI4930000	Isopropyl ester of acetic acid, 1-Methylethyl ester of acetic acid, 2-Propyl acetate	NIOSH See Appendix D OSHA† 250 ppm (950 mg/m ³)	1800 ppm	Colorless liquid with a fruity odor.	MW 102.2 BP 194°F Sol: 3% Fl.P: 36°F IP: 9.95 eV	VP: 42 mm FRZ: -92°F UEL: 8% LEL(100°F) 18%	Nitrates, strong oxidizers, alkalis & acids	Char. CS, GC/FID, III [#1454]
1220 26	1 ppm = 4.25 mg/m ³				Sp.Gr: 0.87 Class IB Flammable Liquid			
Isopropyl alcohol (CH ₃) ₂ CHOH 67-63-0 NT8050000	Dimethyl carbinol, IPA, Isopropanol, 2-Propanol, sec-Propyl alcohol, Rubbing alcohol	NIOSH 400 ppm (980 mg/m ³) ST 500 ppm (1225 mg/m ³) OSHA† 400 ppm (980 mg/m ³)	2000 ppm [LEL]	Colorless liquid with the odor of rubbing alcohol.	MW 60.1 BP 181°F Sol: Miscible Fl.P: 53°F IP: 10.10 eV	VP: 33 mm FRZ: -127°F UEL(200°F) 12.7% LEL 2.0%	Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates	Char. 2-Butanol/ CS, GC/FID, III [#1400, Alcohols I]
1219 26	1 ppm = 2.50 mg/m ³				Sp.Gr: 0.79 Class IB Flammable Liquid			
Isopropylamine (CH ₃) ₂ CHNH ₂ 75-31-0 NT8400000	2-Aminopropane, Monoisopropylamine, 2-Propylamine, sec-Propylamine	NIOSH See Appendix D OSHA† 5 ppm (12 mg/m ³)	750 ppm	Colorless liquid with an ammonia- like odor. [Note: A gas above 91°F.]	MW 59.1 BP: 91°F Sol: Miscible Fl.P(oc): -35°F IP: 8.72 eV	VP: 460 mm FRZ: -150°F UEL: ? LEL: ?	Strong acids, strong oxidizers, aldehydes, ketones, epoxides	Bub. NaOH, GC/FID, II(3) [#S147]
1221 68	1 ppm = 2.46 mg/m ³				Sp.Gr: 0.69 Class IA Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	TBAL	Inh Abs Ing Con	In animals: irrit eyes, skin; hemog, anemia, pulmedema	Eye: Skin: Breath: Swallow: Irr immed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, blood
[2-Isopropoxyethanol]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	OSHA 1800 ppm: SA:CF ⁴ /SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, derm; in animals: narco	Eye: Skin: Breath: Swallow: Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Isopropyl acetate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: SA:CF ⁴ /CCRFOV/GMFOV/ PAPROV ⁴ /SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; drow, dizz, head, dry cracking skin; in animals: narco	Eye: Skin: Breath: Swallow: Irr immed Water flush Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Isopropyl alcohol]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quickdrench	OSHA 125 ppm: SA:CF ⁴ /PAPRS ⁴ 250 ppm: CCRFS/GMFS/PAPRTS ⁴ / SCBAF/SAF 750 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, pulm edema; vis dist, eye, skin burns; derm	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Isopropylamine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
N-Isopropylaniline $C_9H_9NHCH(CH_3)_2$ 768-52-5 BY4190000	N-IPA, Isopropylaniline, N-(1-Methylethyl)- benzenamine, N-Phenylisopropylamine	NIOSH 2 ppm (10 mg/m ³) [skin] OSHA† none	N.D.	Clear, yellowish liquid with a sweet, aromatic odor.	MW: 135.2 BP: 397°F Sol: Insoluble Fl, P (oc): 190°F IP: ? Sp, Gr (60°F): 0.93 Class III B Combustible Liquid	VP (77°F): 0.03 mm FRZ: -58°F UEL: ? LEL: ?	None reported	Filter* (2); Methanol; HPLC/UV; OSHA [#78]
Isopropyl ether $(CH_3)_2CHOCH(CH_3)_2$ 108-20-3 TZ5425000	Diisopropyl ether, Diisopropyl oxide, 2-Isopropoxy propane	NIOSH/OSHA 500 ppm (2100 mg/m ³)	1400 ppm [LEL]	Colorless liquid with a sharp, sweet, ether-like odor.	MW: 102.2 BP: 154°F Sol: 0.2% Fl, P: -18°F IP: 9.20 eV Sp, Gr: 0.73 Class IB Flammable Liquid	VP: 119 mm FRZ: -76°F UEL: 7.9% LEL: 1.4%	Strong oxidizers, acids [Note: Unstable peroxides may form on long contact of isopropyl ether with air.]	Char. CS; GC/FID, III [#S368]
Isopropyl glycidyl ether $C_6H_8O_2$ 4016-14-2 TZ3500000	1,2-Epoxy-3-isopropoxy- propane, IGE, Isopropoxymethyl oxirane	NIOSH C 50 ppm (240 mg/m ³) [15-min] OSHA† 50 ppm (240 mg/m ³)	400 ppm	Colorless liquid	MW: 116.2 BP: 279°F Sol: 19% Fl, P: 92°F IP: ? Sp, Gr: 0.92 Class IC Flammable Liquid	VP (77°F): 9 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics [Note: May form explosive peroxides upon exposure to air or light.]	Char. CS; GC/FID, III [#S77]
Kaolin 1332-58-7 GF1670500	China clay, Clay, Hydrated aluminum silicate, Hydrite, Porcelain clay [Note: Main constituent of Kaolin is Kaolinite (Al ₂ Si ₂ O ₅ (OH) ₄)]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White to yellowish or grayish powder. [Note: When moistened, darkens & develops a clay-like odor.]	MW: varies BP: ? Sol: Insoluble Fl, P: NA IP: NA Sp, Gr: 1.8-2.6 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin; head,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	weak, dizz; cyan; ataxia;	Skin:	blood, CVS, liver,
Wash skin:	When contam		Inh	dysp on effort; tacar;	Breath:	kidneys
Remove:	When wet or contam		Con	methemo	Swallow:	
Change:	N.R.					
Provide:	Quick drench					
[N-Isopropylaniline]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1400 ppm: CCROV*/PAPROV*/GMFOV/	Inh	resp discomfort; derm;	Skin:	CNS
Wash skin:	When contam	SA*/SCBAF	Inh	in animals: drow, dizz,	Breath:	
Remove:	When wet (flamm)	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	uncon, narco	Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE				
[Isopropyl ether]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, upper	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	400 ppm: SA:CF*/SCBAF	Inh	resp sys; skin sens;	Skin:	blood, repro sys
Wash skin:	When contam	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Inh	possible hemato,	Breath:	
Remove:	When wet (flamm)	Escape: GMFOV/SCBAE	Con	repro effects	Swallow:	
Change:	N.R.					
[Isopropyl glycidyl ether]						
Skin:	N.R.	TBAL	Inh	Chronic pulm fib,	Eye:	Resp sys, stomach
Eyes:	N.R.		Con	stomach granuloma	Breath:	
Wash skin:	N.R.					
Remove:	N.R.					
Change:	N.R.					
[Kaolin]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Kepone $C_{10}Cl_{10}O$ 143-50-0 PC8575000	Chlordecone; Decachlorooctahydro-kepone- 2-one; Decachlorooctahydro-1,3,4- metheno-2H-cyclobuta(cd)- pentalen-2-one; Decachlorotetrahydro-4,7- methanoindeneone;	NIOSH Ca See Appendix A 0.001 mg/m ³ OSHA none	N.D.	Tan to white, crystalline, odorless solid. [insecticide]	MW: 490.6 BP: Sublimes Sol(212°F): 0.5% F.P.: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP(77°F): <3 x 10 ⁻³ mm MLT: 662°F (Sublimes) UEL: NA LEL: NA	Acids, acid fumes	Filter/ Imp; Benzene/ Methanol; GC/ECD; III [#5508]
Kerosene 8008-20-6 OA5500000 1223 27	Fuel Oil No. 1, Range oil [Note: A refined petroleum solvent (predominantly C ₁₀ -C ₁₆), which typically is 25% normal paraffins, 11% branched paraffins, 30% monocycloparaffins, 12% dicycloparaffins, 1% tricycloparaffins, 16% mononuclear aromatics & 5% dinuclear aromatics.] 1 ppm 7.07 mg/m ³ (approx)	NIOSH 100 mg/m ³ OSHA none	N.D.	Colorless to yellowish, oily liquid with a strong, character- istic odor.	MW: 170 (approx) BP: 347-617°F Sol: Insoluble F.P.: 100-162°F IP: ? Sp.Gr: 0.81 Class II Combustible Liquid	VP(100°F): 5 mm FRZ: -50°F UEL: 5% LEL: 0.7%	Strong oxidizers	Char; CS; GC/FID; III [#1550, Naphthas]
Ketene $CH_2=CO$ 463-51-4 OA7700000	Carbomethene, Ethenone, Keto-ethylene 1 ppm = 1.75 mg/m ³	NIOSH 0.5 ppm (0.9 mg/m ³) ST 1.5 ppm (3 mg/m ³) OSHA† 0.5 ppm (0.9 mg/m ³)	5 ppm	Colorless gas with a penetrating odor.	MW: 42.0 BP: -69°F Sol: Reacts F.P.: NA (Gas) IP: 9.61 eV RGasD: 1.45 Flammable Gas	VP: >1 atm FRZ: -238°F UEL: ? LEL: ?	Water, alcohols, ammonia [Note: Readily polymerizes. Reacts with water to form acetic acid.]	Bub. FeCl ₃ Vis; II(2) [#S92]
Lead Pb 7439-92-1 OF7525000	Lead metal, Plumbum	NIOSH* 0.100 mg/m ³ See Appendix C OSHA* [1910.1025] 0.050 mg/m ³ See Appendix C [*Note: The REL and PEL also apply to other lead compounds (as Pb) -- See Appendix C.]	100 mg/m ³ (as Pb)	A heavy, ductile, soft, gray solid.	MW: 207.2 BP: 3164°F Sol: Insoluble F.P.: NA IP: NA Sp.Gr: 11.34 Noncombustible Solid in bulk form.	VP: 0 mm (approx) MLT: 621°F UEL: NA LEL: NA	Strong oxidizers, hydrogen peroxide, acids	Filter; HNO ₃ /H ₂ O ₂ ; AAS; III [#7082] [Also #7105.]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Head, ner, tremor; liver,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	W: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	kidney damage; vis dist;	Skin:	Soap wash immed	CNS, liver, kidneys,
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Ing	ataxia, chest pain, skin	Breath:	Resp support	repro sys
Remove:	When wet or contam		Con	eryt; testicular atrophy,	Swallow:	Medical attention	[in animals:
Change:	Daily			low sperm count; [canc]		immed	liver cancer]
Provide:	Eyewash, Quick drench						
[Kepone]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: CCROV/SA	Ing	throat; burning sensation	Skin:	Soap flush immed	CNS
Wash skin:	When contam	2500 ppm: SA:CF/PAPROV	Con	in chest; head, nau, weak,	Breath:	Resp support	
Remove:	When wet or contam	5000 ppm: CCRFOV/GMFOV/PAPRTOV/		restless, inco, conf, drow;	Swallow:	Medical attention	
Change:	N.R.	SCBAF/SAF		vomit, diar; dem;		immed	
Provide:	Quick drench	S: SCBAF:PD,PP/SAF:PD,PP:ASCBA		chemical pneu (aspiriliq)			
		Escape: GMFOV/SCBAE					
[Kerosene]							
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Breath:	Resp support	Eyes, skin, resp sys
Eyes:	N.R.	5 ppm: SA:SCBAF	Con	throat, resp sys; pulm edema			
Wash skin:	N.R.	S: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
Remove:	N.R.	Escape: GMFOV/SCBAE					
Change:	N.R.						
[Ketene]							
Skin:	Prevent skin contact	OSHA	Inh	Weak, lass, insom; facial	Eye:	Irr immed	Eyes, GI tract, CNS,
Eyes:	Prevent eye contact	0.5 mg/m ³ : HIE/SA	Ing	pallor; pal eye, anor,	Skin:	Soap flush prompt	kidneys, blood,
Wash skin:	Daily	1.25 mg/m ³ : SA:CF/PAPRHIE	Con	low-wgt, malnut; constip,	Breath:	Resp support	gingival tissue
Remove:	When wet or contam	2.5 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/		abdom pain, colic; anemia;	Swallow:	Medical attention	
Change:	Daily	SCBAF/SAF		gingival lead line;		immed	
		50 mg/m ³ : SA:PD,PP		tremor, para wrist, ankles;			
		100 mg/m ³ : SAF:PD,PP		encephalopathy; kidney			
		S: SCBAF:PD,PP/SAF:PD,PP:ASCBA		disease; irrit eyes;			
		Escape: HIEF/SCBAE		hypotension			
[Lead]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Limestone CaCO ₃ 1317-65-3 EV9580000	Calcium carbonate. Natural calcium carbonate [Note: Calcite & aragonite are commercially important natural calcium carbonates.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, white to tan powder.	MW: 100.1 BP: Decomposes Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 2.7-2.9 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517- 2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Lindane C ₆ H ₆ Cl ₆ 58-89-9 GV4900000	BHC; HCH; γ-Hexachlorocyclohexane; gamma-isomer of 1,2,3,4,5,6- Hexachlorocyclohexane	NIOSH/OSHA 0.5 mg/m ³ [skin]	50 mg/m ³	White to yellow, crystalline powder with a slight, musty odor. [pesticide]	MW: 290.8 BP: 614°F Sol: 0.001% Fl.P: NA IP: ? Sp.Gr: 1.85 Noncombustible Solid, but may be dissolved in flammable liquids	VP: 0.00001 mm MLT: 235°F UEL: NA LEL: NA	Corrosive to metals	Filter/Bub. Isooctane; GC/ECnD. III [#5502]
Lithium hydride LiH 7580-67-8 OJ6300000	Lithium monohydride	NIOSH/OSHA 0.025 mg/m ³	0.5 mg/m ³	Odorless, off- white to gray, translucent, crystalline mass or white powder. Sp.Gr: 0.78 Combustible Solid that can form airborne dust clouds which may explode on contact with flame, heat, or oxidizers.	MW: 7.95 BP: Decomposes Sol: Reacts Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1256°F UEL: NA LEL: NA	Strong oxidizers, halogenated hydro- carbons, acids, water [Note: May ignite SPONTANEOUSLY in air and may reignite after fire is extinguished. Reacts with water to form hydrogen & lithium hydroxide.]	None available
L.P.G. C ₃ H ₈ /C ₃ H ₆ /C ₄ H ₁₀ /C ₄ H ₈ 68476-85-7 SE7545000	Bottled gas, Compressed petroleum gas, Liquefied hydrocarbon gas, Liquefied petroleum gas, LPG [Note: A fuel mixture of propane, propylene, butanes & butylenes.]	NIOSH/OSHA 1000 ppm (1800 mg/m ³)	2000 ppm [LEL]	Colorless, noncor- rosive, odorless gas when pure. [Note: A foul- smelling odorant is usually added. Shipped as a liquefied compressed gas.]	MW: 42-58 BP: >-44°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.95 eV RGasD: 1.45-2.00 Flammable Gas	VP: >1 atm FRZ: ? UEL: 9.5% (Propane) 8.5% (Butane) LEL: 2.1% (Propane) 1.5% (Butane)	Strong oxidizers, chlorine dioxide	Combustible gas meter; none; none; II(2) [#S93]
1075 22	1 ppm = 1.75-2.41 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	N.R.	TBAL	Inh	Irritates eyes, skin, mucous membrane; cough, sneez, rhin; lac	Eye: Skin: Breath:	Irritated Soap wash Fresh air	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Limestone]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates eyes, skin, nose, throat; head, nau; clonic convuls; resp difficulty; cyan; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irritated Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood, liver, kidneys
Eyes:	N.R.	5 mg/m ³ : CEROVDMFu/SA	Abs				
Wash skin:	When contam	12.5 mg/m ³ : SA:CF*/PAPROVDMFu*	Ing				
Remove:	When wet or contam	25 mg/m ³ : CCRFOVHIE/GMFOVHIE*	Con				
Change:	Daily	PAPRTOVHIE*/SCBAF/SAF					
Provide:	Quick drench	50 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE					
[Lindane]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates eyes, skin; eye, skin burns; mouth, esophagus burns (if ingested); nau; muscle twitches; mental conf; blurred vision	Eye: Skin: Breath: Swallow:	Irritated Brush (DO NOT WASH) Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	0.25 mg/m ³ : HIE/SA	Ing				
Wash skin:	Brush (DO NOT WASH)	0.5 mg/m ³ : SA:CF*/HIEF/PAPRHIE*/SCBAF/SAF	Con				
Remove:	When wet or contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
Change:	Daily	Escape: HIEF/SCBAE					
Provide:	Eyewash, Quick drench (>0.5 mg/m ³)						
[Lithium hydride]							
Skin:	Frostbite	NIOSH/OSHA	Inh	Li-head, drow, asphy; liq:frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Resp sys, CNS
Eyes:	Frostbite	2000 ppm: SA/SCBAF	Con				
Wash skin:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	(liq)				
Remove:	When wet (flamm)	Escape: SCBAE					
Change:	N.R.						
Provide:	Frostbite						
[L.P.G.]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement methoc (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Magnesite MgCO_3 546-93-0 OM2470000	Carbonate magnesium, Hydromagnesite, Magnesium carbonate, Magnesium(II) carbonate [Note: Magnesite is a naturally-occurring form of magnesium carbonate.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White, odorless, crystalline powder.	MW: 84.3 BP: Decomposes Sol: 0.01% Fl.P: NA IP: NA Sp.Gr: 2.96 Noncombustible Solid	VP: 0 mm (approx) MLT: 662°F (Decomposes) UEL: NA LEL: NA	Acids, formaldehyde	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Magnesium oxide fume MgO 1309-48-4 OM3850000	Magnesia fume	NIOSH See Appendix D OSHA† 15 mg/m ³	750 mg/m ³	Finely divided white particulate dispersed in air. [Note: Exposure may occur when magnesium is burned, thermally cut, or welded upon.]	MW: 40.3 BP: 6512°F Sol(88°F): 0.009% Fl.P: NA IP: NA Sp Gr: 3.58 Noncombustible Solid	VP: 0 mm (approx) MLT: 5072°F UEL: NA LEL: NA	Chlorine trifluoride, phosphorus penta- chloride	Filter; Acid, ICP, III [#7300, Elements]
Malathion $\text{C}_{10}\text{H}_{19}\text{O}_6\text{PS}_2$ 121-75-5 WM8400000 2783 55	S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dimethyl- phosphorodithioate; Diethyl (dimethoxyphosphino- thioylthio) succinate [(CH ₃ O) ₂ P(S)SCH(COOC ₂ H ₅)- CH ₂ COOC ₂ H ₅] 1 ppm = 13.73 mg/m ³	NIOSH 10 mg/m ³ [skin] OSHA† 15 mg/m ³ [skin]	250 mg/m ³	Deep-brown to yellow liquid with a garlic-like odor. [insecticide] [Note: A solid below 37°F.]	MW: 330.4 BP: 140°F (Decomposes) Sol: 0.02% Fl.P(oc): >325°F IP: ? Sp Gr: 1.21 Class IIIB Combustible Liquid, but may be difficult to ignite.	VP: 0.00004 mm FRZ: 37°F UEL: ? LEL: ?	Strong oxidizers, magnesium, alkaline pesticides [Note: Corrosive to metals.]	Filter; Isocitane, GC/FPD, III [#5012]
Maleic anhydride $\text{CH}=\text{CH}(\text{O})\text{OCO}$ 108-31-6 ON3675000 2215 60	cis-Butenedioic anhydride; 2,5-Furandione; Maleic acid anhydride; Toxic anhydride 1 ppm = 4.08 mg/m ³	NIOSH/OSHA 1 mg/m ³ (0.25 ppm)	10 mg/m ³	Colorless needles, white lumps, or pellets with an irritating, choking odor.	MW: 98.1 BP: 396°F Sol: Reacts Fl.P: 218°F IP: 9.90 eV Sp.Gr: 1.48 Combustible Solid, but may be difficult to ignite.	VP: 0.2 mm MLT: 127°F UEL: 7.1% LEL: 1.4%	Strong oxidizers, water, alkalis, metals, caustics & amines above 150°F [Note: Reacts slowly with water (hydro- lyzes) to form maleic acid.]	Bub; none; HPLC/UVD; III [#3512]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys; cough	Eye: Irr	Irr immed	Eyes, skin, resp sys
Eyes:	N.R.		Con		Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Magnesite]							
Skin:	N.R.	OSHA	Inh	Irrit eyes, nose;	Breath:	Resp support	Eyes, resp sys
Eyes:	N.R.	150 mg/m ³ : DMFu/SA	Con	metal fume fever: cough,			
Wash skin:	N.R.	375 mg/m ³ : SA:CF/PAPRDMFu		chest pain, flu-like fever			
Remove:	N.R.	750 mg/m ³ : HiEF/PAPRTHiE/ SCBAF/SAF					
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE					
[Magnesium oxide fume]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, miosis,	Eye:	Irr immed	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	100 mg/m ³ : CCROVDMFu/SA	Abs	aching eyes, blurred vision,	Skin:	Soap wash prompt	liver, blood chol.
Wash skin:	When contam	250 mg/m ³ : SA:CF/CCRFOVHiE/ GMFOVHiE/PAPROVDMFu/ SCBAF/SAF	Ing	lac. saliv; anor, nau, vomit,	Breath:	Resp support	CNS, CVS, GI tract
Remove:	When wet or contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Con	abdom cramps, diarr, gidd, conf, ataxia; rhin, head, chest tight, wheez, lar spasm	Swallow:	Medical attention immed	
Change:	Daily						
[Malathion]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit nose, upper resp sys,	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 mg/m ³ : SA:CF/SCBAF/SAF	Ing	conj; photo, double vision,	Skin:	Soap wash immed	
Wash skin:	When contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	bronchial asthma, derm	Breath:	Resp support	
Remove:	When wet or contam	Escape: GMFOVHiE/SCBAE			Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash						
[Maleic anhydride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Malonaldehyde <chem>CHOCH2CHO</chem> 542-78-9 TX6475000	Malonic aldehyde; Malonodialdehyde; Propanedial; 1,3-Propanedial [Note: Pure Malonaldehyde is unstable and may be used as its sodium salt.]	NIOSH Ca See Appendix A See Appendix C (Aldehydes) OSHA none	Ca [N.D.]	Solid (needles).	MW: 72.1 BP: ? Sol: ? Fl.P.: ? IP: ? Sp.Gr: ?	VP: ? MLT: 161°F UEL: ? LEL: ?	Proteins [Note: Pure compound is stable under neutral conditions, but not under acidic conditions.]	None available
Malononitrile <chem>NCCH2CN</chem> 109-77-3 OO3150000 2647 53	Cyanoacetonitrile, Dicyanomethane, Malonic dinitrile 1 ppm = 2.75 mg/m³	NIOSH 3 ppm (8 mg/m³) OSHA none	N.D.	White powder or colorless crystals. [Note: Melts above 50°F. Forms cyanide in the body.]	MW: 66.1 BP: 426°F Sol: 13% Fl.P[oc]: 266°F IP: 12.88 eV Sp.Gr: 1.19 Combustible Solid	VP: ? MLT: 90°F UEL: ? LEL: ?	Strong bases [Note: May polymerize violently on prolonged heating at 265°F, or in contact with strong bases at lower temperatures.]	Char; Toluene; GC/FID; NIOSH Nitriles Crit. Doc.
Manganese compounds and fume (as Mn) Mn (Metal) 7439-96-5 (Metal) OO9275000 (Metal)	Manganese metal; Colloidal manganese, Manganese-55 Synonyms of other compounds vary depending upon the specific manganese compound	NIOSH* 1 mg/m³ ST 3 mg/m³ OSHA† C 5 mg/m³ [* Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]	500 mg/m³ (as Mn)	Metal. A lustrous, brittle, silvery solid.	MW: 54.9 BP: 3564°F Sol: Insoluble Fl.P. NA IP: NA Sp Gr: 7.20 (Metal) Metal. Combustible Solid	VP: 0 mm (approx) MLT: 2271°F UEL: NA LEL: NA	Oxidizers [Note: Will react with water or steam to produce hydrogen.]	Filter, Acid, ICP, III [#7300, Elements]
Manganese cyclopenta- dienyl tricarbonyl (as Mn) <chem>C5H5Mn(CO)3</chem> 12079-65-1 OO9720000	Cyclopentadienyl:manganese tricarbonyl, Cyclopentadienyl tricarbonyl manganese, MCT	NIOSH 0.1 mg/m³ [skin] OSHA† C 5 mg/m³	N.D.	Yellow, crystalline solid with a characteristic odor. [Note: An antiknock additive for gasoline. May be found in an oil & gaseous solution.]	MW: 204.1 BP: Sublimes Sol: Slight Fl.P.: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 167°F (Sublimes) UEL: ? LEL: ?	None reported	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	cough; CNS depres; [carc]	Skin:	CNS
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	Ing		Breath:	[in animals:
Remove:	When wet or contam		Con		Swallow:	thyroid gland tumors]
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Malonaldehyde]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	80 mg/m ³ : SA	Abs	throat; head, dizz, weak,	Skin:	CNS, CVS
Wash skin:	When contam	200 mg/m ³ : SA:CF	Ing	gidd, conf, convuls; dysp;	Breath:	
Remove:	When wet or contam	400 mg/m ³ : SCBAF/SAF	Con	abdom pain, nau, vomit	Swallow:	
Change:	Daily	667 mg/m ³ : SAF:PD,PP				
Provide:	Eyewash, Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Malononitrile]						
Skin:	N.R.	NIOSH	Inh	Parkinson's; asthenia,	Breath:	Resp sys, CNS,
Eyes:	N.R.	10 mg/m ³ : DMXSO*/SA	Ing	insom, mental conf,	Swallow:	blood, kidneys
Wash skin:	N.R.	25 mg/m ³ : SA:CF/PAPRDM*		metal fume fever; dry		
Remove:	N.R.	50 mg/m ³ : HIEFISAT CF/PAPRTHIE/		throat, cough, chest tight,		
Change:	N.R.	SCBAF/SAF/		dysp, rales, flu-like		
		500 mg/m ³ : SA:PD,PP		fever; low-back pain, vomit,		
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		mal, fig, kidney damage		
		Escape: HIEF/SCBAE				
[Manganese compounds and fume (as Mn)]						
Skin:	Prevent skin contact	TBAL	Inh	In animals: irrit skin;	Eye:	Skin, resp sys, CNS,
Eyes:	Prevent eye contact		Abs	pulm edema; convuls; CNS,	Skin:	kidneys
Wash skin:	When contam		Ing	resp sys, kidney changes;	Breath:	
Remove:	When wet or contam		Con	decr resistance to	Swallow:	
Change:	Daily			infection		
[Manganese cyclopentadienyl tricarbonyl (as Mn)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Manganese tetroxide (as Mn) Mn_2O_4 1317-35-7 OP0895000	Manganese oxide, Manganomanganic oxide, Trimanganese tetroxide, Trimanganese tetroxide	NIOSH See Appendix D OSHA† C 5 mg/m ³	N.D.	Brownish-black powder. [Note: Fumes are generated when evermanganese oxides are heated strongly in air.]	MW: 228.8 BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.88	VP: 0 mm (approx) MLT: 2847°F UEL: NA LEL: NA	Soluble in hydrochloric acid (liberates chlorine gas)	Filter; Acids; ICP; III [#7300, Elements]
Marble $CaCO_3$ 1317-65-3 EV9580000	Calcium carbonate, Natural calcium carbonate [Note: Marble is a metamorphic form of calcium carbonate.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, white powder.	MW: 100.1 BP: Decomposes Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 2.7-2.9 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517- 2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; III [Nuisance Dust: #500 (total), #600 (resp)]
Mercury compounds (except (organo) alkyls) (as Hg) Hg (Metal) 7439-97-6 (Metal) OV4550000 (Metal) 2809 60	Mercury metal; Colloidal mercury; Elemental mercury; Metallic mercury; Quicksilver Synonyms of "other" Hg compounds vary depending upon the specific compound. 1 ppm = 8.34 mg/m ³ (Metal)	NIOSH Hg Vapor: 0.05 mg/m ³ [skin] Other: C 0.1 mg/m ³ [skin] OSHA† C 0.1 mg/m ³	10 mg/m ³ (as Hg)	Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]	MW 200.6 BP: 674°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 13.6 (Metal) Metal: Noncombustible Liquid	VP: 0.0012 mm FRZ: -38°F UEL: NA LEL: NA	Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper	Hydrar. Acid, AA: cold, III [#6009, Mercury]
Mercury (organo) alkyl compounds (as Hg)	Synonyms vary depending upon the specific (organo) alkyl mercury compound.	NIOSH 0.01 mg/m ³ ST 0.03 mg/m ³ [skin] OSHA† 0.01 mg/m ³ C 0.04 mg/m ³	2 mg/m ³ (as Hg)	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound.	Properties vary depending upon the specific (organo) alkyl mercury compound.		Strong oxidizers such as chlorine	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	N.R.	TBAL	Inh Ing Con	Asthenia, insom, mental conf; low-back pain, vomit; mal, ftg; kidney damage; pneumitis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Resp sys, CNS, blood, kidneys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	Daily						
[Manganese tetroxide (as Mn)]							
Skin:	N.R.	TBAL	Inh Con	Irr ite eyes, skin, muc memb, upper resp sys; cough, sneez, rhin; lac	Eye: Skin: Breath:	Irr immed Soap wash Fresh air	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Marble]							
Skin:	Prevent skin contact	See Appendix E for Respirator Recommendations for Mercury compounds [except (organo) alkyls].	Inh Abs Ing Con	Irr ite eyes, skin, cough, chest pain, dysp, bron pneumitis; tremor, insom, irrity, indecision, head, ftg, weak, stomatitis, salv, GI dist, anor, low-wgt; prot	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys
Eyes:	N.R.						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	Daily						
[Mercury compounds [except (organo) alkyls] (as Hg)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh Abs Ing Con	Paras; ataxia, dysarthria; vision; hearing dist; spasticity, jerking limbs; dizz, salv, lac; nau, vomit, diarr, constip, skin burns; emotional dist, kidney inj; possible terato effects	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CNS, PNS, kidneys
Eyes:	Prevent eye contact	0.1 mg/m ³ : SA					
Wash skin:	When contam	0.25 mg/m ³ : SA/CF					
Remove:	When wet or contam	0.5 mg/m ³ : SAT/CF/SCBAF/SAF					
Change:	Daily	2 mg/m ³ : SA/PD/PP					
Provide:	Eyewash, Quick drench	5: SCBAF/PD/PP/SAF/PD/PP/ASCBA Escape: SCBAE					
[Mercury (organo) alkyl compounds (as Hg)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Mesityl oxide $(\text{CH}_3)_2\text{C}=\text{CHCOCH}_3$ 141-79-7 SB4200000	Isobutenyl methyl ketone, Isopropylideneacetone, Methyl isobutenyl ketone, 4-Methyl-3-penten-2-one	NIOSH 10 ppm (40 mg/m ³) OSHA† 25 ppm (100 mg/m ³)	1400 ppm [LEL]	Oily, colorless to light-yellow liquid with a peppermint- or honey-like odor.	MW: 98.2 BP: 266°F Sol: 3% Fl.P: 87°F IP: 9.08 eV	VP: 9 mm FRZ: -52°F UEL: 7.2% LEL: 1.4%	Oxidizers, acids	Char, Methanol/ CS; GC/ID: IR [#1301, Ketones II]
1229 26	1 ppm = 4.08 mg/m ³				Sp.Gr(59°F): 0.86 Class IC Flammable Liquid			
Methacrylic acid $\text{CH}_2=\text{C}(\text{CH}_3)\text{COOH}$ 79-41-4 OZ2975000	Methacrylic acid (glacial), Methacrylic acid (inhibited), α-Methacrylic acid, 2-Methylacrylic acid, 2-Methylpropenoic acid	NIOSH 20 ppm (70 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 61°F) with an acrid, repulsive odor.	MW: 86.1 BP: 325°F Sol(77°F): 9% FLP(oc): 171°F IP: ?	VP: 0.7 mm FRZ: 61°F UEL: ? LEL: ?	Oxidizers, elevated temperatures, hydrochloric acid [Note: Typically contains 100 ppm of the monomethyl ether of hydroquinone to prevent polymerization.]	None available
2531 60 (inhibited)	1 ppm = 3.58 mg/m ³				Sp.Gr: 1.02 (Liquid) Class IIIA Combustible Liquid			
Methomyl $\text{CH}_3\text{C}(\text{SCH}_3)\text{NOC}(\text{O})\text{NHCH}_3$ 16752-77-5 AK2975000	Lannate®, Methyl N-[(methylamino)- carbonyloxy]ethanimi- dothioate, S-Methyl-N-(methylcarbamoyl- oxy)thioacetimidate	NIOSH 2.5 mg/m ³ OSHA† none	N.D.	White, crystalline solid with a slight, sulfur- like odor, [insecticide]	MW: 162.2 BP: ? Sol(77°F): 6% Fl.P: NA IP: ?	VP(77°F): 0.00005 mm MLT: 172°F UEL: NA LEL: NA	Strong bases	None available
2757 55 (carbamate pesticide, solid, n.o.s.)					Sp.Gr(75°F): 1.29 Noncombustible Solid, but may be dissolved in flammable liquids.			
Methoxychlor $(\text{C}_6\text{H}_5\text{OCH}_2)_3\text{CHCCl}_3$ 72-43-5 KJ3675000	p,p'-Dimethoxydiphenyltri- chloroethane, DMDT, Methoxy-DDT, 2,2-bis(p-methoxyphenyl)- 1,1,1-trichloroethane, 1,1,1-Trichloro-2,2-bis- (p-methoxyphenyl)ethane	NIOSH Ca See Appendix A OSHA† 15 mg/m ³	Ca [5000 mg/m ³]	Colorless to light- yellow crystals with a slight, fruity odor [insecticide]	MW: 345.7 BP: Decomposes Sol: 0.00001% Fl.P: ? IP: ?	VP: Very low MLT: 171°F UEL: ? LEL: ?	Oxidizers	Filter; Isocetane; GC/ECD; II(4) [#S371]
2761 55 (organochlorine pesticide, solid, n.o.s.)					Sp.Gr: 1.41 Combustible Solid, but difficult to burn.			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Quick drench	NIOSH 250 ppm: SA:CF ¹ /PAPROV ¹ 500 ppm: CCRFOV/GMFOV/PAPRTOV ¹ / SCBAF/SAF 1400 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; narco, coma, in animals: liver, kidney damage; CNS effects	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Mesityl oxide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; eye, skin burns	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Methacrylic acid]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	TBAL	Inh Ing Con	Irrit eyes; blurred vision, miosis; saliv; abdom cramps, nau, vomit; dysp; weak, musc twitch; liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, CNS, CVS, liver, kidneys, blood chol
[Methomyl]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam/Daily When wet or contam Daily	NIOSH § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/HIE/SCBAE	Inh Ing	In animals: fasc, trembling, convuls; kidney, liver damage. [carc]	Skin: Breath: Swallow: Soap wash Fresh air Medical attention immed	CNS, liver, kidneys [in animals: liver & ovarian cancer]
[Methoxychlor]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methoxyflurane <chem>CHCl2CF2OCH3</chem> 76-38-0 KN7820000	2,2-Dichloro-1,1-difluoro- ethyl methyl ether; 2,2-Dichloro-1,1-difluoro- 1-methoxyethane; Methoflurane; Methoxyfluorane; Penthrane	NIOSH* C 2 ppm (13.5 mg/m ³) [60-min] [*Note: REL for exposure to waste anesthetic gas.]	N.D.	Colorless liquid with a fruity odor. [inhalation anesthetic]	MW: 165.0 BP: 220°F Sol: Slight Fl.P: ? IP: ?	VP: 23 mm FRZ: -31°F UEL: ? LEL(176°F): 7%	None reported	None available
	1 ppm = 6.86 mg/m ³	OSHA none			Sp.Gr(77°F): 1.42 Combustible Liquid			
4-Methoxyphenol <chem>CH3OC6H4OH</chem> 150-76-5 SL7700000	Hydroquinone monomethyl ether, p-Hydroxyanisole, Mequinol, p-Methoxyphenol, Monomethyl etherhydroquinone	NIOSH 5 mg/m ³ OSHA† none	N.D.	Colorless to white, waxy solid with an odor of caramel & phenol.	MW: 124.2 BP: 469°F Sol(77°F): 4% Fl.P(oc): 270°F IP: 7.50 eV	VP: <0.01 mm MLT: 135°F UEL: ? LEL: ?	Strong oxidizers, strong bases, acid chlorides, acid anhydrides	None available
					Sp.Gr: 1.55 Combustible Solid; under certain conditions, a dust cloud can probably explode if ignited by a spark or flame.			
Methyl acetate <chem>CH3COOCH3</chem> 79-20-9 AI9100000	Methyl ester of acetic acid, Methyl ethanoate	NIOSH 200 ppm (610 mg/m ³) ST 250 ppm (760 mg/m ³) OSHA† 200 ppm (610 mg/m ³)	3100 ppm [LEL]	Colorless liquid with a fragrant, fruity odor	MW 74.1 BP: 135°F Sol: 25% Fl.P: 14°F IP: 10.27 eV	VP: 173 mm FRZ: -145°F UEL: 16% LEL 3.1%	Nitrates, strong oxidizers, alkalis & acids, water [Note: Reacts slowly with water to form acetic acid & methanol.]	Char, CS, GC/FID, III [#S42]
	1 ppm = 3.08 mg/m ³				Sp.Gr: 0.93 Class IB Flammable Liquid			
Methyl acetylene <chem>CH3C#CH</chem> 74-99-7 UK4250000	Allylene, Propyne, Propyne, 1-Propyne	NIOSH/OSHA 1000 ppm (1650 mg/m ³)	1700 ppm [LEL]	Colorless gas with a sweet odor. [Note: A fuel that is shipped as a liquefied compressed gas.]	MW: 40.1 BP: -10°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.36 eV	VP: 5.2 atm FRZ: -153°F UEL: ? LEL: 1.7%	Strong oxidizers (such as chlorine), copper alloys [Note: Can decompose explosively at 4.5 to 5.6 atmospheres of pressure.]	Bag, none, GC/FID, II(5) [#S84]
	1 ppm. = 1.67 mg/m ³				RGasD: 1.41 Flammable Gas			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh	Irrit eyes; CNS depres,	Eye:	Ir rimmed	Eyes, CNS, liver,
Eyes:	Prevent eye contact		Ing	analgesia; anes, sez,	Skin:	Soap wash	kidneys, repro sys
Wash skin:	N.R.		Con	resp depres; liver,	Breath:	Resp support.	
Remove:	When wet or contam			kidney inj;	Swallow:	Medical attention	
Change:	N.R.			In animals: repro, terato effects		irrimed	
[Methoxyflurane]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Ir rimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	throat, upper resp sys;	Skin:	Soap flush irrimed	CNS
Wash skin:	When contam		Ing	eye, skin burns; CNS	Breath:	Resp support	
Remove:	When wet or contam		Con	depres	Swallow:	Medical attention	
Change:	Daily					irrimed	
Provide:	Eyewash, Quick drench						
[4-Methoxyphenol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Ir rimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	2000 ppm: CCROV/SA*	Ing	throat; head, drow; optic	Skin:	Water flush prompt	CNS
Wash skin:	When contam	3100 ppm: SA:CF/CCRFOV/GMFOV/	Con	nerve atrophy; chest tight;	Breath:	Resp support	
Remove:	When wet (flamm)	PAPROV/SCBAF/SAF		In animals: narco	Swallow:	Medical attention	
Change:	N.R.	S: SCBAF:PD,PP/SAF:PD,PP:ASCBA				irrimed	
		Escape: GMFOV/SCBAE					
[Methyl acetate]							
Skin:	Frostbite	NIOSH/OSHA	Inh	Irrit resp sys; tremor,	Eye:	Frostbite	Resp sys, CNS
Eyes:	Frostbite	1700 ppm: SA/SCBAF	Con	hyperexcitability, anes;	Skin:	Frostbite	
Wash skin:	N.R.	S: SCBAF:PD,PP/SAF:PD,PP:ASCBA	(liq)	liq: frostbite	Breath:	Resp support	
Remove:	When wet (flamm)	Escape: GMFOV/SCBAE					
Change:	N.R.						
Provide:	Frostbite						
[Methyl acetylene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl acetylene- propadiene mixture $\text{CH}_3\text{C}\equiv\text{CH}/\text{CH}_2=\text{C}=\text{CH}_2$ 59355-75-8 UK4920000 1060 17 (stabilized)	MAPP gas, Methylacetylene-allene mixture, Methyl acetylene-propadiene mixture (stabilized), Propadiene-methylacetylene, Propyne-allene mixture, Propyne-propadiene mixture	NIOSH 1000 ppm (1800 mg/m ³) ST 1250 ppm (2250 mg/m ³) OSHA† 1000 ppm (1800 mg/m ³)	3400 ppm [LEL]	Colorless gas with a strong, characteristic, foul odor. [Note: A fuel that is shipped as a liquefied compressed gas.]	MW: 40.1 BP: -36 to -4°F Sol: Insoluble Fl.P: NA (Gas) IP: ? RGasD: 1.48 Flammable Gas	VP: >1 atm FRZ: -213°F UEL: 10.8% LEL: 3.4%	Strong oxidizers, copper alloys [Note: Forms explosive com- pounds at high pressure in contact with alloys containing more than 67% copper.]	Bag, none, GC/FID, II(6) [#S85]
Methyl acrylate $\text{CH}_2=\text{CHCOOCH}_3$ 96-33-3 AT2800000 1919 26 (inhibited)	Methoxycarbonylethylene, Methyl ester of acrylic acid, Methyl propenoate	NIOSH/OSHA 10 ppm (35 mg/m ³) [skin]	250 ppm	Colorless liquid with an acrid odor.	MW: 86.1 BP: 176°F Sol: 6% Fl.P: 27°F IP: 9.90 eV Sp.Gr: 0.96 Class IB Flammable Liquid	VP: 65 mm FRZ: -106°F UEL: 25% LEL: 2.8%	Nitrates, oxidizers such as peroxides, strong alkalis [Note: Polymerizes easily; usually contains an inhibitor such as hydro- quinone.]	Char, CS, GC/FID, III [#S38]
Methylacrylonitrile $\text{CH}_2=\text{C}(\text{CH}_3)\text{CN}$ 126-98-7 UD1400000 3079 28 (inhibited)	2-Cyanopropene-1, isoprenecyanide, Methacrylonitrile, α -Methylacrylonitrile, 2-Methylpropenenitrile	NIOSH 1 ppm (3 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid with an odor like bitter almonds.	MW: 67.1 BP: 195°F Sol: 3% Fl.P: 34°F IP: ? Sp.Gr: 0.80 Class IB Flammable Liquid	VP(77°F): 71 mm FRZ: -32°F UEL: 6.8% LEL: 2%	None reported	None available
Methylal $\text{CH}_3\text{OCH}_2\text{OCH}_3$ 109-87-5 PA8750000 1234 26	Dimethoxymethane, Formal, Formaldehyde dimethylacetal, Methoxymethyl methyl ether, Methylene dimethyl ether	NIOSH/OSHA 1000 ppm (3100 mg/m ³)	2200 ppm [LEL]	Colorless liquid with a chloroform- like odor.	MW: 76.1 BP: 111°F Sol: 33% Fl.P(oc): -26°F IP: 10.00 eV Sp.Gr: 0.86 Class IB Flammable Liquid	VP: 330 mm FRZ: -157°F UEL: 13.8% LEL: 2.2%	Strong oxidizers, acids	Char, Hexane; GC/FID, III [#1611]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl alcohol <chem>CH3OH</chem> 67-56-1 PC1400000	Carbinol, Columbian spirits, Methanol, Pyroligneous spirit, Wood alcohol, Wood naphtha, Wood spirit	NIOSH 200 ppm (260 mg/m ³) ST 250 ppm (325 mg/m ³) [skin] OSHA† 200 ppm (260 mg/m ³)	6000 ppm	Colorless liquid with a character- istic pungent odor.	MW: 32.1 BP: 147°F Sol: Miscible FLP: 52°F IP: 10.84 eV	VP: 95 mm FRZ: -144°F UEL: 36% LEL: 6.0%	Strong oxidizers	Sig el; Water; GC/FID; III [#2000, Methanol]
1230 28	1 ppm = 1.33 mg/m ³				Sp.Gr: 0.79 Class IB Flammable Liquid			
Methylamine <chem>CH3NH2</chem> 74-89-5 PF6300000	Aminomethane, Anhydrous methylamine, Aqueous methylamine, Monomethylamine	NIOSH/OSHA 10 ppm (12 mg/m ³)	100 ppm	Colorless gas with a fish- or ammonia-like odor. [Note: A liquid below 21°F. Shipped as a liquefied compressed gas.]	MW: 31.1 BP: 21°F Sol: Soluble FLP: NA (Gas) 14°F (Liq) IP: 8.97 eV RGasD: 1.08 Sp.Gr: 0.70 (Liquid at 13°F) Flammable Gas Class IA Flammable Liquid	VP: 3.0 atm FRZ: -136°F UEL: 20.7% LEL: 4.9%	Mercury, strong oxidizers, nitromethane [Note: Corrosive to copper & zinc alloys, aluminum & galvanized surfaces.]	XAD-7; Reagent; HPLC/FLD; OSHA [#40]
1061 19 (anhydrous) 1235 68 (aqueous)	1 ppm = 1.29 mg/m ³							
Methyl (n-amy) ketone <chem>CH3CO(CH2)4CH3</chem> 110-43-0 MJ5075000	Amyl methyl ketone, n-Amyl methyl ketone, 2-Heptanone	NIOSH/OSHA 100 ppm (465 mg/m ³)	800 ppm	Colorless to white liquid with a banana-like, fruity odor.	MW: 114.2 BP: 305°F Sol: 0.4% FLP: 102°F IP: 9.33 eV	VP: 3 mm FRZ: -32°F UEL(250°F): 7.9% LEL(151°F): 11%	Strong acids, alkalis & oxidizers [Note: Will attack some forms of plastic.]	Char; Methanol/ CS; GC/FID; III [#1301, Ketones II]
1110 26	1 ppm = 4.75 mg/m ³				Sp.Gr: 0.81 Class II Combustible Liquid			
Methyl bromide <chem>CH3Br</chem> 74-83-9 PA4900000	Bromomethane, Monobromomethane	NIOSH Ca See Appendix A OSHA† C 20 ppm (80 mg/m ³) [skin]	Ca [250 ppm]	Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]	MW: 95.0 BP: 38°F Sol: 2% FLP: NA (Gas) IP: 10.54 eV RGasD: 3.36 Sp.Gr: 1.73 (Liquid at 32°F) Flammable Gas, but only in presence of a high energy ignition source	VP: 1.9 atm FRZ: -137°F UEL: 16.0% LEL: 10%	Aluminum, magnesium, strong oxidizers [Note: Attacks aluminum to form aluminum trimethyl, which is SPONTANE- OUSLY flammable.]	Char(pet) (2); CS; GC/FID; III [#2520]
1062 55	1 ppm = 3.95 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, upper resp	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	2000 ppm: SA	Abs	sys; head, drow, dizz, vert,	Irr immed	CNS, GI tract
Wash skin:	When contam	5000 ppm: SA, CF	Inh	li-head, nau, vomit, vis	Water flush prompt	
Remove:	When wet (flamm)	6000 ppm: SAT:CF/SCBAF/SAF	Ing	dist, optic nerve damage	Resp support	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Con	(blindness); derm	Medical attention immed	
		Escape: SCBAE				
[Methyl alcohol]						
Skin:	Prevent skin contact (soln)/Frostbite	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact (soln)/Frostbite	100 ppm: CCRFS/GMFS/PAPRS*/	Abs	cough; skin, muc memb	Irr immed (soln)/	
Wash skin:	When contam (soln)	SCBAF/SAF	(soln)	burns; derm; con;	Frostbite	
Remove:	When wet (flamm)	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Ing	liq: frostbite	Water flush immed	
Change:	N.R.	Escape: GMFS/SCBAE	(soln)		(soln)/Frostbite	
Provide:	Frostbite		Con		Resp support	
			(soln/liq)		Medical attention immed (soln)	
[Methylamine]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb;	Eye:	Eyes, skin, resp
Eyes:	Prevent eye contact	800 ppm: CCROV*/PAPROV*/GMFOV/	Ing	head; narco, coma, derm	Skin:	sys, CNS, PNS
Wash skin:	When contam	SA*/SCBAF	Con		Irr immed	
Remove:	When wet or contam	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA			Soap wash	
Change:	N.R.	Escape: GMFOV/SCBAE			Fresh air	
					Medical attention immed	
[Methyl (n-amy) ketone]						
Skin:	Prevent skin contact (liq)	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact (liq)	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Abs	musc weak, incc, vis dist,	Skin:	CNS
Wash skin:	When contam (liq)	Escape: GMFOV/SCBAE	(liq)	verti; nau, vomit, head;	Irr immed (liq)	
Remove:	When wet (flamm)		Con	mal; hand tremor; convuls,	Water flush immed	
Change:	N.R.		(liq)	dysp; skin vesic;	(liq)	
Provide:	Quick drench (liq)			liq: frostbite; [carc]	Resp support	
						[In animals: lung, kidney & forestomach tumors]
[Methyl bromide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl Cellosolve® <chem>CH3OCH2CH2OH</chem> 109-86-4 KL5775000	EGME, Ethylene glycol monomethyl ether, Glycol monomethyl ether, 2-Methoxyethanol	NIOSH 0.1 ppm (0.3 mg/m³) [skin] OSHA 25 ppm (80 mg/m³) [skin]	200 ppm	Colorless liquid with a mild, ether-like odor.	MW 76.1 BP: 256°F Sol: Miscible Fl.P. 102°F IP: 9.60 eV	VP: 6 mm FRZ: -121°F UEL: 14% LEL: 1.8%	Strong oxidizers, caustics	Char, Methanol/ CH,Cl, GC/FID, III [#1403, Alcohols IV]
1188 26	1 ppm = 3.16 mg/m³				Sp Gr: 0.96 Class II Combustible Liquid			
Methyl Cellosolve® acetate <chem>CH3COOCH2CH2OCH3</chem> 110-49-6 KL5950000	EGMEA, Ethylene glycol monomethyl ether acetate, Glycol monomethyl ether acetate, 2-Methoxyethyl acetate	NIOSH 0.1 ppm (0.5 mg/m³) [skin] OSHA 25 ppm (120 mg/m³) [skin]	200 ppm	Colorless liquid with a mild, ether-like odor	MW 118.1 BP: 293°F Sol: Miscible Fl.P. 120°F IP: ?	VP: 2 mm FRZ: -85°F UEL: 8.2% LEL: 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char, CS, GC/FID, III [#1451]
1189 26	1 ppm = 4.91 mg/m³				Sp Gr: 1.01 Class II Combustible Liquid			
Methyl chloride <chem>CH3Cl</chem> 74-87-3 PA6300000	Chloromethane, Monochloromethane	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) OSHA† 100 ppm C 200 ppm 300 ppm (5-min max peak in any 3 hrs)	Ca [2000 ppm]	Colorless gas with a faint, sweet odor which is not noticeable at dangerous concentrations [Note: Shipped as a liquefied compressed gas]	MW: 50.5 BP: -12°F Sol: 0.5% Fl.P. NA (Gas) IP: 11.28 eV	VP: 5.0 atm FRZ: -144°F UEL: 17.4% LEL: 8.1%	Chemically-active metals such as potassium, powdered aluminum, zinc & magnesium; water [Note: Reacts with water (hydrolyzes) to form hydrochloric acid.]	Char(2), CH,Cl, GC/FID, III [#1001]
1063 18	1 ppm = 2.10 mg/m³				RGasD: 1.78 Flammable Gas			
Methyl chloroform <chem>CH2Cl2</chem> 71-55-6 KJ2975000	Chloroethene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized)	NIOSH C 350 ppm (1900 mg/m³) [15-min] OSHA† 350 ppm (1900 mg/m³)	700 ppm	Colorless liquid with a mild, chloroform-like odor.	MW 133.4 BP: 165°F Sol: 0.4% Fl.P. ? IP: 11.00 eV	VP: 100 mm FRZ: -23°F UEL: 12.5% LEL: 7.5%	Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water [Note: Reacts slowly with water to form hydrochloric acid.]	Char; CS, GC/FID, III [#1003, Haloge- nated Hydro- carbons]
2831 74	1 ppm = 5.55 mg/m³				Sp Gr: 1.34 Combustible Liquid, but burns with difficulty.			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench		NIOSH 1 ppm: SA* 2.5 ppm: SA:CF* 5 ppm: SCBAF/SAF 100 ppm: SA:PD,PP* 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, drow, weak; ataxia, tremor, som; anemic pallor, in animals: repro, terato effects	Eye: Skin: Breath: Swallow: Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, CNS, blood, kidneys, repro sys, hemato sys
[Methyl Cellosolve®]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH 1 ppm: SA* 2.5 ppm: SA:CF* 5 ppm: SCBAF/SAF 100 ppm: SA:PD,PP* 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; kidney, brain damage; in animals: narco, repro, terato effects	Eye: Skin: Breath: Swallow: Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, kidneys, brain, CNS, PNS, repro sys, hemato sys
[Methyl Cellosolve® acetate]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite		NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con (liq)	Dizz, nau, vomit, vis dist, stagger, slurred speech, convuls, coma; liver, kidney damage; liq: frostbite; repro, terato effects; [carc]	Eye: Skin: Breath: Frostbite Frostbite Resp support	CNS, liver, kidneys, repro sys [in animals: lung, kidney & forestomach tumors]
[Methyl chloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH/OSHA 700 ppm: SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin; head, lass, CNS depres, poor equi, derm; card army, liver damage	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, CNS, CVS, liver
[Methyl chloroform]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl-2-cyano- acrylate <chem>CH2=C(CN)COOCH3</chem> 137-05-3 AS7000000	Mecrylate, Methylcyanoacrylate, Methyl-2-cyanoacrylate, Methyl ester of 2-cyano- acrylic acid	NIOSH 2 ppm (8 mg/m³) ST 4 ppm (16 mg/m³) OSHA† none	N.D.	Colorless liquid with a characteristic odor.	MW: 111.1 BP: ? Sol: 30% Fl.P: 174°F IP: ?	VP(77°F): 0.2 mm FRZ: ? UEL: ? LEL: ?	Moisture [Note: Contact with moisture causes rapid polymerization.]	XAD-7; CH, CN/ H, PO; HPLC/UV; OSHA [#55]
1 ppm = 4.62 mg/m³					Sp.Gr(81°F): 1.10 Class IIIA Combustible Liquid			
Methylcyclohexane <chem>CH2C6H11</chem> 108-87-2 GV6125000	Cyclohexylmethane, Hexahydrotoluene	NIOSH 400 ppm (1600 mg/m³) OSHA† 500 ppm (2000 mg/m³)	1200 ppm [LEL]	Colorless liquid with a faint, benzene-like odor.	MW: 98.2 BP: 214°F Sol: Insoluble Fl.P: 25°F IP: 9.85 eV	VP: 37 mm FRZ: -196°F UEL 6.7% LEL 1.2%	Strong oxidizers	Char: CS, GC/FID; III [#1500, Hydro- carbons]
2296 27					Sp.Gr: 0.77 Class IB Flammable Liquid			
Methylcyclohexanol <chem>CH2C6H11OH</chem> 25639-42-3 GW0175000	Hexahydrocresol, Hexahydromethylphenol	NIOSH 50 ppm (235 mg/m³) OSHA† 100 ppm (470 mg/m³)	500 ppm	Straw-colored liquid with a weak odor like coconut oil.	MW: 114.2 BP: 311-356°F Sol: 4% Fl.P: 149-158°F IP: 9.80 eV	VP(86°F): 2 mm FRZ: -58°F UEL: ? LEL: ?	Strong oxidizers	Char: CH, Cl, GC/FID; III [#5374]
2617 26					Sp.Gr: 0.92 Class IIIA Combustible Liquid			
o-Methylcyclohexanone <chem>CH2C6H10O</chem> 583-60-8 GW1750000	2-Methylcyclohexanone	NIOSH 50 ppm (230 mg/m³) ST 75 ppm (345 mg/m³) [skin] OSHA† 100 ppm (460 mg/m³) [skin]	600 ppm	Colorless liquid with a weak, peppermint-like odor.	MW: 112.2 BP: 325°F Sol: Insoluble Fl.P: 118°F IP: ?	VP: 1 mm FRZ: 7°F UEL: ? LEL: ?	Strong oxidizers	Porapak; Acetone; GC/FID; III [#2521]
2297 26					Sp.Gr: 0.93 Class II Combustible Liquid			
1 ppm = 4.66 mg/m³								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Daily N.R. N.R. Eyewash	TBAL	Inh Ing Con	Irrit eyes, skin, nose; blurred vision, lac; rhinitis	Eye: Skin: Breath: Swallow: Irr immed Water wash Resp support Medical attention immed	Eyes, skin, resp sys
[Methyl-2-cyanoacrylate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 1200 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, li-head, drow, in animals: narco	Eye Skin: Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Methylcyclohexane]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 500 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; head, in animals: narco, liver, kidney damage	Eye Skin: Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys, liver
[Methylcyclohexanol]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 500 ppm: SA* 600 ppm: SA/CF*/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals: irrit eyes, eyes, muc memb, narco, derm	Eye Skin: Breath Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Skin, resp sys, liver, kidneys, CNS
[o-Methylcyclohexanone]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl cyclopenta- dienylmanganese tricarbonyl (as Mn) $\text{CH}_3\text{C}_5\text{H}_5\text{Mn}(\text{CO})_3$ 12108-13-3 OP1450000	CI-2, Combustion Improver-2, Manganese tricarbonyl- methylcyclopentadienyl, 2-Methylcyclopentadienyl manganese tricarbonyl, MMT	NIOSH 0.2 mg/m ³ [skin] OSHA† C 5 mg/m ³	N.D.	Yellow to dark- orange liquid with a faint, pleasant odor. [Note: A solid below 36°F.]	MW: 218.1 BP: 449°F Sol: Insoluble Fl.P: 230°F IP: ?	VP(212°F): 7 mm FRZ: 36°F UEL: ? LEL: ?	Light (decomposes)	None available
	1 ppm = 9.06 mg/m ³				Sp.Gr: 1.39 Class IIIB Combustible Liquid			
Methyl demeton $\text{C}_8\text{H}_{10}\text{O}_3\text{PS}_2$ 8022-00-2 TG1760000	Demeton methyl; C,O-Dimethyl 2-ethylmer- captoethyl thiophosphate; Metasystox®; Methylmercaptophos; Methylsystox® [(CH ₃ O) ₂ P(S)O(CH ₂) ₂ SC ₂ H ₅] [(CH ₃ O) ₂ P(O)S(CH ₂) ₂ SC ₂ H ₅]	NIOSH 0.5 mg/m ³ [skin] OSHA† none	N.D.	Oily, colorless to pale-yellow liquid with an unpleasant odor. [Insecticide] [Note: Technical grade consists of 2 isomers: thiono & thio.]	MW: 230.3 BP: Decomposes Sci: 0.03-0.3% Fl.P: ? IP: ?	VP: 0.0004 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, alkalis, water	None available
	1 ppm = 9.57 mg/m ³				Sp.Gr: 1.20 Combustible Liquid			
4,4'-Methylenebis(2- chloroaniline) $\text{CH}_2(\text{C}_6\text{H}_4\text{ClNH}_2)_2$ 101-14-4 CY1050000	DACPM; 3,3'-Dichloro-4,4'-diamino- diphenylmethane; MBOCA; 4,4'-Methylenebis(o-chloro- aniline); 4,4'-Methylenebis(2-chloro- benzenamine); MOCA 1 ppm = 11.10 mg/m ³	NIOSH Ca See Appendix A 0.003 mg/m ³ [skin] OSHA† none	Co [N.D.]	Tan-colored pellets or flakes with a faint, amine-like odor.	MW: 267.2 BP: ? Sol: Slight Fl.P: ? IP: ?	VP(77°F): 0.00001 mm MLT: 230°F UEL: ? LEL: ?	Chemically-active metals (e.g., potassium, sodium, magnesium, zinc)	None available
					Sp.Gr: 1.44			
Methylene bis(4-cyclo- hexylisocyanate) $\text{CH}_2[(\text{C}_6\text{H}_{10})\text{NCO}]_2$ 5124-30-1 NQ9250000	Dicyclohexylmethane 4,4'- diisocyanate; DMDI; bis(4-isocyanatocyclohexyl)- methane; HMDI; Hydrogenated MDI; Reduced MDI; Saturated MDI 1 ppm = 10.91 mg/m ³	NIOSH C 0.01 ppm (0.11 mg/m ³) OSHA† none	N.D.	Clear, colorless to light-yellow liquid.	MW: 262.4 BP: ? Sol: Reacts Fl.P: >395°F IP: ?	VP(77°F): 0.001 mm FRZ: <14°F UEL: ? LEL: ?	Water, ethanol, alcohols, amines, bases, acids, organotin catalysts [Note: May slowly polymerize if heated above 122°F.]	None available
					Sp.Gr(77°F): 1.07 Class IIIB Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes; gidd, nau, head;	Eye:	Irr immed	Eyes, CNS, liver,
Eyes:	Prevent eye contact		Abs	in animals: tremor, severe	Skin:	Soap wash immed	kidneys
Wash skin:	When contam		Ing	clonic spasms, weak, slow	Breath:	Resp support	
Remove:	When wet or contam		Con	respiration; liver, kidney inj	Swallow:	Medical attention immed	
Change:	N.R.						
[Methyl cyclopentadienyl manganese tricarbonyl (as Mn)]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin; ache eyes,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	rhin; nau, head, dizz, vomit	Skin:	Soap wash immed	CNS, CVS, blood chol
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Methyl demeton]							
Skin:	Prevent skin contact	NIOSH	Inh	Hema, cyan, nau, methemo,	Eye:	Irr immed	Liver, blood, kidneys
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	kidney irrit; [carc]	Skin:	Soap flush immed	[in animals: liver,
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Ing		Breath:	Resp support	lung & bladder
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	tumors]
Change:	Daily						
Provide:	Eyewash, Quick drench						
[4,4'-Methylenebis(2-chloroaniline)]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.1 ppm: SA*	Ing	skin, resp sens; chest tight,	Skin:	Water flush immed	
Wash skin:	When contam	0.25 ppm: SA:CF*	Con	dysp, cough, dry throat,	Breath:	Resp support	
Remove:	When wet or contam	0.5 ppm: SCBAF/SAF		wheez, pulm edema; skin	Swallow:	Medical attention immed	
Change:	N.R.	1 ppm: SAF:PD,PP		blisters			
Provide:	Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
[Methylene bis(4-cyclohexylisocyanate)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methylene bisphenyl isocyanate $\text{CH}_2(\text{C}_6\text{H}_4\text{NCO})_2$ 101-68-8 NQ9350000 2489 55	4,4'-Diphenylmethane diisocyanate; MDI; Methylene bis(4-phenyl isocyanate); Methylene di-p-phenylene ester of isocyanic acid 1 ppm = 10.40 mg/m ³	NIOSH 0.05 mg/m ³ (0.005 ppm) C 0.2 mg/m ³ (0.020 ppm) [10-min] OSHA C 0.2 mg/m ³ (0.02 ppm)	75 mg/m ³	White to light- yellow, odorless fakes. [Note: A liquid above 99°F.]	MW: 250.3 BP: 597°F Sol: 0.2% FLP: 390° IP: ? Sp Gr: 1.23 (Solid at 77°F) 1.19 (Liquid at 122°F) Combustible Solid	VP(77°F): 0.000005 mm MLT: 99°F UEL: ? LEL: ?	Strong alkalis, acids, alcohol [Note: Polymerizes at 450°F.]	Bub. Acetylate; HPLC/UV/D, III [#5521]
Methylene chloride CH_2Cl_2 75-09-2 PA8050000 1593 74	Dichloromethane, Methylene dichloride 1 ppm = 3.53 mg/m ³	NIOSH Ca See Appendix A OSHA 500 ppm C 1000 ppm 2000 ppm (5-min max peak in any 2 hrs)	Ca [2300 ppm]	Colorless liquid with a chloroform- like odor. [Note: A gas above 104°F.]	MW: 84.9 BP: 104°F Sol: 2% FLP: ? IP: 11.32 eV Sp Gr: 1.33 Combustible Liquid	VP: 350 mm FRZ: -139°F UEL: 23% LEL: 13%	Strong oxidizers; caustics; chemically- active metals such as aluminum, magnesium powders, potassium & sodium; concentrated nitric acid	Char(2). CS; GC/FID, III [#1005]
4,4'-Methylene- dianiline $\text{CH}_2(\text{C}_6\text{H}_4\text{NH}_2)_2$ 101-77-9 BY5425000	4,4'-Diaminodiphenylmethane, para,para'-Diaminodiphenyl- methane; Dianilinomethane; 4,4'-Diphenylmethanediamine; MDA	NIOSH Ca See Appendix A OSHA [1910.1050] 0.010 ppm ST0.100 ppm	Ca [N.D.]	Pale-brown, crystalline solid with a faint, amine-like odor.	MW: 198.3 BP: 748°F Sol: 0.1% FLP: 374°F IP: 10.70 eV Sp.Gr: 1.06 (Liquid at 212°F) Combustible Solid	VP(77°F): 0.0000002 mm MLT: 198°F UEL: ? LEL: ?	Strong oxidizers	Filter; Reagent; HPLC/UV/D; III [#5029]
Methyl ethyl ketone peroxide $\text{C}_6\text{H}_{10}\text{O}_4$ 1338-23-4 EL9450000 2127 49 (60% MEKP) 2550 51	2-Butanone peroxide, Ethyl methyl ketone peroxide, MEKP, MEK peroxide, Methyl ethyl ketone hydroperoxide 1 ppm = 7.33 mg/m ³	NIOSH C 0.2 ppm (1.5 mg/m ³) OSHA† none	N.D.	Colorless liquid with a character- istic odor. [Note: Explosive decomposition occurs at 230°F.]	MW: 176.2 BP: 244°F (Decomposes) Sol: Soluble FLP(oc): 125-200°F (60% MEKP) IP: ? Sp.Gr(59°F): 1.12 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Organic materials, heat, flames, sunlight, trace contaminants [Note: A strong oxidiz- ing agent. Pure MEKP is shock sensitive. Commercial product is diluted with 40% dimethylphthalate, cyclohexane peroxide, or diallyl phthalate to reduce sensitivity to shock.]	Imp; Reagent; Vis; III [#3508]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 0.5 mg/m ³ : SA* 1.25 mg/m ³ : SA:CF* 2.5 mg/m ³ : SCBAF/SAF 75 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; resp sens, cough, pulm secretions, chest pain, dysp, asthma	Eye Skin Breath: Swallow Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys
[Methylene bisphenyl isocyanate]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, fig, weak, som, li-head, numb tingle limbs, nau; [carc]	Eye Skin Breath: Swallow Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, CVS, CNS [in animals: lung, liver, salivary & mammary gland tumors]
[Methylene chloride]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes; jaun, hepatitis; myocardial damage; in animals: heart, liver, spleen damage; [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, liver, CVS, spleen [in animals: bladder cancer]
[4,4'-Methylenedianiline]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; cough, dysp, pulm edema; blurred vision; blisters, scars skin; abdom pain, vomit, diarr; derm; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Water wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Methyl ethyl ketone peroxide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Methyl formate <chem>HCOOCH3</chem> 107-31-3 LQ8925000	Methyl ester of formic acid, Methyl methanoate	NIOSH 100 ppm (250 mg/m ³) ST 150 ppm (375 mg/m ³) OSHA† 100 ppm (250 mg/m ³)	4500 ppm	Colorless liquid with a pleasant odor. [Note: A gas above 89°F.]	MW: 60.1 BP: 89°F Sol: 30% Fl.P: -2°F IP: 10.82 eV	VP: 476 mm FRZ: -148°F UEL: 22% LEL: 4.5%	Strong oxidizers [Note: Reacts slowly with water to form methanol & formic acid.]	Carbo-B(2), Ethyl acetate, GC/FID, II(5) [#S291]
1243 26	1 ppm = 2.50 mg/m ³				Sp. Gr: 0.98 Class IA Flammable Liquid			
5-Methyl-3-heptanone <chem>C6H13COCH2CH(CH3)CH2CH3</chem> , 3-Methyl-5-heptanone 541-85-5 MJ7350000	Amyl ethyl ketone, Ethyl amyl ketone, 3-Methyl-5-heptanone	NIOSH/OSHA 25 ppm (130 mg/m ³)	100 ppm	Colorless liquid with a pungent odor.	MW: 128.2 BP: 315°F Sol: Insoluble Fl.P: 138°F IP: ?	VP: 2 mm FRZ: -70°F UEL: ? LEL: ?	Strong oxidizers	Char; Methanol/ CS; GC/FID; III [#1301, Ketones II]
2271 26	1 ppm = 5.33 mg/m ³				Sp. Gr: 0.82 Class II Combustible Liquid			
Methyl hydrazine <chem>CH3NHNH2</chem> 60-34-4 MV5600000	MMH, Monomethylhydrazine	NIOSH Ca See Appendix A C 0.04 ppm (0.08 mg/m ³) [2-hr] OSHA C 0.2 ppm (0.35 mg/m ³) [skin]	Ca [20 ppm]	Fuming, colorless liquid with an ammonia-like odor.	MW: 46.1 BP: 150°F Sol: Miscible Fl.P: 17°F IP: 8.00 eV	VP: 38 mm FRZ: -32°F UEL: 92% LEL: 2.5%	Oxides of iron, copper, manganese, lead, copper alloys; porous materials such as earth, asbestos, wood & cloth, strong oxidizers such as fluorine & chlorine, nitric acid; hydrogen peroxide	Bub; Pho-acid; Vis; III [#3510]
1244 57	1 ppm = 1.52 mg/m ³				Sp. Gr(77°F): 0.87 Class IB Flammable Liquid			
Methyl iodide <chem>CH3I</chem> 74-88-4 PA9450000	Iodomethane, Monoiodomethane	NIOSH Ca See Appendix A 2 ppm (10 mg/m ³) [skin] OSHA† 5 ppm (28 mg/m ³) [skin]	Ca [100 ppm]	Colorless liquid with a pungent, ether-like odor. [Note: Turns yellow, red, or brown on exposure to light & moisture.]	MW: 141.9 BP: 109°F Sol: 1% Fl.P: NA IP: 9.54 eV	VP: 400 mm FRZ: -88°F UEL: NA LEL: NA	Strong oxidizers [Note: Decomposes at 518°F.]	Char; Toluene; GC/FID; III [#1014]
2644 55	1 ppm = 5.90 mg/m ³				Sp. Gr: 2.28 Noncombustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA 1000 ppm: SA* 2500 ppm: SA, CF* 4500 ppm: SCBAF/SAF S: SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, nose; chest tight, dysp; vis dist; CNS depres; in animals: pulm edema; narco	Eye:	Eyes, resp sys, CNS
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet (flamm)		Con		Swallow:	
Change:	N.R.					
[Methyl formate]						
Skin:	Prevent skin contact	NIOSH/OSHA 100 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF S: SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, muc memb; head, narco, coma, derm	Eye:	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	N.R.					
[5-Methyl-3-heptanone]						
Skin:	Prevent skin contact	NIOSH X: SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: SCBAE	Inh	Irrit eyes, skin, resp sys; vomit, diarr, tremor, ataxia; anoxia, cyan; convuls; [carc]	Eye:	Eyes, skin, resp sys, CNS, liver, blood, CVS [in animals: lung, liver, blood vessel & intestine tumors]
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet (flamm)		Con		Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Methyl hydrazine]						
Skin:	Prevent skin contact	NIOSH X: SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, resp sys; nau, vomit, verti, ataxia; slurred speech, drow; derm; [carc]	Eye:	Eyes, skin, resp sys, CNS [in animals: lung, kidney & forestomach tumors]
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Methyl iodide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Methyl isoamyl ketone <chem>CH3COCH2CH2CH(CH3)2</chem> 110-12-3 MP3850000	Isoamyl methyl ketone, Isopentyl methyl ketone, 2-Methyl-5-hexanone, 5-Methyl-2-hexanone, MIAK	NIOSH 50 ppm (240 mg/m³) OSHA† 100 ppm (475 mg/m³)	N.D.	Colorless, clear liquid with a pleasant, fruity odor.	MW: 114.2 BP: 291°F Sol: 0.5% Fl.P: 97°F IP: 9.284 eV	VP: 5 mm FRZ: -101°F UEL(200°F): 8.2% LEL(200°F): 1.0%	Oxidizers	None available
2302 26	1 ppm = 4.75 mg/m³				Sp.Gr: 0.81 Class IC Flammable Liquid			
Methyl isobutyl carbinol <chem>(CH3)2CHCH2CH2(OH)CH3</chem> 108-11-2 SA7350000	Isobutyl/methylcarbinol, Methyl amyl alcohol, 4-Methyl-2-pentanol, MIBC	NIOSH 25 ppm (100 mg/m³) ST 40 ppm (165 mg/m³) [skin] OSHA† 25 ppm (100 mg/m³) [skin]	400 ppm	Colorless liquid with a mild odor.	MW: 102.2 BP: 271°F Sol: 2% Fl.P: 106°F IP: ?	VP: 3 mm FRZ: -130°F UEL: 5.5% LEL: 1.0%	Strong oxidizers	Char. 2-Propanol/ CS; GC/FID; III [#1402, Alcohols III]
2053 26	1 ppm = 4.25 mg/m³				Sp.Gr: 0.81 Class II Combustible Liquid			
Methyl isocyanate <chem>CH3NCO</chem> 624-83-9 NQ9450000	Methyl ester of isocyanic acid, MIC	NIOSH/OSHA 0.02 ppm (0.05 mg/m³) [skin]	3 ppm	Colorless liquid with a sharp, pungent odor.	MW: 57.1 BP: 139°F Sol(59°F): 10% Fl.P: 19°F IP: 10.67 eV	VP: 348 mm FRZ: -49°F UEL: 26% LEL: 5.3%	Water, oxidizers, acids, alkalis, amines, iron, tin, copper [Note: Usually con- tains inhibitors to prevent polymeri- zation.]	XAD-7; CH,CN; HPLC/FLD; OSHA [#54]
2480 30	1 ppm = 2.37 mg/m³				Sp.Gr: 0.96 Class IB Flammable Liquid			
Methyl isopropyl ketone <chem>CH3COCH(CH3)2</chem> 563-80-4 EL9100000	2-Acetyl propane, Isopropyl methyl ketone, 3-Methyl-2-butanone, 3-Methyl butan-2-one, MIPK	NIOSH 200 ppm (705 mg/m³) OSHA† none	N.D.	Colorless liquid with an acetone- like odor.	MW: 86.2 BP: 199°F Sol: Very slight Fl.P: ? IP: 9.32 eV	VP: 42 mm FRZ: -134°F UEL: ? LEL: ?	Oxidizers	None available
2397 26	1 ppm = 3.58 mg/m³				Sp.Gr: 0.81 Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH 500 ppm: CCROV/SA* 1250 ppm: SA:CF*/PAPROV* 2500 ppm: CCRFOV/GMFOV/PAPRTOV*/ SAT:CF*/SCBAF/SAF 5000 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; head, narco, coma; derm; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Soap flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet (flamm)					
Change:	N.R.					
[Methyl isoamyl ketone]						
Skin:	Prevent skin contact	NIOSH/OSHA 250 ppm: SA* 400 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; head, drow, derm, in animals: narco	Eye: Skin: Breath: Swallow: Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, CNS
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet or contam					
Change:	N.R.					
[Methyl isobutyl carbinol]						
Skin:	Prevent skin contact	NIOSH/OSHA 0.2 ppm: SA* 0.5 ppm: SA:CF* 1 ppm: SCBAF/SAF 3 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, resp sens, cough, pulm secretions, chest pain, dysp, asthma, eye, skin damage; in animals: pulm edema	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Methyl isocyanate]						
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb; resp sys; cough	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet or contam					
Change:	N.R.					
[Methyl isopropyl ketone]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl mercaptan CH_3SH 74-93-1 PB4375000	Mercaptomethane, Methanethiol, Methyl sulphydrate	NIOSH C 0.5 ppm (1 mg/m ³) [15-min] OSHA† C 10 ppm (20 mg/m ³)	150 ppm	Colorless gas with a disagreeable odor like garlic or rotten cabbage. [Note: A liquid below 43°F. Shipped as a liquefied compressed gas.]	MW: 48.1 BP: 43°F Sol: 2% Fl.P: NA (Gas) (oc) 0°F (Liq) IP: 9.44 eV RGasD: 1.66 Sp.Gr: 0.90 (Liquid at 32°F) Flammable Gas Class IA Flammable Liquid	VP: 1.7 atm FRZ: -186°F UEL: 21.8% LEL: 3.9%	Strong oxidizers, bleaches, copper, aluminum, nickel- copper alloys	Filter*, HCl/DCE, GC/FPD, III [#2542]
1064 13	1 ppm = 2.00 mg/m ³							
Methyl methacrylate $\text{CH}_2=\text{C}(\text{CH}_3)\text{COOCH}_3$ 80-62-6 OZ5075000	Methacrylate monomer, Methyl ester of methacrylic acid, Methyl-2-methyl-2-propenoate	NIOSH/OSHA 100 ppm (410 mg/m ³) OSHA† none	1000 ppm	Colorless liquid with an acid, fruity odor.	MW: 100.1 BP: 214°F Sol: 1.5% Fl.P(oc): 50°F IP: 9.70 eV Sp.Gr: 0.94 Class IB Flammable Liquid	VP: 29 mm FRZ: -54°F UEL: 8.2% LEL: 1.7%	Nitrates, oxidizers, peroxides, strong alkalis, moisture [Note: May polymerize if subjected to heat, oxidizers, or ultraviolet light. Usually contains an inhibitor such as hydroquinone.]	XAD-2, CS, GC/FPD, III [#2537]
1247 26 (inhibited)	1 ppm = 4.16 mg/m ³							
Methyl parathion $(\text{CH}_3\text{O})_2\text{P}(\text{S})\text{OC}_6\text{H}_4\text{NO}_2$ 298-00-0 TG0175000	Azophos®; O,O-Dimethyl-O-p-nitro- phenylphosphorothioate; Parathion methyl	NIOSH 0.2 mg/m ³ [skin] OSHA† none	N.D.	White to tan, crystalline solid or powder with a pungent, garlic- like odor. [pesticide] [Note: The commer- cial product in xylene is a tan liquid.]	MW: 263.2 BP: 289°F Sol(77°F): 0.006% Fl.P: ? IP: ? Sp.Gr: 1.36 Combustible Solid	VP: 0.00001 mm MLT: 99°F UEL: ? LEL: ?	Strong oxidizers, water [Note: Explosive risk when heated above 122°F.]	None available
2783 55								
Methyl silicate $(\text{CH}_3\text{O})_2\text{Si}$ 681-84-5 VV9800000	Methyl orthosilicate, Tetramethoxysilane, Tetramethyl ester of silicic acid, Tetramethyl silicate	NIOSH 1 ppm (6 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid. [Note: A solid below 28°F.]	MW: 152.3 BP: 250°F Sol: Soluble Fl.P: 205°F IP: ? Sp.Gr: 1.02 Class IIIB Combustible Liquid	VP(77°F): 12 mm FRZ: 28°F UEL: ? LEL: ?	Oxidizers; hexa- fluorides of rhenium, molybdenum & tungsten	None available
2606 57	1 ppm = 6.37 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq)/Frostbite Prevent eye contact (liq)/Frostbite N.R. When wet (flamm) N.R. Eyewash (liq), Quick drench (liq), Frostbite	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SAT:CF/SCBAF/SAF 150 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Irrit eyes, skin, resp sys; narco, cyan; convuls; liq: frostbite	Eye: Skin: Breath:	Irr Immed (liq)/ Frostbite Water/flush Immed (liq)/Frostbite Resp support	Eyes, skin, resp sys, CNS, blood
[Methyl mercaptan]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1000 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; derm	Eye: Skin: Breath: Swallow:	Irr Immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Methyl methacrylate]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH 2 mg/m ³ : CCROVDMFu/SA 5 mg/m ³ : SA:CF/PAPROVDMFu 10 mg/m ³ : CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SAT:CF/ SCBAF/SAF 200 mg/m ³ : SAF:FD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; nau, vomit, abdom cramps, diarr, saliv; head, gidd, vert; weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash Immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Methyl parathion]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Daily When wet or contam N.R. Eyewash	TBAL	Inh Ing Con (vap/ liq)	Irrit eyes, corn damage (following even short-term exposure to the vapor); lung, kidney inj; pulm edema	Eye: Skin: Breath: Swallow:	Irr Immed (vap/liq) Soap wash Resp support Medical attention immed	Eyes, resp sys, kidneys
[Methyl silicate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
α -Methyl styrene $C_9H_8C(CH_3)=CH_2$ 98-83-9 WL5250000	AMS. Isopropenyl benzene. 1-Methyl-1-phenylethylene. 2-Phenyl propylene 1 ppm = 4.91 mg/m ³	NIOSH 50 ppm (240 mg/m ³) ST 100 ppm (485 mg/m ³) OSHA† C 100 ppm (480 mg/m ³)	700 ppm	Colorless liquid with a character- istic odor.	MW: 118.2 BP: 330°F Sol: Insoluble Fl.P: 129°F IP: 8 35 eV Sp.Gr: 0.91 Class II Combustible Liquid	VP: 2 mm FRZ: -10°F UEL: 6.1% LEL: 1.9%	Oxidizers, peroxides, halogens, catalysts for vinyl or ionic polymers; aluminum, iron chloride, copper [Note: Usually con- tains an inhibitor such as tert-butyl catechol.]	Char; CS; GC/FID. III [#1501, Aromatic Hydro- carbons]
Metribuzin $C_8H_{10}N_4OS$ 21087-64-9 XZ2990000	4-Amino-6-(1,1-dimethyl- ethyl)-3-(methylthio)- 1,2,4-triazin-5(4H)-one; Sencor®	NIOSH 5 mg/m ³ OSHA† none	N.D.	Colorless, crystalline solid. [herbicide]	MW: 214.3 BP: ? Sol: 0.1% Fl.P: NA IP: ? Sp.Gr: 1.31 Noncombustible Solid	VP: 0.0000004 mm MLT: 257°F UEL: NA LEL: NA	None reported	None available
Mica (containing less than 1% quartz) 12001-26-2 VV8760000	Biotite, Lepidolite, Margarite, Muscovite, Phlogopite, Roscoelite, Zinnwaldite	NIOSH 3 mg/m ³ (resp) OSHA† 20 mppcf	1500 mg/m ³	Colorless, odor- less flakes or sheets of hydrous silicates.	MW: 797 (approx) BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.6-3.2 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter, none; Grav; III [#0600, Nuisance Dust resp]]
Mineral wool fiber PY8070000	Manmade mineral fibers, Rock wool, Slag wool, Synthetic vitreous fibers [Note: Produced by blowing steam or air through molten rock (rock wool) or various furnace slags that are by-products of metal smelting or refining processes (slag wool).]	NIOSH 3 fibers/cm ³ (fibers $\leq 3.5 \mu m$ diameter & $\geq 10 \mu m$ in length) 5 mg/m ³ (total) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Typically, a mineral "wool" with diameters $>0.5 \mu m$ & $>1.5 \mu m$ in length.	MW: varies BP: NA Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: ? Noncombustible Fibers	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0500, Nuisance Dust (total)] [Also #7400.]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, nose,	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	500 ppm: CCROV/SA*	Ing	throat; drow; derm	Skin:	CNS
Wash skin:	When contam	700 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF	Con		Breath:	
Remove:	When wet or contam	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE			Immed	
[α-Methyl styrene]						
Skin:	Prevent skin contact	TBAL	Inh	In animals: CNS depres;	Eye:	CNS, thyroid, liver
Eyes:	N.R.		Ing	thyroid, liver, enzyme	Skin:	
Wash skin:	When contam/Daily		Con	changes	Breath:	
Remove:	When wet or contam				Swallow:	
Change:	Daily				Immed	
[Metribuzin]						
Skin:	N.R.	NIOSH	Inh	Irritate eyes; pneumoconiosis,	Eye:	Resp sys
Eyes:	N.R.	15 mg/m ³ : DM	Con	cough, dysp, weak, low-wgt	Breath:	
Wash skin:	N.R.	30 mg/m ³ : DMXSO/SA			Immed	
Remove:	N.R.	75 mg/m ³ : SA:CF/PAPRDM			Fresh air	
Change:	N.R.	150 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF				
		1500 mg/m ³ : SA:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Mica (containing less than 1% quartz)]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	5X REL: D	Con	dysp	Skin:	
Wash skin:	Daily	10X REL: DXSQ/HIE/SA			Breath:	
Remove:	N.R.	25X REL: SA:CF/PAPRDM			Immed	
Change:	Daily	50X REL: HIEF/PAPRTHIE/SCBAF/SAF			Soap wash	
		1000X REL: SAF:PD,PP			Fresh air	
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Mineral Wool]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Molybdenum Mo 7439-98-7 QA4680000	Molybdenum metal	NIOSH* See Appendix D OSHA† 15 mg/m³ [*Note: The REL and PEL also apply to other insoluble molybdenum compounds (as Mo).]	5000 mg/m³ (as Mo)	Dark gray or black powder with a metallic luster.	MW: 95.9 BP: 8717°F Sol: Insoluble F.P.: NA IP: NA Sp Gr: 10.28 Combustible Solid in form of dust or powder.	VP: 0 mm (approx) MLT: 4752°F UEL: NA LEL: NA	Strong oxidizers	Filter; Acid; ICP; III [#7300, Elements]
Molybdenum (soluble compounds, as Mo)	Synonyms vary depending upon the specific soluble molybdenum compound.	NIOSH See Appendix D OSHA 5 mg/m³	1000 mg/m³ (as Mo)	Appearance and odor vary depending upon the specific soluble molybdenum compound.	Properties vary depending upon the specific soluble molybdenum compound		Varies	Filter; Acid; ICP; III [#7300, Elements]
Monocrotophos C ₇ H ₁₄ NO ₃ P 6923-22-4 TC4375000	3-Hydroxy-N-methylcrotona- mide dimethylphosphate, Monocroton [(CH ₃ O) ₂ P(O)OC(CH ₃)=CHC(O)NHCH ₃]	NIOSH 0.25 mg/m³ OSHA† none	N.D.	Colorless to reddish-brown solid with a mild, ester odor. [insecticide]	MW: 223.2 BP: 257°F Sol: Miscible F.P.: >200°F IP: ? Sp.Gr: ? Combustible Solid	VP: 0.000007 mm MLT: 129°F UEL: ? LEL: ?	Metals, low molecular weight alcohols & glycols [Note: Corrosive to black iron, drum steel, stainless steel 304 & brass. Should be stored at 70-80°F.]	None available
2783 55 (organophosphorus pesticide, n.o.s.)								
Monomethyl aniline C ₇ H ₉ NHCH ₃ 100-61-8 BY4550000	MA, (Methylamino)benzene, N-Methyl aniline, Methylphenylamine, N-Phenylmethylamine	NIOSH 0.5 ppm (2 mg/m³) [skin] OSHA† 2 ppm (9 mg/m³) [skin]	100 ppm	Yellow to light- brown liquid with a weak, ammonia- like odor.	MW: 107.2 BP: 384°F Sol: Insoluble F.P. 175°F IP: 7.32 eV Sp Gr: 0.99 Class IIIA Combustible Liquid	VP: 0.3 mm FRZ: -71°F UEL: ? LEL: ?	Strong acids, strong oxidizers	Sub. NaOH; GC/FID; III [#S153]
2294 57	1 ppm = 4.46 mg/m³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		OSHA 75 mg/m³: DM ⁺ 150 mg/m³: DMXSO ⁺ /SA 375 mg/m³: SA:CF/PAPRDM ⁺ 750 mg/m³: HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 5000 mg/m³: SA:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: irrit eyes, nose, throat, anor, diarr, low-wgt, listlessness, liver, kidney damage	Eye: Breath: Swallow	Irr immed Resp support Medical attention immed	Eyes, resp sys, liver, kidneys
[Molybdenum]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		OSHA 25 mg/m³: DM ⁺ 50 mg/m³: DMXSO ⁺ /SA ⁺ 125 mg/m³: SA:CF*/PAPRDM ⁺ 250 mg/m³: HIEF/SAT:CF*/PAPRTHIE/ SCBAF/SAF 1000 mg/m³: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: irrit eyes, nose, throat, anor, inco, dysp, anemia	Eye: Skin: Breath: Swallow	Irr immed Water flush Resp support Medical attention immed	Eyes, resp sys, kidneys, blood
[Molybdenum (soluble compounds, as Mo)]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		TBAL	Inh Abs Ing Con	Irrit eyes, miosis, blurred vision; dizz, convuls; dysp; saliv, abdom cramps, nau, diarr, vomit; in animals: possible terato effects	Eye: Skin: Breath: Swallow	Irr immed Water flush Resp support Medical attention immed	Eyes, resp sys, CNS, CVS, blood chol, repro sys
[Monocrotophos]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH 5 ppm: SA 12.5 ppm: SA:CF 25 ppm: SAT:CF/SCBAF/SAF 100 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Weak, dizz, head, dysp, cyan; methemo, pulm edema; liver, kidney damage	Eye: Skin: Breath: Swallow	Irr immed Soap wash Resp support Medical attention immed	Resp sys, liver, kidneys, blood, CNS
[Monomethyl aniline]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Morpholine <chem>C4H9ON</chem> 110-91-8 QD6475000	Diethylene imidoxide, Diethylene oximide, Tetrahydro-1,4-oxazine; Tetrahydro-p-oxazine	NIOSH 20 ppm (70 mg/m ³) ST 30 ppm (105 mg/m ³) [skin] OSHA† 20 ppm (70 mg/m ³) [skin]	1400 ppm [LEL]	Colorless liquid with a weak, ammonia- or fish- like odor. [Note: A solid below 23°F.]	MW: 87.1 BP: 264°F Sol: Miscible Fl.P(oc): 98°F IP: 8.88 eV	VP: 6 mm FRZ: 23°F UEL: 11.2% LEL: 1.4%	Strong acids, strong oxidizers, metals, nitro compounds [Note: Corrosive to metals.]	Si gel, H ₂ SO ₄ /NaOH, GC/FID, II(3) [#S150]
1760 60(aqueous) 2054 29	1 ppm = 3.62 mg/m ³				Sp.Gr: 1.007 Class IC Flammable Liquid			
Naphtha (coal tar) 8030-30-6 DE3030000	Crude solvent coal tar naphtha, High solvent naphtha, Naphtha	NIOSH/OSHA 100 ppm (400 mg/m ³)	1000 ppm [LEL]	Reddish-brown, mobile liquid with an aromatic odor.	MW: 110 (approx) BP: 320-428°F Sol: Insoluble Fl.P: 100-109°F IP: ?	VP: <5 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char, CS, GC/FID, III [#1550]
1256 27 (solvent) 2553 27	1 ppm = 4.57 mg/m ³ (approx)				Sp.Gr: 0.89-0.97 Class II Combustible Liquid			
Naphthalene <chem>C10H8</chem> 91-20-3 QJ0525000	Naphthalin, Tar camphor, White tar	NIOSH 10 ppm (50 mg/m ³) ST 15 ppm (75 mg/m ³) OSHA† 10 ppm (50 mg/m ³)	250 ppm	Colorless to brown solid with an odor of mothballs. [Note: Shipped as a molten solid.]	MW: 128.2 BP: 424°F Sol: 0.003% Fl.P: 174°F IP: 8.12 eV	VP: 0.08 mm MLT: 176°F UEL: 5.9% LEL: 0.9%	Strong oxidizers, chromic anhydride	Char, CS, GC/FID, III [#1501, Aromatic Hydro- carbons]
1334 32 (crude or refined) 2304 32 (molten)	1 ppm = 5.33 mg/m ³				Sp.Gr: 1.15 Combustible Solid, but will take some effort to ignite.			
Naphthalene disocyanate <chem>C10H6(NCO)2</chem> 3173-72-6 NQ9600000	1,5-Diisocyanatonaphtha- lene; 1,5-Naphthalene diiso- cyanate; 1,5-Naphthalene ester of isocyanic acid; NDI	NIOSH 0.040 mg/m ³ (0.005 ppm) C 0.170 mg/m ³ (0.025 ppm) [10-min] OSHA none	N.D.	White to light- yellow, crystalline flakes.	MW: 210.2 BP: 505°F Sol: ? Fl.P(oc): 311°F IP: ?	VP(75°F): 0.003 mm MLT: 251°F UEL: ? LEL: ?	None reported	None available
	1 ppm = 8.74 mg/m ³				Sp.Gr: ? Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash (>15%), Quick drench (>25%)	NIOSH/OSHA 500 ppm: SA:CF/PAPROV 1000 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 1400 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, resp sys; vis dist, cough, in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Morpholine]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 1000 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, li-head, drow, derm, in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Naphtha (coal tar)]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 100 ppm: CCRFOVDM/SA* 250 ppm: SA:CF/CCRFOVHIE/ PAPROVDM/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, head, conf, excitement, mal, nau, vomit, abdom pain; irrit bladder, profuse sweat, jaun, hema, hemog, renal shutdown, derm; optical neuritis, corn damage	Eye: Skin: Breath: Swallow: Irr immed Molten flush immed/ sol-liq soap wash prompt Resp support Medical attention immed	Eyes, skin, blood, liver, kidneys, CNS
[Naphthalene]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 0.05 ppm: SA* 0.125 ppm: SA:CF* 0.25 ppm: SCBAF/SAF 1 ppm: SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; resp sens, cough, pulm secretions, chest pain, dysp; asthma	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys
[Naphthalene diisocyanate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
α -Naphthylamine $C_{10}H_9NH_2$ 134-32-7 QM1400000	1-Aminonaphthalene, 1-Naphthylamine	NIOSH Ca See Appendix A OSHA [1910.1004] See Appendix B	Ca [N.D.]	Colorless crystals with an ammonia- like odor. [Note: Darkens in air to a reddish- purple color.]	MW: 143.2 BP: 573°F Sol: 0.002% FLP: 315°F IP: 7.30 eV	VP: (220°F) 1 mm MLT: 122°F UEL: ? LEL: ?	Oxidizes in air	Filter/ Si gel, CH ₃ COOH/ 2-Pro- panol, GC/FID, III [#5518]
2077 55					Sp Gr: 1.12 Combustible Solid			
β -Naphthylamine $C_{10}H_9NH_2$ 91-59-8 QM2100000	2-Aminonaphthalene, 2-Naphthylamine	NIOSH Ca See Appendix A OSHA [1910.1009] See Appendix B	Ca [N.D.]	Odorless, white to red crystals with a faint, aromatic odor. [Note: Darkens in air to a reddish- purple color.]	MW: 143.2 BP: 583°F Sol: Miscible in hot water FLP: 315°F IP: 9.71 eV	VP: (226°F) 1 mm MLT: 232°F UEL: ? LEL: ?	None reported	Filter/ Si gel, CH ₃ COOH/ 2-Pro- panol, GC/FID, III [#5518]
1650 55					Sp Gr: (208°F): 1.06 Combustible Solid			
Niax® Catalyst ESN 62765-93-9 QR3900000	None [Note: A Mixture of 95% dimethylaminopropio- nitrile & 5% bis(2- dimethylamino)ethyl ether.]	NIOSH/OSHA See Appendix C	N.D.	Aliquid mixture. [Note: Used in the past as a catalyst in the manufacture of flexible poly- urethane foams.]	MW: mixture BP: ? Sol: ? FLP: ? IP: ?	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
					Sp. Gr: ?			
Nickel carbonyl (as Ni) $Ni(CO)_4$ 13463-39-3 QR6300000	Nickel tetracarbonyl, Tetracarbonyl nickel	NIOSH Ca See Appendix A 0.001 ppm (0.007 mg/m ³) OSHA 0.001 ppm (0.007 mg/m ³)	Ca [2 ppm]	Colorless to yellow liquid with a musty odor. [Note: A gas above 110°F.]	MW: 170.7 BP: 110°F Sol: 0.05% FLP: <4°F IP: 8.28 eV	VP: 315 mm FRZ: -13°F UEL: ? LEL: 2%	Nitric acid, bromine, chlorine & other oxidizers, flammable materials	Char (low Ni) HNO ₃ , AAS/GF; III [#6007]
1259 57	1 ppm = 7.10 mg/m ³				Sp. Gr: (63°F): 1.32 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH ✕ SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Derm: hemorrhagic cystitis; dysp, ataxia, methemo, hema, dysuria, [carc]	Eye Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Bladder, skin [bladder cancer]
[α-Naphthylamine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH ✕ SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Derm: hemorrhagic cystitis, dysp, ataxia; methemo, hema, dysuria [carc]	Eye Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Bladder, skin [bladder cancer]
[β-Naphthylamine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH ✕ SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irr ites, skin; urinary dysfunc; neurological disorders; pins & needles sensation in hands & feet; musc weak, lass, nau, vomit; decr nerve conduction times of lower legs	Eye: Skin: Breath: Swallow: Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, urinary tract, PNS
[NIAx® Catalyst ESN]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R. Eyewash, Quick drench	NIOSH ✕ SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Head, vert; nau, vomit, epigastric pain; subs pain; cough, hyperpnea; cyan; weak; leucyt; pneumitis; delirium; convuls; [carc]. in animals: repro, terato effects	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Lungs, paranasal sinus, CNS, repro sys [lung & nasal cancer]
[Nickel carbonyl (as Ni)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Nickel metal and other compounds (as Ni) Ni (Metal) 7440-02-0 (Metal) QR5950000 (Metal)	Nickel metal; Elemental metal. Nickel catalyst Synonyms of other nickel compounds vary depending upon the specific compound.	NIOSH* Ca See Appendix A 0.015 mg/m ³ OSHA†* 1 mg/m ³ [*Note: The REL and PEL do not apply to Nickel carbonyl.]	Ca [10 mg/m ³ (as Ni)]	Metal: Lustrous, silvery, odorless solid.	MW: 58.7 BP: 5139°F Sol: Insoluble Fl, P: NA IP: NA Sp, Gr: 8.90 (Metal) Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.	VP: 0 mm (approx) MLT: 2831°F UEL: NA LEL: NA	Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate	Filter; Acid; ICP; III [*7300, Elements]
Nicotine C ₁₀ H ₁₄ NC ₂ H ₄ NCH ₃ 54-11-5 QS5250000 1654 55	3-(1-Methyl-2-pyrrolidyl)- pyridine 1 ppm = 6.74 mg/m ³	NIOSH/OSHA 0.5 mg/m ³ [skin] OSHA† 2 ppm (5 mg/m ³) [Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]	5 mg/m ³	Pale-yellow to dark brown liquid with a fish-like odor when warm. [insecticide]	MW: 162.2 BP: 482°F (Decomposes) Sol: Miscible Fl, P: 203°F IP: 8.01 eV Sp, Gr: 1.01 Class IIIB Combustible Liquid	VP: 0.08 mm FRZ: -110°F UEL: 4.0% LEL: 0.7%	Strong oxidizers, strong acids	XAD-2; Ethyl acetate; GC/Alk-FID; II(3) [*S293]
Nitric acid HNO ₃ 7697-37-2 QU5775000 1760 60 (>40% acid) 2031 44 (>40% acid) 2032 44 (fuming)	Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA) 1 ppm = 2.62 mg/m ³	NIOSH/OSHA 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³) OSHA† 2 ppm (5 mg/m ³) [Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]	25 ppm	Colorless, yellow, or red, fuming liquid with an acid, suffocating odor.	MW: 63.0 BP: 181°F Sol: Miscible Fl, P: NA IP: 11.95 eV Sp, Gr(77°F): 1.50 Noncombustible Liquid, but increases the flammability of combustible materials	VP: 48 mm FRZ: -44°F UEL: NA LEL: NA	Combustible materials, metallic powders, hydrogen sulfide, carbides, alcohols [Note: Reacts with water to produce heat. Corrosive to metals]	Si gel; NaHCO ₃ / Na ₂ CO ₃ ; IC; III [*7903, Inorganic Acids]
Nitric oxide NO 10102-43-9 QX0525000 1660 20	Mononitrogen monoxide, Nitrogen monoxide 1 ppm = 1.25 mg/m ³	NIOSH/OSHA 25 ppm (30 mg/m ³)	100 ppm	Colorless gas. [Note: Shipped as a nonliquefied compressed gas.]	MW: 30.0 BP: -241°F Sol: 5% Fl, P: NA IP: 9.27 eV RGA D: 1.04 Nonflammable Gas, but will accelerate the burning of combustible materials.	VP: 34.2 atm FRZ: -263°F UEL: NA LEL: NA	Fluorine, combustible materials, ozone, NH ₃ , chlorinated hydro- carbons, metals, carbon disulfide [Note: Reacts with water to form nitric acid. Rapidly converted in air to nitrogen dioxide.]	Mcl-sieve; Reagent; Vis; III [*S321]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Sens derm, allergic asthma,	Skin:	Nasal cavities,
Eyes:	N.R.	W. SCBAF, PD, PP/SAF, PD, PP, ASCBA	Ing	pneutis; [carc]	Breath	lungs, skin,
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Con		Swallow	[lung & nasal cancer]
Remove:	When wet or contam					
Change:	Daily					
[Nickel metal and other compounds (as Ni)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Nau, saliv, abdom pain,	Eye:	CNS, CVS, lungs,
Eyes:	Prevent eye contact	5 mg/m ³ : SA/SCBAF	Abs	vomit, diarr, head, dizz,	Skin:	GI tract, reprod sys
Wash skin:	When contam	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Ing	hearing, vis dist; conf,	Breath:	
Remove:	When wet or contam	Escape: GMFOV/SCBAE	Con	weak, inco; paroxysmal	Swallow:	
Change:	N.R.			atrial fibril, convuls,		
Provide:	Eyewash, Quick drench			dysp; in animals: terato effects		
[Nicotine]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 ppm: SA, CF, CCRFS, GMFS, SCBAF/SAF	Ing	delayed pulm edema,	Skin:	teeth
Wash skin:	When contam	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Con	pneutis, bron; dental erosion	Breath:	
Remove:	When wet or contam	Escape: GMFS/SCBAE			Swallow:	
Change:	N.R.					
Provide:	Eyewash (pH<2.5), Quick drench (pH<2.5)					
[Nitric acid]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, wet skin, nose,	Breath:	Eyes, skin, resp sys,
Eyes:	N.R.	100 ppm: SA, CF, CCRFS, PAPRS, GMFS, SA, SCBAF		throat, drow, uncon; methemo	Resp support	blood, CNS
Wash skin:	N.R.	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA				
Remove:	N.R.	Escape: GMFS/SCBAE				
Change:	N.R.					
[Nitric oxide]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, F.P., IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
p-Nitroaniline <chem>NO2C6H4NH2</chem> 100-01-6 BY7000000	para-Aminonitrobenzene, 4-Nitroaniline, 4-Nitrobenzenamine, p-Nitrophenylamine, PNA	NIOSH 3 mg/m ³ [skin] OSHA† 6 mg/m ³ (1 ppm) [skin]	300 mg/m ³	Bright yellow, crystalline powder with a slight, ammonia-like odor.	MW 138.1 BP: 630°F Sol: 0.08% F.P. 390°F IP: 8.85 eV	VP: 0.00002 mm MLT: 295°F UEL: ? LEL: ?	Strong oxidizers, strong reducers [Note: May result in spontaneous heating of organic materials in the presence of moisture]	Filter, 2-Propanol; HPLC/UV/D, III [#5033]
1661 55					Sp.Gr: 1.42 Combustible Solid			
Nitrobenzene <chem>C6H5NO2</chem> 98-95-3 DA6475000	Essence of mirbane, Nitrobenzol, Oil of mirbane	NIOSH/OSHA 1 ppm (5 mg/m ³) [skin]	200 ppm	Yellow, oily liquid with a pungent odor like paste shoe polish. [Note: A solid below 42°F.]	MW 123.1 BP: 411°F Sol: 0.2% F.P. 190°F IP: 9.92 eV	VP(77°F): 0.3 mm FRZ: 42°F UEL: ? LEL(200°F): 1.8%	Concentrated nitric acid, nitrogen tetroxide, caustics, phosphorus penta- chloride, chemically- active metals such as tin or zinc	Sig el, Methanol; GC/FID, III [#2005]
1662 55	1 ppm = 5.12 mg/m ³				Sp.Gr: 1.20 Class IIIA Combustible Liquid			
4-Nitrobiphenyl <chem>C6H4C6H4NO2</chem> 92-93-3 DV5600000	p-Nitrobiphenyl, p-Nitrodiphenyl, 4-Nitrodiphenyl, p-Phenylnitrobenzene, 4-Phenylnitrobenzene, PNB	NIOSH Ca See Appendix A OSHA(1910.1003) See Appendix B	Ca [N.D.]	White to yellow, crystalline solid with a sweet odor.	MW 199.2 BP: 644°F Sol: Insoluble F.P.: 290°F IP: 10.1 eV	VP: ? MLT: 237°F UEL: ? LEL: ?	Strong reducers	Filter/ Sig el(2), 2-Propanol, GC/FID, III(4) [P&CAM #273]
					Sp.Gr: ? Combustible solid			
p-Nitrochlorobenzene <chem>ClC6H4NO2</chem> 100-00-5 CZ1050000	p-Chloronitrobenzene, 4-Chloronitrobenzene, 1-Chloro-4-nitrobenzene, 4-Nitrochlorobenzene, PCNB, PNCB	NIOSH Ca See Appendix A [skin] OSHA 1 mg/m ³ [skin]	Ca [100 mg/m ³]	Yellow, crystalline solid with a sweet odor.	MW 157.6 BP: 468°F Sol: Slight F.P. 261°F IP: 9.96 eV	VP(86°F): 0.2 mm MLT: 182°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Sig el, Methanol, GC/FID; III [#2005, Nitro- benzenes]
1578 55					Sp.Gr: 1.52 Solid that does not burn, or burns with difficulty.			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Quick drench	NIOSH 30 mg/m ³ : SA* 75 mg/m ³ : SA/CF* 150 mg/m ³ : SCBAF/SAF 300 mg/m ³ : SAF/PD,PP §: SCBAF/PD,PP/SAF/PD,PP:ASCBA Escape: GMFOVDMFw/SCBAE	Inh Abs Ing Con	Irrit nose, throat; cyan, ataxia; lacr; tachypnea; dysp; irrity; vomit, diarr; convuls; resp arrest; anemia; methemo; jaundice	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Resp sys, blood, heart, liver
[p-Nitroaniline]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact N.R. When wet or contam Daily Quick drench	NIOSH/OSHA 10 ppm: CCROV*/SA* 25 ppm: SA/CF*/PAPROV* 50 ppm: CCRFOV/GMFOV/PAPRTOV*/ SCBAF/SAF 200 ppm: SAF/PD,PP §: SCBAF/PD,PP/SAF/PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrite eyes, skin, anoxia; derm; anemia; methemo; in animals: liver, kidney damage; testicular effects	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, blood, liver, kidneys CVS, repro sys
[Nitrobenzene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH §: SCBAF/PD,PP/SAF/PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, leth, dizz; dysp, ataxia, weak; methemo; urinary burning; acute hemorrhagic cystitis; [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Bladder, blood [in animals: bladder tumors]
[4-Nitrobiphenyl]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH §: SCBAF/PD,PP/SAF/PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Anoxia, unpleasant taste; anemia, methemo; in animals: hema, hemog; spleen, kidney, bone marrow changes; repro effects; [carc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Blood, liver, kidneys, CVS, spleen, bone marrow, repro sys [in animals: vascular & liver tumors]
[p-Nitrochlorobenzene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Nitroethane <chem>CH3CH2NO2</chem> 79-24-3 K15600000	Nitroetan	NIOSH/OSHA 100 ppm (310 mg/m ³)	1000 ppm	Colorless, oily liquid with a mild, fruity odor.	MW 75.1 BP 237°F Sol 5% Fl.P. 82°F IP 10.88 eV	VP(77°F): 21mm FRZ: -130°F UEL ? LEL 3.4%	Amines, strong acids, alkalis & oxidizers hydrocarbons, combustibles, metal oxides	XAD-2(2), Ethyl acetate, GC/FID, III [#2526]
2842 26	1 ppm = 3.12 mg/m ³				Sp Gr: 1.05 Class IC Flammable Liquid			
Nitrogen dioxide <chem>NO2</chem> 10102-44-0 QW9800030	Dinitrogen tetroxide (N ₂ O ₄), Nitrogen peroxide	NIOSH ST 1 ppm (1.8 mg/m ³) OSHA† C 5 ppm (9 mg/m ³)	20 ppm	Yellowish-brown liquid or reddish- brown gas (above 70°F) with a pun- gent, acid odor. [Note: In solid form (below 15°F) it is found structurally as N ₂ O ₄ .]	MW 46.0 BP 70°F Sol Reacts Fl.P. NA IP 9.75 eV Sp Gr: 1.44 (Liquid at 68°F) RGasD: 2.62 Noncombustible Liquid/Gas, but will accelerate the burning of combustible materials	VP 720 mm FRZ 15°F UEL NA LEL NA	Combustible material, water, chlorinated hydrocarbons, carbon disulfide, ammonia [Note: Reacts with water to form nitric acid.]	Palmer Tube, Reagent; V/s, III [#6700]
1067 20	1 ppm = 1.91 mg/m ³							
Nitrogen trifluoride <chem>NF3</chem> 7783-54-2 QX1925000	Nitrogen fluoride, Trifluoramine, Trifluorammonia	NIOSH/OSHA 10 ppm (29 mg/m ³)	1000 ppm	Colorless gas with a moldy odor. [Note: Shipped as anonliquefied compressed gas.]	MW 71.0 BP -200°F Sol: Slight Fl.P. NA IP 12.97 eV	VP >1 atm FRZ -340°F UEL NA LEL NA	Water, oil, grease, oxidizable materials, ammonia carbon monoxide, methane, hydrogen, hydrogen sulfide, activated charcoal, diborane	None available
2451 15	1 ppm = 2.95 mg/m ³				RGasD: 2.46 Nonflammable Gas			
Nitroglycerine <chem>CH3NO2CHNO2CH2NO2</chem> 55-63-0 QX2100000 1204 26 (1% soln. in alcohol) 3064 26 (1-5% soln. in alcohol)	Glyceryl trinitrate, NG, 1,2,3-Propanetriol trinitrate, Trinitroglycerine	NIOSH ST 0.1 mg/m ³ [skin] OSHA† C 0.2 ppm (2 mg/m ³) [skin]	75 mg/m ³	Colorless to pale- yellow, viscous liquid or solid (below 56°F) [Note: An explosive ingredient in dynamite (20-40%) with ethylene glycol dinitrate (80-60%).]	MW 227.1 BP Begins to decompose at 122-140°F Sol 0.1% Fl.P. Explodes IP ? Sp Gr: 1.60 Explosive Liquid	VP 0.0003 mm FRZ 56°F UEL ? LEL ?	Heat, ozone, shock, acids [Note: An OSHA Class A Explosive (1910.109).]	Tenax GC, Ethanol, GC/ECD, III, [#2507]
	1 ppm = 9.44 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Derm:	Eye	Skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm SCBAF/SAF	Ing	in animals: lac, dysp,	Irr immed	CNS, kidneys,
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con	pulm rales, edema, liver,	Soap wash prompt	liver
Remove:	When wet (flamm)	Escape SCBAE		kidney inj; narco	Resp support	
Change:	N.R.				Medical attention immed	
[Nitroethane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat;	Eye	Eyes, resp sys, CVS
Eyes:	Prevent eye contact	20 ppm: SA:CF*/SCBAF/SAF	Ing	cough, mucoid frothy	Skin	
Wash skin:	When contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con	sputum, decr pulm func,	Breath	
Remove:	When wet or contam	Escape GMFS/SCBAE		chronic bron, dysp chest	Swallow	
Change:	N.R.			pain, pulm edema, cyan,		
Provide:	Eyewash, Quick drench			tachypnea, tacer		
[Nitrogen dioxide]						
Skin:	N.R.	NIOSH/OSHA	Inh	In animals: anoxia, cyan,	Breath	Blood, liver, kidneys
Eyes:	N.R.	100 ppm: CCRS/SA		methemo, weak, dizz,	Resp support	
Wash skin:	N.R.	250 ppm: SA:CF/PAPRS		head, liver, kidney inj		
Remove:	N.R.	500 ppm: CCRFS/GMFS/PAPRTS*/				
Change:	N.R.	SAT:CF*/SCBAF/SAF				
		1000 ppm: SAF:PD, PP				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape GMFS/SCBAE				
[Nitrogen trifluoride]						
Skin:	Prevent skin contact	NIOSH	Inh	Throb head, dizz, nau,	Eye	CVS, blood, skin,
Eyes:	Prevent eye contact	1 mg/m ³ : SA*	Abs	vomit, abdom pain;	Skin:	CNS
Wash skin:	When contam	2.5 mg/m ³ : SA:CF*	Ing	hypotension; flush;	Breath:	
Remove:	When wet (flamm)	5 mg/m ³ : SAT:CF*/SCBAF/SAF	Con	palp, methemo; delirium,	Swallow	
Change:	Daily	75 mg/m ³ : SAF:PD, PP		CNS depres; angina,		
Provide:	Quick drench	§ SCBAF PD, PP/SAF PD, PP ASCBA		skin irrit		
		Escape GMFOVH/E/SCBAE				
[Nitroglycerine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Nitromethane <chem>CH3NO2</chem> 75-52-5 PA9800000	Nitrocarbol	NIOSH See Appendix D OSHA 100 ppm (250 mg/m ³)	750 ppm	Colorless, oily liquid with a disagreeable odor.	MW: 61.0 BP: 214°F Sol: 10% FLP: 95°F IP: 11.08 eV	VP: 28 mm FRZ: -20°F UEL: ? LEL: 7.3%	Amines; strong acids, alkalis & oxidizers; hydrocarbons & other combustible materials; metallic oxides [Note: Slowly corrodes steel & copper when wet.]	Chrom-106; Ethyl acetate; GC/FPD; III [#2527]
1261 26	1 ppm = 2.54 mg/m ³				Sp Gr: 1.14 Class IC Flammable Liquid			
2-Nitronaphthalene <chem>C10H7NO2</chem> 581-89-5 QJ9760000	β-Nitronaphthalene	NIOSH Ca* See Appendix A [*Note: Since metabolized to β-Naphthylamine.] OSHA none	Ca [N.D.]	Colorless solid.	MW: 178.2 BP: ? Sol: Insoluble FLP: ? IP: 8.67 eV	VP: ? MLT: 174°F UEL: ? LEL: ?	For "Nitrates" in general: Aluminum, cyanides, esters, phosphorus, tin chlorides, thiocyanates, sodium hypophosphite	None available
1-Nitropropane <chem>CH3CH2CH2NO2</chem> 108-03-2 TZ5075000	Nitropropane, 1-NP	NIOSH/OSHA 25 ppm (90 mg/m ³)	1000 ppm	Colorless liquid with a somewhat disagreeable odor.	MW: 89.1 BP: 269°F Sol: 1% FLP: 96°F IP: 10.61 eV	VP: 8 mm FRZ: -162°F UEL: ? LEL: 2.2%	Amines; strong acids, alkalis & oxidizers, hydrocarbons & other combustible materials; metal oxides	XAD-4; CS; GC/NPD; OSHA [#46]
2608 26	1 ppm = 3.70 mg/m ³				Sp Gr: 1.00 Class IC Flammable Liquid			
2-Nitropropane <chem>(CH3)2CHNO2</chem> 79-46-9 TZ5250000	Dimethylnitromethane, iso-Nitropropane, 2-NP	NIOSH Ca See Appendix A OSHA† 25 ppm (90 mg/m ³)	Ca [100 ppm]	Colorless liquid with a pleasant, fruity odor.	MW: 89.1 BP: 249°F Sol: 2% FLP: 75°F IP: 10.71 eV	VP: 13 mm FRZ: -135°F UEL: 11.0% LEL: 2.6%	Amines; strong acids, alkalis & oxidizers, metal oxides; combustible materials	Chrom-106; Ethyl acetate; GC/FID; III [#2528]
2608 26	1 ppm = 3.70 mg/m ³				Sp Gr: 0.99 Class IC Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	OSHA	Inh	Derm:	Eye:	Eyes, skin, CNS, liver
Eyes:	Prevent eye contact	750 ppm: SA:CF*/SCBAF/SAF	Ing	in animals: irrit eyes, resp	Skin:	
Wash skin:	When contam	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Con	sys; convuls, narco; liver damage	Breath:	
Remove:	When wet (flamm)	Escape: SCBAE			Swallow:	
Change:	N.R.					
[Nitromethane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit skin, resp sys;	Eye:	Skin, resp sys [bladder cancer]
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Abs	derm; [carc]	Skin:	
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[2-Nitronaphthalene]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes; head, nau,	Eye:	Eyes, CNS, liver, kidneys
Eyes:	Prevent eye contact	250 ppm: SA*	Ing	vomit, diarr,	Skin:	
Wash skin:	N.R.	625 ppm: SA:CF*	Con	in animals: liver, kidney damage	Breath:	
Remove:	When wet (flamm)	1000 ppm: SCBAF/SAF			Swallow:	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA				
		Escape: SCBAE				
[1-Nitropropane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys, CNS, kidneys, liver [in animals: liver tumors]
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP,ASCBA	Ing	resp sys; head, anor, nau,	Skin:	
Wash skin:	When contam	Escape: SCBAE	Con	vomit, diarr; kidney, liver damage; [carc]	Breath:	
Remove:	When wet (flamm)				Swallow:	
Change:	N.R.					
[2-Nitropropane]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
N-Nitrosodimethylamine (CH ₃) ₂ N ₂ O 62-75-9 IQ0525000	Dimethylnitrosamine, N,N-Dimethylnitrosamine, DMNA; N-Methyl-N-nitroso- methanamine; NDMA; N-Nitroso-N,N-dimethylamine	NIOSH Ca See Appendix A OSHA (1910.1016) See Appendix B	Ca [N.D.]	Yellow, oily liquid with a faint, character- istic odor	MW 74.1 BP 306°F Sol. Soluble Fl.P. ? IP 8.69 eV	VP 3 mm FRZ ? UEL ? LEL ?	Strong oxidizers [Note: Should be stored in dark bottles]	T-Sorb, Methanol/ CH ₃ Cl, GC/FID, III [#2522]
	1 ppm = 3.08 mg/m ³				Sp Gr 1.005 Combustible Liquid			
o-Nitrotoluene NO ₂ C ₆ H ₄ CH ₃ 88-72-2 XT3150000	o-Methylnitrobenzene, 2-Methylnitrobenzene, ortho-Nitrotoluene, 2-Nitrotoluene	NIOSH 2 ppm (11 mg/m ³) [skin] OSHA† 5 ppm (30 mg/m ³) [skin]	200 ppm	Yellow liquid with a weak, aromatic odor. [Note: A solid below 25°F.]	MW 137.1 BP 432°F Sol 0.07% Fl.P. 223°F IP 9.43 eV	VP 0.1 mm FRZ 25°F UEL ? LEL 2.2%	Strong oxidizers, sulfuric acid	Si gel, Methanol, GC/FID, III [#2005, Nitro- benzenes]
	1 ppm = 5.70 mg/m ³				Sp Gr 1.16 Class IIIB Combustible Liquid			
m-Nitrotoluene NO ₂ C ₆ H ₄ CH ₃ 99-08-1 XT2975000	m-Methylnitrobenzene, 3-Methylnitrobenzene, meta-Nitrotoluene, 3-Nitrotoluene	NIOSH 2 ppm (11 mg/m ³) [skin] OSHA† 5 ppm (30 mg/m ³) [skin]	200 ppm	Yellow liquid with a weak, aromatic odor. [Note: A solid below 59°F.]	MW 137.1 BP 450°F Sol 0.05% Fl.P. 223°F IP 9.48 eV	VP 0.1 mm FRZ 59°F UEL ? LEL 1.6%	Strong oxidizers, sulfuric acid	Si gel, Methanol, GC/FID, III [#2005, Nitro- benzenes]
	1 ppm = 5.70 mg/m ³				Sp Gr 1.16 Class IIIB Combustible Liquid			
p-Nitrotoluene NO ₂ C ₆ H ₄ CH ₃ 99-99-0 XT3325000	p-Methylnitrobenzene, 4-Methylnitrobenzene, para-Nitrotoluene, 4-Nitrotoluene	NIOSH 2 ppm (11 mg/m ³) [skin] OSHA† 5 ppm (30 mg/m ³) [skin]	200 ppm	Crystalline solid with a weak, aromatic odor.	MW 137.1 BP 460°F Sol 0.04% Fl.P. 223°F IP 9.50 eV	VP 0.1 mm MLT 126°F UEL ? LEL 1.6%	Strong oxidizers, sulfuric acid	Si gel, Methanol, GC/FID, III [#2005, Nitro- benzenes]
	1 ppm = 5.70 mg/m ³				Sp Gr 1.12 Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Nau, vomit, diarr,	Eye	Liver, kidneys,
Eyes:	Prevent eye contact	W SCBAF PD, PP/SAF PD, PP ASCBA	Abs	abdom cramps; head,	Skin	lungs
Washskin:	When contam/Daily	Escape: HIEF/SCBAE	Ing	fever, enlarged liver,	Breath	[in animals:
Remove:	When wet or contam		Con	jaur, dect liver, kidney,	Swallow	lung, kidney,
Change:	Daily			pulmfunc; [carc]		liver & nasal
Provide:	Eyewash, Quick drench					cavity tumors]
[N-Nitrosodimethylamine]						
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan, head,	Eye	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm: SA*	Abs	weak, dizz, ataxia,	Skin	skin, GI tract
Washskin:	When contam	50 ppm: SA, CF*	Ing	dysp, tacar, nau, vomit	Breath	
Remove:	When wet or contam	100 ppm: SAT, CF*/SCBAF/SAF	Con		Swallow	
Change:	N.R.	200 ppm: SAF PD, PP				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOVHIE/SCBAE				
[o-Nitrotoluene]						
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan; head,	Eye	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm: SA*	Abs	weak, dizz; ataxia;	Skin	skin, GI tract
Washskin:	When contam	50 ppm: SA, CF*	Ing	dysp, tacar; nau, vomit	Breath	
Remove:	When wet or contam	100 ppm: SAT, CF*/SCBAF/SAF	Con		Swallow	
Change:	N.R.	200 ppm: SAF PD, PP				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOVHIE/SCBAE				
[m-Nitrotoluene]						
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan, head,	Eye	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm: SA*	Abs	weak, dizz; ataxia;	Skin	skin, GI tract
Washskin:	When contam	50 ppm: SA, CF*	Ing	dysp, tacar; nau, vomit	Breath	
Remove:	When wet or contam	100 ppm: SAT, CF*/SCBAF/SAF	Con		Swallow	
Change:	Daily	200 ppm: SAF PD, PP				
		§ SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOVHIE/SCBAE				
[p-Nitrotoluene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Nitrous oxide N_2O 10024-97-2 QX1350000 1070 14 (compressed) 2201 23 (cryogenic liquid)	Dinitrogen monoxide, Hyponitrous acid anhydride, Laughing gas 1 ppm = 1.83 mg/m ³	NIOSH* 25 ppm (46 mg/m ³) (TWA over the time exposed) [Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Colorless gas with a slightly sweet odor. [Inhalation anesthetic] [Note: Shipped as a liquefied compressed gas.]	MW: 44.0 BP: -127°F Sol(77°F): 0.1% F.P.: NA IP: 12.89 eV RGasD: 1.53 Nonflammable Gas, but supports combustion at elevated temperatures.	VP: 51.3 atm FRZ: -132°F UEL: NA LEL: NA	Aluminum, boron, hydrazine, lithium hydride, phosphine, sodium	Bag; none; IR; III [#5600]
Nonane $CH_3(CH_2)_7CH_3$ 111-84-2 RA6115000 1920 27	n-Nonane, Nonylhydride 1 ppm = 5.33 mg/m ³	NIOSH 200 ppm (1050 mg/m ³) OSHA† none	N.D.	Colorless liquid with a gasoline- like odor.	MW: 128.3 BP: 303°F Sol: insoluble F.P.: 88°F IP: 10.21 eV	VP: 3 mm FRZ: -60°F UEL: 2.9% LEL: 0.8%	Strong oxidizers (e.g., peroxides, nitrates, perchlorates)	None available
1-Nonanethiol $CH_3(CH_2)_7SH$ 1455-21-6	1-Mercaptononane, n-Nonylmercaptan, Nonylthiol 1 ppm = 6.66 mg/m ³	NIOSH C 0.5 ppm (3.3 mg/m ³) [15-min] OSHA none	N.D.	Liquid.	MW: 160.3 BP: ? Sol: insoluble F.P.: ? IP: ?	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
Octachloronaphthalene $C_{10}Cl_8$ 2234-13-1 QK0250000	Halowax® 1051: 1,2,3,4,5,6,7,8-Octa- chloronaphthalene; Perchloronaphthalene	NIOSH 0.1 mg/m ³ ST 0.3 mg/m ³ [skin] OSHA† 0.1 mg/m ³ [skin]	Unknown	Waxy, pale-yellow solid with an aromatic odor.	MW: 403.7 BP: 770°F Sol: Insoluble F.P.: NA IP: ?	VP: <1 mm MLT: 365°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/FID; II(2) [#597]
					Sp.Gr: 2.00 Noncombustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite		TBAL	Inh Con (liq)	Dysp; drow, head; asphy; repro effects; liq; frostbite	Eye: Skin: Breath:	Frostbite Frostbite Fresh air	Resp sys, CNS, repro sys
[Nitrous oxide]							
Skin: N.R. Eyes: Prevent eye contact Wash skin: Daily Remove: When wet (flamm) Change: N.R. Provide: Eyewash		TBAL	Inh Ing Con	Irrite eyes, skin, nose, throat; head, drow, dizz, conf, nau, tremor, inco; dysp; chemical pneu (aspir liq)	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Nonane]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrite eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, blood, CNS
[1-Nonanethiol]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily		NIOSH/OSHA 1 mg/m ³ : SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVH/E/SCBAE	Inh Abs Ing Con	Acne-form derm, liver damage, jaun	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Skin, liver
[Octachloronaphthalene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1-Octadecanethiol $\text{CH}_3(\text{CH}_2)_{16}\text{SH}$ 2885-00-9	1-Mercaptooctadecane, Octadecyl mercaptan, Stearyl mercaptan	NIOSH C 0.5 ppm (5.9 mg/m ³) [15-min] OSHA none	N.D.	Solid or liquid (above 77°F).	MW: 286.6 BP: ? Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 0.85 Combustible Solid Combustible Liquid	VP: ? MLT: 77°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
1 ppm = 11.91 mg/m ³								
Octane $\text{CH}_3(\text{CH}_2)_6\text{CH}_3$ 111-65-9 RG8400000	n-Octane, normal-Octane	NIOSH 75 ppm (350 mg/m ³) C 385 ppm (1800 mg/m ³) [15-min] OSHA† 500 ppm (2350 mg/m ³)	1000 ppm [LEL]	Colorless liquid with a gasoline- like odor	MW 114.2 BP 258°F Sol(77°F): 0.00007% Fl.P 56°F IP 9.82 eV Sp.Gr: 0.70 Class IB Flammable Liquid	VP 10 mm FRZ -70°F UEL 6.5% LEL 1.0%	Strong oxidizers	Char. CS, GC/FID. III [#1500, Hydro- carbons]
1262 27	1 ppm = 4.75 mg/m ³							
1-Octanethiol $\text{CH}_3(\text{CH}_2)_7\text{SH}$ 111-88-6	1-Mercaptooctane, n-Octyl mercaptan, Octylthiol, 1-Octylthiol	NIOSH C 0.5 ppm (3.0 mg/m ³) [15-min] OSHA none	N.D.	Water-white liquid with a mild odor.	MW: 146.3 BP: 390°F Sol: Insoluble Fl.P(oc): 115°F IP: ? Sp.Gr: 0.84 Class II Combustible Liquid	VP(212°F): 3 mm FRZ: -57°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	Tenax GC; Acetone; GC/FPD; III [#2510]
1 ppm = 6.08 mg/m ³								
Oil mist (mineral) 8012-95-1 PY8030000	Heavy mineral oil mist, Paraffin oil mist, White mineral oil mist	NIOSH 5 mg/m ³ ST 10 mg/m ³ OSHA 5 mg/m ³	2500 mg/m ³	Colorless, oily liquid aerosol dispersed in air. [Note: Has an odor like burned lubricating oil.]	MW Varies BP: 680°F Sol: Insoluble Fl.P(oc): 380°F IP: ? Sp.Gr: 0.90 Class IIIB Combustible Liquid	VP: <0.5 mm FRZ 0°F UEL ? LEL ?	None reported	Filter, CFC-113, IR, III [#5026]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA/CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, resp sys; head, dizz, weak, cyan, nau, convuls	Eye:	Eyes, skin, resp sys, CNS, blood
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	Daily				Irrimmed Soap wash immed Resp support Medical attention immed	
[1-Octadecanethiol]						
Skin:	Prevent skin contact	NIOSH 750 ppm SA* 1000 ppm: SA/CF*/SCBAF/SAF §: SCBAF PD PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, nose, drow dem, chemical pneu (aspir liq); in animals: narco	Eye	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact		Ing		Skin	
Wash skin:	When contam		Con		Breath	
Remove:	When wet (flamm)				Swallow	
Change:	N.R.				Irrimmed Soap wash immed Resp support Medical attention immed	
[Octane]						
Skin:	Prevent skin contact	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA/CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh	Irrit eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye:	Eyes, skin, resp sys, blood, CNS
Eyes:	Prevent eye contact		Ing		Skin:	
Wash skin:	When contam		Con		Breath:	
Remove:	When wet or contam				Swallow:	
Change:	N.R.				Irrimmed Soap wash immed Resp support Medical attention immed	
[1-Octanethiol]						
Skin:	Prevent skin contact	NIOSH/OSHA 50 mg/m ³ HiE/SA 125 mg/m ³ SA/CF/PAPRHiE 250 mg/m ³ HiEF/SAT CF/PAPRTHiE/ SCBAF/SAF 2500 mg/m ³ SA:PD,PP §: SCBAF PD,PP/SAF PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Irrit eyes, skin, resp sys	Skin	Eyes, skin, resp sys
Eyes:	N.R.		Con		Breath:	
Wash skin:	When contam				Soap wash	
Remove:	When wet or contam				Fresh air	
Change:	Daily					
[Oil mist (mineral)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, F.P., IP, Sp. Gr., flammability	VP, FRZ, UEL, LEL		
Osmium tetroxide (as Os) OsO ₄ 20816-12-0 RN1140000	Osmic acid anhydride, Osmium oxide	NIOSH 0.002 mg/m ³ (0.0002 ppm) ST 0.006 mg/m ³ (0.0006 ppm) OSHA† 0.002 mg/m ³	1 mg/m ³ (as Os)	Colorless, crystalline solid or pale-yellow mass with an unpleasant, acrid, chlorine-like odor. [Note: A liquid above 105°F.]	MW: 254.2 BP: 266°F Sol(77°F): 6% F.P. NA IP: 12.60 eV	VP: 7 mm MLT: 105°F UEL: NA LEL: NA	Hydrochloric acid, easily oxidized organic materials [Note: Begins to sublime below BP. Contact with other materials may cause fire.]	None available
2471 55	1 ppm = 10.57 mg/m ³				Sp Gr: 5.10 Noncombustible Solid			
Oxalic acid HOOC-COOH-2H ₂ O 144-62-7 RD2450000	Ethanedioic acid, Oxalic acid (aqueous), Oxalic acid dihydrate	NIOSH 1 mg/m ³ ST 2 mg/m ³ OSHA† 1 mg/m ³	500 mg/m ³	Colorless, odorless powder or granular solid. [Note: The anhydrous form (COOH) ₂ is an odorless, white solid.]	MW: 126.1 BP: Sublimes Sol: 14% F.P. ? IP: ? Sp Gr: 1.90 Combustible Solid	VP: <0.001 mm MLT: 215°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers, silver compounds, strong alkalis, chlorites [Note: Gives off water of crystallization at 215°F and begins to sublime.]	None available
Oxygen difluoride OF ₂ 7783-41-7 RS2100000	Difluorine monoxide, Fluorine monoxide, Oxygen fluoride	NIOSH C 0.05 ppm (0.1 mg/m ³) OSHA† 0.05 ppm (0.1 mg/m ³)	0.5 ppm	Colorless gas with a peculiar, foul odor. [Note: Shipped as a nonliquefied compressed gas.]	MW: 54.0 BP: -230°F Sol: 0.02% F.P. NA IP: 13.11 eV RGasD: 1.88 Nonflammable Gas, but a strong oxidizer	VP: >1 atm FRZ: -371°F UEL: NA LEL: NA	Combustible materials, chlorine, bromine, iodine, platinum, metal oxides, moist air, hydrogen sulfide, hydrocarbons, water. [Note: Reacts very slowly with water to form hydrofluoric acid.]	None available
Ozone O ₃ 10028-15-6 RS8225000	Triatomic oxygen	NIOSH C 0.1 ppm (0.2 mg/m ³) OSHA† 0.1 ppm (0.2 mg/m ³)	5 ppm	Colorless to blue gas with a very pungent odor.	MW: 48.0 BP: -169°F Sol(32°F): 0.001% F.P. NA IP: 12.52 eV RGasD: 1.66 Nonflammable Gas, but a powerful oxidizer	VP: >1 atm FRZ: -315°F UEL: NA LEL: NA	All oxidizable materials (both organic & inorganic)	Imp; Reagent, Vis, IR(1) [P&CAM #154]
	1 ppm = 2.00 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, resp sys; lac,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.1 mg/m ³ : CCRFSH/E/GMFSH/E/	Ing	vis dist. con; head;	Skin:	
Wash skin:	When contam	SCBAF/SAF	Con	cough, dysp; derm	Breath:	
Remove:	When wet or contam	1 mg/m ³ : SAF/PD,PP			Swallow:	
Change:	Daily	§: SCBAF/PD,PP/SAF/PD,PP:ASCBA				
Provide:	Eyewash	Escape: GMFSH/E/SCBAE				
[Osmium tetroxide (as Os)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 mg/m ³ : SA:CF/PAPRDM ⁴	Ing	eye burns; local pain,	Skin:	kidneys
Wash skin:	When contam	50 mg/m ³ : HIEF/SCBAF/SAF	Con	cyan; shock, collapse,	Breath:	
Remove:	When wet or contam	500 mg/m ³ : SAF/PD,PP		convuls; kidney damage	Swallow:	
Change:	Daily	§: SCBAF/PD,PP/SAF/PD,PP:ASCBA				
Provide:	Eyewash	Escape: HIEF/SCBAE				
[Oxalic acid]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	N.R.	0.5 ppm: SA/SCBAF	Con	head; pulm edema; eye,	Skin:	
Wash skin:	N.R.	§: SCBAF/PD,PP/SAF/PD,PP:ASCBA		skin burns (from contact	Breath:	
Remove:	N.R.	Escape: GMFS/SCBAE		with the gas under pressure)		
Change:	N.R.					
[Oxygen difluoride]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, muc memb;	Eye:	Eyes, resp sys
Eyes:	N.R.	1 ppm: CCRS/SA	Con	pulm edema; chronic	Breath:	
Wash skin:	N.R.	2.5 ppm: SA:CF/PAPRS ⁴		resp disease		
Remove:	N.R.	5 ppm: CCRFS/4/GMFS/4/SAT:CF/				
Change:	N.R.	SCBAF/SAF				
		§: SCBAF/PD,PP/SAF/PD,PP:ASCBA				
		Escape: GMFS/SCBAE				
[Ozone]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Paraffin wax fume C_nH_{2n+2} 8002-74-2 RV0350000	Paraffin fume, Paraffin scale fume	NIOSH 2 mg/m ³ OSHA† none	N.D.	Paraffin wax is a white to slightly yellowish, odorless solid. [Note: Consists of a mixture of high molecular weight hydrocarbons (e.g., $C_{24}H_{50}$).]	MW: 350-420 BP: ? Sol: Insoluble Fl.P: 390°F IP: ? Sp.Gr: 0.88-0.92 Combustible Solid	VP: ? MLT: 115-154°F UEL: ? LEL: ?	None reported	None available
Paraquat (Paraquat dichloride) $CH_3(C_4H_4N)_2CH_3 \cdot 2Cl$ 1910-42-5 DW2275000	1,1'-Dimethyl-4,4'- bipyridinium dichloride, N,N'-Dimethyl-4,4'- bipyridinium dichloride, Paraquat chloride, Paraquat dichloride [Note: Paraquat is a cation ($C_{12}H_{14}N_2^{+}$); the commercial product is the dichloride salt of paraquat.]	NIOSH 0.1 mg/m ³ (resp) [skin] OSHA† 0.5 mg/m ³ (resp) [skin]	1 mg/m ³	Yellow solid with a faint, ammonia- like odor. [herbicide]	MW 257.2 BP: Decomposes Sol Miscible Fl.P. NA IP: ? Sp Gr 1.24 Noncombustible Solid	VP: <0.0000001 mm MLT: 572°F (Decomposes) [Note: Corrosive to metals. Decomposes in presence of ultraviolet light.] UEL: NA LEL: NA	Strong oxidizers, alkylaryl-sulfonate wetting agents [Note: Corrosive to metals. Decomposes in presence of ultraviolet light.]	Filter, Water, HPLC/UVD, III [#5003]
Parathion $(C_4H_9O)_2P(S)OC_6H_4NO_2$ 56-38-2 TF4550000 2783 55 (liquid/dry) 2784 28 (flammable liquid)	O,O-Diethyl-O(p-nitrophenyl) phosphorothioate; Diethyl parathion; Ethyl parathion; Parathion-ethyl 1 ppm = 12.11 mg/m ³	NIOSH 0.05 mg/m ³ [skin] OSHA 0.1 mg/m ³ [skin]	10 mg/m ³	Pale-yellow to dark-brown liquid with a garlic- like odor. [Note: A solid below 43°F. Pesticide that may be absorbed on a dry carrier.]	MW 291.3 BP: 707°F Sol: 0.001% Fl.P(oc): 392°F IP: ? Sp.Gr 1.27 Class IIIB Combustible Liquid	VP: 0.00004 mm FRZ: 43°F UEL: ? LEL: ?	Strong oxidizers, alkaline materials	Filter, isooctane, GC/FPD, III [#5012]
Particulates not otherwise regulated	"Inert" dusts, Nuisance dusts, PNOR [Note: Includes all inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically in 1910.1000.]	NIOSH See Appendix D OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Dusts from solid substances without specific occupational exposure standards.	Properties vary depending upon the specific solid.		Varies	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0500 (resp)]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con	discomfort, nau	Breath:	Resp support	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Paraffin wax fume]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye	Irrimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 mg/m ³ : CCROVDMFu*/PAPROVDMFu*/	Abs	throat, resp sys; epis;	Skin	Water flush immed	heart, liver,
Wash skin:	When contam	SA*/SCBAF	Ing	derm, fingernail damage,	Breath	Resp support	kidneys, GI tract
Remove:	When wet or contam	§ SCBAF: PD, PP/SAF, PD, PP, ASCBA	Con	irrit GI tract, heart,	Swallow	Medical attention	
Change:	N.R.	Escape: GMFOVHIE/SCBAE		liver, kidney damage		immed	
Provide:	Quick drench						
[Paraquat]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	0.5 mg/m ³ : CCROVDMFu/SA	Abs	miosis, rhin, head, chest	Skin	Soap wash immed	CNS, CVS, blood chol
Wash skin:	When contam	1.25 mg/m ³ : SA, CF/PAPROVDMFu	Ing	tight, wheez, lar spasm,	Breath	Resp support	
Remove:	When wet or contam	2.5 mg/m ³ : CCRFOVHIE/SAT, CF/	Con	saliv, cyan, anor, nau,	Swallow	Medical attention	
Change:	Daily	PAPRTOVHIE/SCBAF/SAF		vomit, abdom cramps, diarr,		immed	
Provide:	Eyewash, Quick drench	10 mg/m ³ : SA, PD, PP		sweat, musc fasc, weak,			
		§ SCBAF: PD, PP/SAF, PD, PP, ASCBA		para, gidd, conf, ataxia,			
		Escape: GMFOVHIE/SCBAE		convuls, coma, low BP;			
				card irreg			
[Parathion]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, throat,	Eye:	Irrimmed	Eyes, skin, resp sys
Eyes:	N.R.		Con	upper resp sys	Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Paraculates not otherwise regulated]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Pentaborane B_5H_9 19624-22-7 RY8925000	Pentaboron nonahydride	NIOSH 0.005 ppm (0.01 mg/m ³) ST 0.015 ppm (0.03 mg/m ³) OSHA† 0.005 ppm (0.01 mg/m ³)	1ppm	Colorless liquid with a pungent odor like sour milk.	MW: 63.1 BP: 140°F Sol: Reacts Fl.P: 86°F IP: 9.90 eV Sp.Gr: 0.62 Class IC Flammable Liquid	VP: 171 mm FRZ: -52°F UEL: ? LEL: 0.42%	Oxidizers, halogens, water, halogenated hydrocarbons [Note: May ignite SPONTANEOUSLY in moist air. Corrosive to natural rubber. Hydrolyzes slowly with heat in water to form boric acid.]	None available
1380 75	1 ppm = 2.62 mg/m ³							
Pentachloroethane $CHCl_2CCl_2$ 76-01-7 KI6300000	Ethane pentachloride, Pentalin	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes) OSHA none	N.D.	Colorless liquid with a sweetish, chloroform-like odor.	MW: 202.3 BP: 322°F Sol: 0.05% Fl.P: ? IP: 11.28 eV Sp.Gr: 1.68 Combustible Liquid	VP: 3 mm MLT: -20°F UEL: ? LEL: ?	(Sodium-potassium alloy + bromoform), alkalis, metals, water [Note: Hydrolysis produces dichloro- acetic acid. Reaction with alkalis & metals produces spontaneously explosive chloroacetylenes.]	Porapak; Hexane; GC/ECD; III [#2517]
1669 55	1 ppm = 8.41 mg/m ³							
Pentachloronaphthalene $C_{10}H_2Cl_6$ 1321-64-8 QK0300000	Halowax® 1013; 1,2,3,4,5-Pentachloro- naphthalene	NIOSH/OSHA 0.5 mg/m ³ [skin]	Unknown	Pale-yellow or white solid or powder with an aromatic odor.	MW: 300.4 BP: 636°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 1.67 Noncombustible Solid	VP: <1 mm MLT: 248°F UEL: NA LEL: NA	Strong oxidizers	Filter/Bub; Isocane; GC/ECD; II(2) [#596]
Pentachlorophenol C_6Cl_5OH 87-86-5 SM6300000	PCP; Penta; 2,3,4,5,6-Pentachlorophenol	NIOSH/OSHA 0.5 mg/m ³ [skin]	2.5 mg/m ³	Colorless to white, crystalline solid with a benzene-like odor. [fungicide]	MW: 266.4 BP: 588°F (Decomposes) Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 1.98 Noncombustible Solid	VP(77°F): 0.0001 mm MLT: 374°F UEL: NA LEL: NA	Strong oxidizers, acids, alkalis	Filter/Bub; Methanol; HPLC/UVD; III [#5512]
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Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp. G, flammability	VP, FRZ UEL, LEL		
Pentaerythritol <chem>C(CH2OH)4</chem> 115-77-6 RZ2490000	2,2-bis(Hydroxymethyl)- 1,3-propanediol; Methane tetramethylol; Monopentaerythritol; PE; Tetrahydroxymethylmethane; Tetramethylolmethane	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Colorless to white, crystalline, odorless powder. [Note: Technical grade is 88% monopentaerythri- tol & 12% dipen- taerythritol.]	MW: 136.2 BP: Sublimes Sol(59°F): 6% FLP: ? IP: ? Sp.Gr: 1.38 Combustible Solid	VP: 0 mm (approx) MLT: 500°F (Sublimes) UEL: ? LEL: ?	Organic acids, oxidizers [Note: Explosive compound is formed when a mixture of PE & thiophosphoryl chloride is heated.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
n-Pentane <chem>CH3(CH2)3CH3</chem> 109-66-0 RZ9450000	Pentane normal-Pentane	NIOSH 120 ppm (350 mg/m ³) C 610 ppm (1800 mg/m ³) [15-min] OSHA† 1000 ppm (2950 mg/m ³)	1500 ppm [LEL]	Colorless liquid with a gasoline- like odor [Note: A gas above 97°F May be utilized as a fuel.]	MW: 72.2 BP: 97°F Sol: 0.04% FLP: -57°F IP: 10.34 eV Sp.Gr: 0.63 Class IA Flammable Liquid	VP: 420 mm FRZ: -202°F UEL: 7.8% LEL: 1.5%	Strong oxidizers	Char. CS, GC/FID, III [#1500, Hydro- carbons]
1-Pentanethiol <chem>CH3(CH2)4SH</chem> 110-66-7 SA3150000	Amylhydrosulfide, Amylmercaptan, Amyl sulphydrate, Pentyl mercaptan	NIOSH C 0.5 ppm (2.1 mg/m ³) [15-min] OSHA none	N.D.	Water-white to yellowish liquid with a strong, garlic-like odor.	MW: 104.2 BP: 260°F Sol: Insoluble FLP(oc): 65°F IP: ? Sp.Gr: 0.84 Class IB Flammable Liquid	VP(77°F): 14 mm FRZ: -104°F UEL: ? LEL: ?	Oxidizers, reducing agents, alkali metals, calcium hypochlorite, concentrated nitric acid	None available
2-Pentanone <chem>CH3COCH2CH2CH3</chem> 107-87-9 SA7875000	Ethyl acetone, Methyl propyl ketone, MPK	NIOSH 150 ppm (530 mg/m ³) OSHA† 200 ppm (700 mg/m ³)	1500 ppm	Colorless to water-white liquid with a characteristic acetone-like odor	MW: 86.1 BP: 215°F Sol: 6% FLP: 45°F IP: 9.39 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 27 mm FRZ: -108°F UEL: 8.2% LEL: 1.5%	Oxidizers, bromine trifluoride	Char. CS, GC/FID, III [#1300, Ketones I]
1249 26	1 ppm = 3.58 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection: — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Washskin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Ing Con	Irrit eyes, resp sys	Eye: Skin: Breath: Swallow:	Irrimed Water wash Fresh air Medical attention immed	Eyes, resp sys
[Pentaerythritol]							
Skin: Eyes: Washskin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 1200 ppm: SA 1500 ppm: SA/CF/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, derm, chemical pneu. (aspir liq); crow, in animals: narco	Eye Skin Breath Swallow	Irrimed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[n-Pentane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 5 ppm: CCRFOV/SA 12.5 ppm: SA/CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, resp sys; head, nausea, dizziness; vomit, diarrhea; dermatitis	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[1-Pentanethiol]							
Skin: Eyes: Washskin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 1500 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, mucous memb., head, derm, narcosis, coma	Eye Skin Breath Swallow	Irrimed Water flush Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[2-Pentanone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Perchloromethyl mercaptan <chem>Cl3CSCI</chem> 594-42-3 PB0370000	PCM, PMM, Trichloromethane sulfonyl chloride, Trichloromethyl sulfur chloride	NIOSH/OSHA 0.1 ppm (0.8 mg/m ³)	10 ppm	Pale-yellow, oily liquid with an unbearable, acrid odor.	MW: 185.9 BP: 297°F (Decomposes) Sol: Insoluble Fl.P: NA IP: ?	VP: 3 mm FRZ: ? UEL: NA LEL: NA	Alkalis, amines, hot iron, water [Note: Corrosive to most metals. Forms HCl, sulfur & CO ₂ on contact with water.]	None available
1670 55	1 ppm = 7.73 mg/m ³				Sp.Gr: 1.69 Noncombustible Liquid, but will support combustion			
Perchloryl fluoride <chem>ClO3F</chem> 7516-94-6 SD1925000	Chlorine fluoride oxide, Chlorine oxyfluoride, Tr oxychlorofluoride	NIOSH 3 ppm (14 mg/m ³) ST 6 ppm (28 mg/m ³) OSHA† 3 ppm (13.5 mg/m ³)	100 ppm	Colorless gas with a characteristic, sweet odor. [Note: Shipped as a liquefied compressed gas.]	MW: 102.5 BP: -52°F Sol: 0.06% Fl.P: NA IP: 13.60 eV	VP: 10.5 atm FRZ: -234°F UEL: NA LEL: NA	Combustibles, strong bases, amines, finely divided metals, reducing agents, alcohols	None available
3083 20	1 ppm = 4.26 mg/m ³				RGasD: 3.64 Nonflammable Gas, but will support combustion			
Perlite 93763-70-3 SO5254000	Expanded perlite [Note: An amorphous material consisting of fused sodium potassium aluminosilicate.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Odorless, light- gray to glassy- black solid. [Note: Expanded perlite is a fluffy, white particulate.]	MW: varies BP: ? Sol: <1% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: >2000°F UEL: NA LEL: NA	None reported	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Petroleum distillates (naphtha) 8002-05-9 SE7449000	Aliphatic petroleum naphtha, Petroleum naphtha, Rubbers solvent	NIOSH 350 mg/m ³ C 1800 mg/m ³ [15-min] OSHA† 500 ppm (2000 mg/m ³)	1100 ppm [LEL]	Colorless liquid with a gasoline- or kerosene-like odor. [Note: A mixture of paraffins (C ₆ to C ₁₂) that may contain a small amount of aromatic hydrocarbons.]	MW: 99 (approx) BP: 85-460°F Sol: Insoluble Fl.P: -40 to -86°F IP: ?	VP: 40 mm (approx) FRZ: -99°F UEL: 5.9% LEL: 1.1%	Strong oxidizers	Char; CS; GC/FID; III [#1550, Naphthas]
1255 27	1 ppm = 4.11 mg/m ³ (approx)				Sp.Gr: 0.63-0.66 Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 1 ppm: CCROV/SA* 2.5 ppm: SA CF*/PAPROV* 5 ppm: CCRFOV/GMFOV/PAPRTOV*/ SAT CF*/SCBAF/SAF 10 ppm: SAF PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irr: eyes, skin, nose, throat, lac, cough, dysp, deep breath pain, coarse rales, vomit, pallor, lacar, acidosis, anuria, liver, kidney damage	Eye: Skin: Breath Swallow Irr: immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Perchloromethyl mercaptan]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	NIOSH/OSHA 30 ppm: SA 75 ppm: SA CF* 100 ppm: SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irr: resp sys, liq: frostbite; in animals: methemo, cyan, weak, dizz, head, pulf edema, pneumitis, anoxia	Eye: Skin: Breath Frostbite Frostbite Resp support	Skin, resp sys, blood
[Perchloryl fluoride]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irr: eyes, skin, throat, upper resp sys	Eye: Breath: Irr: immed Fresh air	Eyes, skin, resp sys
[Perlite]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 850 ppm: SA 1100 ppm: SA CF*/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irr: eyes, nose, throat, dizz, drow, head, nau, dry cracked skin, chemical pneu (aspiriliq)	Eye: Skin: Breath: Swallow Irr: immed Soap wash prompt Resp support Medical Attention immed	Eyes, skin, resp sys, CNS
[Petroleum distillates (naphtha)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Phenol C_6H_5OH 108-95-2 SJ3325000 1671 55 (solid) 2312 55 (molten) 2821 55 (solution)	Carbolic acid, Hydroxybenzene, Monohydroxybenzene, Phenyl alcohol, Phenyl hydroxide 1 ppm = 3.91 mg/m ³	NIOSH 5 ppm (19 mg/m ³) C15 6 ppm (60 mg/m ³) [15-min] [skin] OSHA 5 ppm (19 mg/m ³) [skin]	250 ppm	Colorless to light-pink crystalline solid with a sweet, acid odor. [Note: Phenol liquefies by mixing with about 8% water.]	MW: 94.1 BP: 359°F Sol(77°F): 9% Fl.P. 175°F IP: 8.50 eV Sp Gr: 1.06 Combustible Solid	VP: 0.4 mm MLT: 109°F UEL: 8.6% LEL: 1.8%	Strong oxidizers, calcium hypochlorite, aluminum chloride, acids	XAD-7, Methanol, HPLC/UVD, OSHA [#32]
Phenothiazine $S(C_6H_4)_2NH$ 92-84-2 SN5075000	Dibenzothiazine, Fenothiazine, Thiodiphenylamine	NIOSH 5 mg/m ³ [skin] OSHA† none	N.D.	Grayish-green to greenish-yellow solid. [insecticide]	MW: 199.3 BP: 700°F Sol: Insoluble Fl.P.: ? IP: ? Sp.Gr.: ? Combustible Solid, but not a high fire risk.	VP: 0 mm (approx) MLT: 365°F UEL: ? LEL: ?	None reported	None available
p-Phenylenediamine $C_6H_4(NH_2)_2$ 106-50-3 SS8050000 1673 53	4-Aminoaniline, 1,4-Benzenediamine, p-Diaminobenzene, 1,4-Phenylenediamine	NIOSH/OSHA 0.1 mg/m ³ [skin]	25 mg/m ³	White to slightly red, crystalline solid	MW: 106.2 BP: 513°F Sol(75°F): 4% Fl.P. 312°F IP: 5.89 eV Sp Gr: ? Combustible Solid	VP: <1 mm MLT: 295°F UEL: ? LEL: ?	Strong oxidizers	Filter†; EDTA; HPLC/UVD; OSHA [#87]
Phenyl ether (vapor) $C_6H_5OC_6H_5$ 101-84-8 KN8970000	Diphenyl ether, Diphenyl oxide, Phenoxybenzene, Phenyl oxide 1 ppm = 7.08 mg/m ³	NIOSH/OSHA 1 ppm (7 mg/m ³)	100 ppm	Colorless, crystalline solid or liquid (above 82°F) with a geranium-like odor.	MW: 170.2 BP: 498°F Sol: Insoluble Fl.P. 239°F IP: 8.09 eV Sp Gr: 1.08 Combustible Solid Class IIIB Combustible Liquid	VP(77°F): 0.02 mm MLT: 82°F UEL: 6.0% LEL: 0.7%	Strong oxidizers	Char. CS, GC/FID, III [#572]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA 50 ppm: CCROVDM/SA 125 ppm: SA CF/PAPROVDM 250 ppm: CCRFOVH/E/GMFOVH/E/ PAPRTOVH/E/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOVH/E/SCBAE	Inh	Irrit eyes, nose, throat,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	anor, low-wgt, weak,	Skin	liver, kidneys
Wash skin:	When contam		Ing	muscle ache, pain, dark	Breath	
Remove:	When wet or contam		Con	urine, cyan, liver, kidney	Swallow	
Change:	Daily			damage, skin burns, derm,		
Provide:	Eyewash. Quick drench			ochronosis, tremor, convuls, twitch	Irrimmed Soap wash immed Resp support Medical attention immed	
[Phenol]						
Skin:	Prevent skin contact	TBAL	Inh	itching, irrit, reddening	Eye:	Skin, CVS, liver,
Eyes:	Prevent eye contact		Abs	skin; hepatitis, hemolytic	Skin:	kidneys
Wash skin:	When contam/Daily		Ing	anemia, abdom cramps, tacer;	Breath:	
Remove:	When wet or contam		Con	kidney damage; skin photo	Swallow:	
Change:	Daily			sens		
[Phenothiazine]						
Skin:	Prevent skin contact	NIOSH/OSHA 2.5 mg/m ³ : SA CF ⁴ 5 mg/m ³ : SCBAF/SAF 25 mg/m ³ : SAF PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFSH/E/SCBAE	Inh	Irrit pharynx, larynx,	Eye	Resp sys, skin
Eyes:	Prevent eye contact		Abs	bronchial asthma, sens	Skin:	
Wash skin:	When contam/Daily		Ing	derm	Breath	
Remove:	When wet or contam		Con		Swallow	
Change:	Daily					
[p-Phenylene diamine]						
Skin:	Prevent skin contact	NIOSH/OSHA 25 ppm: SA CF ⁴ /PAPROVDM ⁴ 50 ppm: CCRFOVH/E/GMFOVH/E/ SCBAF/SAF 100 ppm: SAF PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOVH/E/SCBAE	Inh	Irrit eyes, nose, skin, nau	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con		Skin	
Wash skin:	When contam				Breath	
Remove:	When wet or contam					
Change:	N.R.					
[Phenyl ether (vapor)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Phenylether-biphenyl mixture (vapor) $C_6H_5OC_6H_4C_6H_5$ 8004-13-5 DV1500000	Diphenyl oxide-diphenyl mixture, Dowtherm® A 1 ppm 6.90 mg/m ³ (approx)	NIOSH/OSHA 1 ppm (7 mg/m ³)	10 ppm	Colorless to straw-colored liquid or solid (below 54°F) with a disagreeable, aromatic odor. [Note: A mixture typically contains 75% phenyl ether & 25% biphenyl.]	MW: 166 (approx) BP: 495°F Sol: Insoluble FLP: 239°F IP: ? Sp Gr(77°F): 1.06 Class IIIB Combustible Liquid	VP(77°F): 0.08 mm FRZ: 54°F UEL: ? LEL: ?	Strong oxidizers	Sig el. Benzene, GC/FID, III [#S73]
Phenyl glycidyl ether $C_8H_8O_2$ 122-60-1 TZ3675000	1,2-Epoxy-3-phenoxy propane; Glycidyl phenyl ether; PGE; Phenyl 2,3-epoxypropyl ether 1 ppm = 6.24 mg/m ³	NIOSH Ca See Appendix A C 1 ppm (6 mg/m ³) [15-min] OSHA† 10 ppm (60 mg/m ³)	Ca [100 ppm]	Colorless liquid. [Note: A solid below 38°F.]	MW: 150.1 BP: 473°F Sol: 0.2% FLP: 248°F IP: ? Sp Gr: 1.11 Class IIIB Combustible Liquid	VP: 0.01 mm FRZ: 38°F UEL: ? LEL: ?	Strong oxidizers, amines, strong acids, strong bases	Char. CS, GC/FID, III [#S74]
Phenyldiazine $C_6H_5NHNH_2$ 100-63-0 MW8925000 2572 53	Hydrazinobenzene, Monophenyldiazine 1 ppm = 4.49 mg/m ³	NIOSH Ca See Appendix A C 0.14 ppm [skin] (0.6 mg/m ³) [2-hr] OSHA† 5 ppm (22 mg/m ³) [skin]	Ca [15 ppm]	Colorless to pale- yellow liquid or solid (below 67°F) with a faint aromatic odor.	MW: 108.1 BP: 470°F (Decomposes) Sol: Slight FLP: 190°F IP: 7.64 eV Sp Gr: 1.10 Class IIIA Combustible Liquid Combustible Solid	VP(77°F): 0.04 mm FRZ: 67°F UEL: ? LEL: ?	Strong oxidizers, lead dioxide	Bub. Pho-acid, Vis. III [#S160]
N-Phenyl-β-naphthyl- amine $C_{16}H_{15}N$ 135-88-6 QM4550000	2-Anilinonaphthalene, β-Naphthylphenylamine, PBNA, 2-Phenylaminonaphthalene, Phenyl-β-naphthylamine OSHA none	NIOSH Ca* See Appendix A [*Note: Since metabolized to β-Naphthylamine.] OSHA none	Ca [N.D.]	White to yellow crystals or gray to tan flakes or powder. [Note: Commercial product may con- tain 20-30 ppm of β-Naphthylamine.]	MW: 219.3 BP: 743°F Sol: Insoluble FLP: ? IP: ? Sp Gr: 1.24 Combustible Solid	VP: ? MLT: 226°F UEL: ? LEL: ?	Oxidizers	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin:	Prevent skin contact	NIOSH/OSHA 10 ppm: SA:CF/CCRFOVHIE/ GMFOVHIE/PAPROVDM/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh	Irritate eyes, nose, skin, nau	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con		Skin:	Soap wash prompt	
Wash skin:	When contam				Breath:	Resp support	
Remove:	When wet or contam						
Change:	N.R.						
[Phenyl ether-biphenyl mixture (vapor)]							
Skin:	Prevent skin contact	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh	Irritate eyes, skin, upper	Eye:	Irr immed	Eyes, skin, CNS,
Eyes:	Prevent eye contact		Abs	resp sys; skin sens;	Skin:	Soap wash prompt	hemato sys, repro sys
Wash skin:	When contam		Ing	narco; possible hemato,	Breath:	Resp support	[in animals:
Remove:	When wet or contam		Con	repro effects; [carc]	Swallow:	Medical attention	nasal cancer]
Change:	N.R.					immed	
Provide:	Eyewash, Quick drench						
[Phenyl glycidyl ether]							
Skin:	Prevent skin contact	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh	Skin sens, hemolytic	Eye:	Irr immed	Blood, resp sys,
Eyes:	Prevent eye contact		Abs	anemia, dysp, cyan, jaun,	Skin:	Soap wash immed	liver, kidneys,
Wash skin:	When contam/Daily		Ing	kidney damage; vascular	Breath:	Resp support	skin
Remove:	When wet or contam		Con	thrombosis; [carc]	Swallow:	Medical attention	[in animals:
Change:	Daily					immed	tumors of the
Provide:	Eyewash, Quick drench					lungs, liver,	
						blood vessels	
						& intestine]	
[Phenylhydrazine]							
Skin:	Prevent skin contact	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh	Irritation; leucoplakia;	Eye:	Irr immed	Eyes, skin, bladder
Eyes:	Prevent eye contact		Abs	acne; hypersensitivity to	Skin:	Soap wash immed	[bladder cancer]
Wash skin:	When contam/Daily		Ing	sunlight; [carc]	Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash, Quick drench						
[N-Phenyl-β-naphthylamine]							

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Phenylphosphine $C_6H_5PH_2$ 638-21-1 SZ210G000	Fenylfosfin, PF, Phosphaniiline	NIOSH C 0.05 ppm (0.25 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a foul odor.	MW: 110.1 BP: 320°F Sol: Insoluble Fl.P: ? IP: ?	VP: ? FRZ: ? UEL: ? LEL: ?	None reported [Note: Spontaneously combustible in high concentrations in air. Potential exposure to gaseous phenylphosphine when polyphosphinates are heated above 392°F.]	None available
	1 ppm = 4.58 mg/m ³				Sp.Gr(59°F): 1.001 Combustible Liquid			
Phorate ($C_4H_8O_5$)P(S)SCH ₂ SC ₂ H ₅ 298-02-2 TD9450000 3018 55 (organo- phosphorus pesticide, n.o.s.)	O,O-Diethyl S-(ethylthio)- methylphosphorodithioate; O,O-Diethyl S-ethylthio- methylthiothionophosphate; Thimet; Timet	NIOSH C 0.05 mg/m ³ ST 0.2 mg/m ³ [skin] OSHA† none	N.D.	Clear liquid with a skunk-like odor. [insecticide]	MW: 260.4 BP: ? Sol: 0.005% Fl.P(oc): 320°F IP: ?	VP: 0.0008 mm FRZ: -45°F UEL: ? LEL: ?	Water, alkalis [Note: Hydrolyzed in the presence of moisture and by alkalis.]	None available
	1 ppm = 10.82 mg/m ³				Sp.Gr(7°F): 1.16 Class IIIB Combustible Liquid, but does not readily ignite.			
Phosdrin® $C_4H_{10}PO_4$ 7786-34-7 GQ5250000 2783 55	2-Carbomethoxy-1-methylvinyl dimethyl phosphate, Mevinphos [Note: Commercial product is a mixture of the cis- & trans isomers.] (CH_3CO) ₂ P(O)OC(CH ₃)=CHCOOCH ₃]	NIOSH 0.01 ppm (0.1 mg/m ³) ST 0.03 ppm (0.3 mg/m ³) [skin] OSHA† 0.1 mg/m ³ [skin]	4 ppm	Pale-yellow to orange liquid with a weak odor. [Note: Insecticide that may be absorbed on a dry carrier.]	MW: 224.2 BP: Decomposes Sol: Miscible Fl.P(oc): 347°F IP: ?	VP: 0.003 mm FRZ: 44°F (trans-) 70°F (cis-) UEL: ? LEL: ?	Strong oxidizers [Note: Corrosive to cast iron, some stainless steels & brass]	Chrom-102; Toluene; GC/FPD; III [#2503]
	1 ppm = 9.32 mg/m ³				Sp.Gr: 1.25 Class IIIB Combustible Liquid			
Phosgene $COCl_2$ 75-44-5 SY5600000 1076 15	Carbon oxychloride, Carbonyl chloride, Carbonyl dichloride, Chloroformyl chloride	NIOSH 0.1 ppm (0.4 mg/m ³) C 0.2 ppm (0.8 mg/m ³) [15-min] OSHA 0.1 ppm (0.4 mg/m ³)	2 ppm	Colorless gas with a suffocating odor like musty hay. [Note: A fuming liquid below 47°F. Shipped as a liquefied compressed gas.]	MW: 98.9 BP: 47°F Sol: Slight Fl.P: NA IP: 11.55 eV RGasD: 3.48 Sp.Gr: 1.43 (Liquid at 32°F) Nonflammable Gas	VP: 1.6 atm FRZ: -198°F UEL: NA LEL: NA	Moisture, alkalis, ammonia, alcohols, copper [Note: Reacts slowly in water to form hydrochloric acid & carbon dioxide]	Imp. Reagent; Vis: II(1) [P&CAM #219]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam N.R.	TBAL	Inh Ing Con	In animals: blood changes, anemia, testicular degeneration; loss of appetite, diarr, lac, hind leg tremor; derm	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Blood, CNS, skin, repro sys
[Phenylphosphine]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irr eyes, skin, resp sys; miosis; rhin; head, chest tight, wheez, lar spasm, salv, cyan, anor, nau, vomit, abdom cramps, diarr, sweat; musc fasc, weak, para; gidd, conf, ataxia; convuls, coma; low BP; card irreg	Eye: Skin: Breath: Swallow: Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Phorate]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH/OSHA 0.1 ppm: SA 0.25 ppm: SA/CF 0.5 ppm: SAT/CF/SCBAF/SAF 4 ppm: SA PD, PP §: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irr eyes, skin, resp sys; miosis; rhin; head, chest tight, wheez, lar spasm, salv, cyan, anor, nau, vomit, abdom cramps, diarr, para; ataxia, convuls; low BP, card irreg	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Phosdrin®]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq) Prevent eye contact (liq) When contam (liq) When wet or contam (liq) N.R. Quick drench (liq)	NIOSH/OSHA 1 ppm: SA* 2 ppm: SCBAF/SAF §: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irr eyes; dry burning throat; vomit; cough, foamy sputum, dysp, chest pain, cyan; liq: frostbite	Eye: Skin: Breath: Irr immed (liq) Water flush immed (liq) Resp support	Eyes, skin, resp sys
[Phosgene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Phosphine PH_3 7803-51-2 SY7525000	Hydrogen phosphide, Phosphorated hydrogen, Phosphorus hydride, Phosphorus trihydride	NIOSH 0.3 ppm (0.4 mg/m ³) ST 1 ppm (1 mg/m ³) OSHA† 0.3 ppm (0.4 mg/m ³)	50 ppm	Colorless gas with a fish- or garlic- like odor. [pesticide] [Note: Shipped as a liquefied compressed gas. Pure compound is odorless.]	MW: 34.0 BP: -126°F Sol: Slight Fl.P: NA (Gas) IP: 9.96 eV RGasD: 1.18 Flammable Gas	VP: 41.3 atm FRZ: -209°F UEL: ? LEL: 1.79%	Air, oxidizers, chlorine, acids, moisture, halogenated hydrocarbons, copper [Note: May ignite SPONTANEOUSLY on contact with air.]	Beaded carbon†; H_2O / buffer; IC; OSHA [#180]
2199 18	1 ppm = 1.41 mg/m ³							
Phosphoric acid H_3PO_4 7664-38-2 TB6300000	Orthophosphoric acid, Phosphoric acid (aqueous), White phosphoric acid	NIOSH 1 mg/m ³ ST 3 mg/m ³ OSHA† 1 mg/m ³	1000 mg/m ³	Thick, colorless, odorless, crystalline solid. [Note: Often used in an aqueous solution.]	MW: 98.0 BP: 415°F Sol: Miscible Fl.P: NA IP: ? Sp.Gr(77°F): 1.87 (pure) 1.33 (50% soln.) Noncombustible Liquid	VP: 0.03 mm MLT: 108°F UEL: NA LEL: NA	Strong caustics, most metals [Note: Readily reacts with metals to form flammable hydrogen gas. DO NOT MIX WITH SOLUTIONS CONTAINING BLEACH OR AMMONIA.]	Sig el†: NaHCO_3 / Na_2CO_3 ; IC; III [#7903, Inorganic Acids]
1805 60	1 ppm = 4.07 mg/m ³							
Phosphorus (yellow) P_4 7723-14-0 TH3500000	Elemental phosphorus, White phosphorus	NIOSH/OSHA 0.1 mg/m ³	5 mg/m ³	White to yellow, soft, waxy solid with acid fumes in air. [Note: Usually shipped or stored in water.]	MW: 124.0 BP: 536°F Sol: 0.0003% Fl.P: ? IP: ? Sp.Gr: 1.82 Flammable Solid	VP: 0.03 mm MLT: 111°F UEL: ? LEL: ?	Air, oxidizers (including elemental sulfur & strong caustics), halogens [Note: Ignites SPONTANEOUSLY in moist air.]	Tenax GC; Xylene, GC/FPD; III [#7905]
1381 38								
Phosphorus oxychloride POCl_3 10025-87-3 TH4897000	Phosphorus chloride, Phosphorus oxytrichloride, Phosphoryl chloride	NIOSH 0.1 ppm (0.6 mg/m ³) ST 0.5 ppm (3 mg/m ³) OSHA† none	N.D.	Clear, colorless to yellow, oily liquid with a pungent & musty odor. [Note: A solid below 34°F.]	MW: 153.3 BP: 222°F Sol: Decomposes Fl.P: NA IP: ? Sp.Gr(77°F): 1.65 Noncombustible Liquid, but may set fire to combustible materials.	VP(81°F): 40 mm FRZ: 34°F UEL: NA LEL: NA	Water, combustible materials, carbon disulfide, dimethyl- formamide, metals (except nickel & lead) [Note: Decomposes in water to hydrochloric & phosphoric acids.]	None available
1810 39	1 ppm = 6.37 mg/m ³							

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH/OSHA 3 ppm: SA 7.5 ppm: SA/CF 15 ppm: GMFS/SCBAF/SAF 50 ppm: SA/PD,PP §: SCBAF/PD,PP/SAF/PD,PP/ASCB Escape: GMFS/SCBAE	Inh Con (liq)	Nau, vomit, abdom pain, diarr; thirst; chest tight, dysp; musc pain, chills; stupor or syncope; pulm edema; liq: frostbite	Eye: Skin: Breath: Frostbite Resp support	Resp sys
[Phosphine]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash (>1.6%), Quick drench (>1.6%)	NIOSH/OSHA 25 mg/m³: SA/CF* 50 mg/m³: HIEF/SCBAF/SAF 1000 mg/m³: SAF/PD,PP §: SCBAF/PD,PP/SAF/PD,PP/ASCB Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys; eye, skin burns; derm	Eye: Skin: Breath: Swallow: Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Phosphoric acid]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Note: Flame retardant personal protective equipment should be provided.]	NIOSH/OSHA 1 mg/m³: SA 2.5 mg/m³: SA/CF* 5 mg/m³: SCBAF/SAF §: SCBAF/PD,PP/SAF/PD,PP/ASCB Escape: SCBAE	Inh Ing Con	Irrit eyes, resp tract; eye, skin burns; abdom pain, nau, jaun; anemia; cachexia; dental pain, salv, jaw pain, swell	Eye: Skin: Breath: Swallow: Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, jaw, teeth, blood
[Phosphorus (yellow)]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; dysp, cough, lung edema; dizz, head, weak; abdom pain, nau, vomit; neph	Eye: Skin: Breath: Swallow: Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys
[Phosphorus oxychloride]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Phosphorus pentachloride PCl_5 10026-13-8 TB6125000 1806 39	Pentachlorophosphorus, Phosphoric chloride, Phosphorus perchloride	NIOSH/OSHA 1 mg/m ³	70 mg/m ³	White to pale- yellow, crystal- line solid with a pungent, unpleasant odor.	MW: 208.3 BP: Sublimes Sol: Reacts Fl.P: NA IP: ? Sp.Gr: 3.60 Noncombustible Solid	VP(132°F): 1mm MLT: 324°F (Sublimes) UEL: NA LEL: NA	Water, magnesium oxide, chemically- active metals such as sodium & potassium, alkalis, amines [Note: Hydrolyzes in water (even in humid air) to form hydrochloric acid & phosphoric acid Corrosive to metals.]	Filter/Bub; Reagent, Vis: II(5) [#S257]
Phosphorus pentasulfide $\text{P}_2\text{S}_5/\text{P}_4\text{S}_{10}$ 1314-80-3 TH4375000 1340 41	Phosphorus persulfide, Phosphorus sulfide, Sulfurphosphide	NIOSH 1 mg/m ³ ST 3 mg/m ³ OSHA† 1 mg/m ³	250 mg/m ³	Greenish-gray to yellow, crystal- line solid with an odor of rotten eggs.	MW: 222.3/ 444.6 BP: 957°F Sol: Reacts Fl.P: ? IP: ? Sp.Gr: 2.09 Flammable Solid, which may SPONTANEOUSLY ignite in presence of moisture.	VP(572°F): 1mm MLT: 550°F UEL: ? LEL: ?	Water, alcohols, strong oxidizers, acids, alkalis [Note: Reacts with water to form hydrogen sulfide, sulfur dioxide, and phosphoric acid.]	None available
Phosphorus trichloride PCl_3 7719-12-2 TH3675000 1809 39	Phosphorus chloride 1 ppm = 5.71 mg/m ³	NIOSH 0.2 ppm (1.5 mg/m ³) ST 0.5 ppm (3 mg/m ³) OSHA† 0.5 ppm (3 mg/m ³)	25 ppm	Colorless to yellow, fuming liquid with an odor like hydrochloric acid.	MW: 137.4 BP: 169°F Sol: Reacts Fl.P: NA IP: 9.91 eV Sp.Gr: 1.58 Noncombustible Liquid; however, a strong oxidizer that may ignite combustibles upon contact.	VP: 100 mm FRZ: -170°F UEL: NA LEL: NA	Water, chemically- active metals such as sodium & potassium, aluminum, strong nitric acid, acetic acid, organic matter [Note: Hydrolyzes in water to form hydrochloric acid and phosphoric acid.]	Bub. Reagent; Vis, III [#6402]
Phthalic anhydride $\text{C}_8\text{H}_4(\text{CO})_2\text{O}$ 85-44-9 TI3150000 2214 60	1,2-Benzenedicarboxylic anhydride; PAN; Phthalic acid anhydride 1 ppm = 6.16 mg/m ³	NIOSH 6 mg/m ³ (1 ppm) OSHA† 12 mg/m ³ (2 ppm)	60 mg/m ³	White solid (flake) or a clear, colorless liquid (molten) with a characteristic, acid odor.	MW: 148.1 BP: 563°F Sol: 0.6% Fl.P: 305°F IP: 10.00 eV Sp.Gr: 1.53 (Flake) 1.20 (Molten) Combustible Solid	VP: 0.0015 mm MLT: 267°F UEL: 10.5% LEL: 1.7%	Strong oxidizers, water [Note: Converted to phthalic acid in hot water.]	Filter, NH ₄ OH; HPLC/UV/D, II(3) [#S179]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 mg/m ³ : SA*	Ing	bron; derm	Skin:	
Wash skin:	When contam	25 mg/m ³ : SA; CF*	Con		Breath:	
Remove:	When wet or contam	50 mg/m ³ : SCBAF/SAF			Swallow:	
Change:	Daily	70 mg/m ³ : SAF; PD, PP				
Provide:	Eyewash, Quick drench	§: SCBAF; PD, PP/SAF; PD, PP; ASCBA				
		Escape: GMFOVHIE/SCBAE				
[Phosphorus pentachloride]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	10 mg/m ³ : SA*	Ing	apnea, coma, convuls;	Skin:	CNS
Wash skin:	When contam	25 mg/m ³ : SA; CF*	Con	conj pain, lac, photo,	Breath:	
Remove:	When wet or contam	50 mg/m ³ : SCBAF/SAF		kerato-conj, corn vesic;	Swallow:	
Change:	Daily	250 mg/m ³ : SAF; PD, PP		dizz; head; fig; irrity,		
		§: SCBAF; PD, PP/SAF; PD, PP; ASCBA		insom; GI dist		
		Escape: GMFSHIE/SCBAE				
[Phosphorus pentasulfide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm: SCBAF/SAF	Ing	throat; pulm edema;	Skin:	
Wash skin:	When contam	25 ppm: SAF; PD, PP	Con	eye, skin burns	Breath:	
Remove:	When wet or contam	§: SCBAF; PD, PP/SAF; PD, PP; ASCBA			Swallow:	
Change:	N.R.	Escape: GMFS4/SCBAE				
Provide:	Eyewash, Quick drench					
[Phosphorus trichloride]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, upper resp	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	30 mg/m ³ : DM*	Ing	sys, conj; nasal ulcer	Skin:	liver, kidneys
Wash skin:	When contam	60 mg/m ³ : DMXSO*/HIEF/PAPRDM*/	Con	bleeding; bron, bronchial	Breath:	
Remove:	When wet or contam	SA/SCBAF		asthma; derm;	Swallow:	
Change:	Daily	§: SCBAF; PD, PP/SAF; PD, PP; ASCBA		in animals: liver, kidney		
		Escape: HIEF/SCBAE		damage		
[Phthalic anhydride]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
m-Phthalodinitrile $C_6H_4(CN)_2$ 626-17-5 CZ1900000	1,3-Benzenedicarbonitrile; m-Dicyanobenzene; 1,3-Dicyanobenzene; Isophthalodinitrile; m-PDN	NIOSH 5 mg/m ³ OSHA† none	N.D.	Needle-like, color- less to white, crystalline, flaky solid with an almond-like odor.	MW: 128.1 BP: Sublimes Sol: Slight Fl.P: ? IP: ?	VP: 0.01 mm MLT: 324°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers (e.g., chlorine, bromine, fluorine)	None available
Sp.Gr: 4.42 Combustible Solid and a severe explosion hazard.								
Picloram $C_6H_3Cl_3O_2N_2$ 1918-02-1 TJ7525000	4-Amino-3,5,6-trichloro- picolinic acid; 4-Amino-3,5,6-trichloro- 2-picolinic acid; ATCP; Grazon®; Tordon®	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Colorless to white crystals with a chlorine-like odor. [herbicide]	MW: 241.5 BP: Decomposes Sol: 0.04% Fl.P: ? IP: ?	VP(95°F): 0.0000006 mm MLT: 424°F (Decomposes) UEL: ? LEL: ?	Hot concentrated alkali (hydrolyzes)	Filter; none; Grav; III [Nuisance Dust: #500 (total), #600 (resp)]
Sp.Gr: ? Combustible Solid								
Picric acid $(NO_2)_3C_6H_2OH$ 88-89-1 TJ7875000	Phenol trinitrate; 2,4,6-Trinitrophenol [Note: An OSHA Class A Explosive (1910.109).]	NIOSH 0.1 mg/m ³ ST 0.3 mg/m ³ [skin] OSHA 0.1 mg/m ³ [skin]	75 mg/m ³	Yellow, odorless solid [Note: Usually used as an aqueous solution.]	MW 229.1 BP: Explodes above 572°F Sol 1% Fl.P: 302°F IP: ?	VP(383°F): 1 mm MLT: 252°F UEL: ? LEL: ?	Copper, lead, zinc & other metals; salts; plaster; concrete, ammonia [Note: Corrosive to metals. An explosive mixture results when the aqueous solution crystallizes.]	Filter; Methanol/ Water; HPLC/UV/D: II(4) [#S228]
Sp.Gr: 1.76 Combustible Solid								
Pindone $C_{12}H_{10}O_2C(O)C(CH_3)_2$ 83-26-1 NK6300000	tert-Butyl valone, 1,3-Dioxo-2-pivaloyl-indane; Pival®; Pivalyl; 2-Pivalyl-1,3-indandione	NIOSH/OSHA 0.1 mg/m ³	100 mg/m ³	Bright-yellow powder with almost no odor. [rodenticide]	MW: 230.3 BP: Decomposes Sol(77°F): 0.002% Fl.P: ? IP: ?	VP: Very low MLT: 230°F UEL: ? LEL: ?	None reported	None available
Sp.Gr: 1.06								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	TBAL	Inh Abs Ing Con	Head, nau, conf; in animals: irrit eyes, skin	Eye: Skin: Breath: Swallow: Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, CNS
[m-Phthalodinitrile]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam N.R. Daily	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; nau; In animals: liver, kidney changes	Eye: Skin: Breath: Swallow: Irrimed Soap wash Fresh air Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Picloram]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	NIOSH/OSHA 0.5 mg/m ³ : DM 1 mg/m ³ : DMXSQ/SA 2.5 mg/m ³ : SA, CF/PAPRDM 5 mg/m ³ : HIEF/SAT, CF/PAPRTHiE/ SCBAF/SAF 75 mg/m ³ : SAF:PD, PP §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; sens derm; yellow-stained hair, skin; weak, myalgia, anuria, polyuria; bitter taste, GI dist; hepatitis, hema, album, neph	Eye Skin Breath Swallow: Irrimed Soap wash prompt Resp support Medical attention immed	Eyes, skin, kidneys, liver, blood
[Picric acid]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. Daily	NIOSH/OSHA 0.5 mg/m ³ : DM 1 mg/m ³ : DMXSQ/SA 2.5 mg/m ³ : SA, CF/PAPRDM 5 mg/m ³ : HIEF/SAT, CF/PAPRTHiE/ SCBAF/SAF 100 mg/m ³ : SAF:PD, PP §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: HIEF/SCBAE	Inh Ing	Epis, excess bleeding from minor cuts, bruises; smoky urine, black tarry stools; abdom, back pain	Eye: Breath: Swallow: Irrimed Resp support Medical attention immed	Blood prothrombin
[Pindone]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Piperazine dihydro- chloride $C_4H_{10}N_2 \cdot 2HCl$ 142-64-3 TL4025000	Piperazine hydrochloride [Note: The monochloride, $C_4H_9N_2 \cdot HCl$ is also commercially available.]	NIOSH 5 mg/m ³ OSHA† none	N.D.	White to cream- colored needles or powder.	MW: 159.1 BP: ? Sol: 41% Fl.P: ? IP: ?	VP: ? MLT: 635°F UEL: ? LEL: ?	Water [Note: Slightly hygroscopic (i.e., absorbs moisture from the air).]	None available
					Sp.Gr: ? Combustible Solid, but does not ignite easily.			
Plaster of Paris $CaSO_4 \cdot 0.5H_2O$ 26499-65-0 TP0700000	Calcium sulfate hemihydrate, Dried calcium sulfate, Gypsum hemihydrate, Hemihydrate gypsum [Note: Plaster of Paris is the hemihydrate form of Calcium Sulfate & Gypsum is the dihydrate form.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	White or yellowish, finely divided, odorless powder.	MW: 145.2 BP: ? Sol(77°F): 0.3% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 325°F (Loses H ₂ O) UEL: NA LEL: NA	Moisture, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Platinum Pt 7440-06-4 TP2160000	Platinum black, Platinum metal, Platinum sponge	NIOSH 1 mg/m ³ OSHA† none	N.D.	Silvery, whitish- gray, malleable, ductile metal.	MW: 195.1 BP: 6921°F Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 3222°F UEL: NA LEL: NA	Aluminum, acetone, arsenic, ethane, hydrazine, hydrogen peroxide, lithium, phosphorus, selenium, tellurium, various fluorides	Filter; Acids; ICP; III [#7300, Elements]
					Sp.Gr: 21.45 Noncombustible Solid in bulk form, but finely divided powder can be dangerous to handle.			
Platinum (soluble salts, as Pt)	Synonyms vary depending upon the specific soluble platinum salt.	NIOSH/OSHA 0.002 mg/m ³	4 mg/m ³ (as Pt)	Appearance and odor vary depending upon the specific soluble platinum salt.	Properties vary depending upon the specific soluble platinum salt.		Varies	Filter; Acid/ Reagent; AAS/GF; II(7) [#S191]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; skin burns, sens; asthma; GI upset, head, nau, vomit, inco, musc weak	Eye: Skin: Breath: Swallow: Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet or contam					
Change:	Daily					
Provide:	Eyewash, Quick Drench					
[Piperazine dihydrochloride]						
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb, resp sys; cough	Eye: Breath: Swallow: Irrimmed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	N.R.					
Wash skin:	N.R.					
Remove:	N.R.					
Change:	N.R.					
[Plaster of Paris]						
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; derm	Eye: Skin: Breath: Swallow: Irrimmed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	N.R.					
Wash skin:	N.R.					
Remove:	N.R.					
Change:	Daily					
[Platinum]						
Skin:	Prevent skin contact	NIOSH/OSHA 0.05 mg/m ³ : SA/CF ⁴ 0.1 mg/m ³ : HIEF/SCBAF/SAF 4 mg/m ³ : SAF/PD,PP 5: SCBAF/PD,PP/SAF/PD,PP,ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, nose, cough, dysp, wheez, cyan; derm, sens skin; lymphocytosis	Eye: Skin: Breath: Swallow: Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet or contam					
Change:	Daily					
[Platinum (soluble salts, as Pt)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Portland cement 65997-15-1 VV8770000	Cement, Hydraulic cement, Portland cement silicate [Note: A class of hydraulic cements containing tri- and dicalcium silicate in addition to alumina, tricalcium aluminate, and iron oxide.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	5000 mg/m ³	Gray, odorless powder	MW: ? BP: NA Sol: Insoluble Fl.P: NA IP: NA Sp Gr: ? Noncombustible Solid	VP: 0 mm (approx) MLT: NA UEL: NA LEL: NA	None reported	Filter, none, Grav, III [#0500, Nuisance Dust (total)]
Potassium cyanide (as CN) KCN 151-50-8 TS8750000 1680 55 (solution)	Potassium salt of hydrocyanic acid	NIOSH* C 5 mg/m ³ (4.7 ppm) [10-min] OSHA* 5 mg/m ³ [*Note: The REL and PEL also apply to other cyanides (as CN) except Hydrogen cyanide.]	25 mg/m ³ (as CN)	White, granular or crystalline solid with a faint, almond-like odor.	MW 65.1 BP: 2957°F Sol(77°F): 72% Fl.P: NA IP: NA Sp Gr: 1.55 Noncombustible Solid, but contact with acids releases highly flammable hydrogen cyanide.	VP: 0 mm (approx) MLT: 1173°F UEL: NA LEL: NA	Strong oxidizers (such as acids, acid salts, chlorates & nitrates) [Note: Absorbs moisture from the air forming a syrup.]	Filter/Bub: KOH, ISE, III [#7904, Cyanides] [Also #6010, Hydrogen Cyanide.]
Potassium hydroxide KOH 1310-58-3 TT2100000 1813 63 (dry, solid) 1814 60 (solution)	Caustic potash, Lye, Potassium hydrate	NIOSH 2 mg/m ³ OSHA† none	N.D.	Odorless, white or slightly yellow lumps, rods, flakes, sticks, or pellets. [Note: May be used as an aqueous solution.]	MW: 56.1 BP: 2415°F Sol(59°F): 107% Fl.P: NA IP: ? Sp Gr: 2.04 Noncombustible Solid; however, may react with H ₂ O & other substances and generate sufficient heat to ignite combustible materials.	VP(131°F): 1 mm MLT: 716°F UEL: NA LEL: NA	Acids, water, metals (when wet), halogenated hydrocarbons, maleic anhydride [Note: Heat is generated if KOH comes in contact with H ₂ O & CO ₂ from the air.]	Filter: HCl, Titrate, III [#7401, Alkaline Dusts]
Propane CH ₃ CH ₂ CH ₃ 74-98-6 TX2275000 1978 22	Bottled gas, Dimethylmethane, n-Propane, Propyl hydride 1 ppm = 1.83 mg/m ³	NIOSH/OSHA 1000 ppm (1800 mg/m ³)	2100 ppm [LEL]	Colorless, odorless gas. [Note: A foul-smelling odorant is often added when used for fuel purposes. Shipped as a liquefied compressed gas.]	MW 44.1 BP: -44°F Sol: 0.01% Fl.P: NA (Gas) IP: 11.07 eV R Gas D: 1.55 Flammable Gas	VP(70°F): 8.4 atm FRZ: -306°F UEL: 9.5% LEL: 2.1%	Strong oxidizers	Combustible gas meter, none, II(2) [S87]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection— maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH 50 mg/m ³ : D 100 mg/m ³ : DXSQ/SA 250 mg/m ³ : SA, CF/PAPRD 500 mg/m ³ : HIEF/SAT, CF/PAPRTHIE/SCBAF/SAF 5000 mg/m ³ : SA, PD, PP §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: HIEF/SCBAE	Inh	Irritate eyes, skin, nose; cough, expectoration, exertional dysp, wheez, chronic bron; derm	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing		Skin:	
Wash skin:	When contam		Con		Breath:	
Remove:	When wet or contam				Swallow:	
Change:	N.R.					
[Portland cement]						
Skin:	Prevent skin contact	NIOSH/OSHA 25 mg/m ³ : SA/SCBAF §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFSE/SCBAE	Inh	Irritate eyes, skin, upper resp sys; asphy; weak, head, conf; nau, vomit; incr rate resp; slow gasping resp; thyroid, blood changes	Eye:	Eyes, skin, resp sys, CVS, CNS, thyroid, blood
Eyes:	Prevent eye contact		Abs		Skin:	
Wash skin:	When contam		Ing		Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Potassium cyanide (as CN)]						
Skin:	Prevent skin contact	TBAL	Inh	Irritate eyes, skin, resp sys; cough, sneez; eye, skin burns; vomit, diarr	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing		Skin:	
Wash skin:	When contam		Con		Breath:	
Remove:	When wet or contam				Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Potassium hydroxide]						
Skin:	Frostbite	NIOSH/OSHA 2100 ppm: SA/SCBAF §: SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: SCBAE	Inh	Dizz, conf, excitation, asphy; liq: frostbite	Eye:	CNS
Eyes:	Frostbite		Con		Skin:	
Wash skin:	N.R.		(liq)		Breath:	
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Frostbite					
[Propane]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Propanesultone <chem>C3H4O3S</chem> 1120-71-4 RP5425000	3-Hydroxy-1-propanesul- phonic acid sultone; 1,3-Propane sultone	NIOSH Ca See Appendix A OSHA none	N.D.	White, crystalline solid or a colorless liquid (above 86°F). [Note: Releases a foul odor as it melts.]	MW: 122.2 BP: 7 Sol: 10% Fl.P: >235°F IP: 7	VP: 7 MLT: 86°F UEL: 7 LEL: 7	None reported	None available
					Sp.Gr: 1.39 Combustible Solid			
1-Propanethiol <chem>CH3CH2CH2SH</chem> 107-03-9 TZ7300000	3-Mercaptopropane, Propane-1-thiol, Propyl mercaptan, n-Propyl mercaptan	NIOSH C 0.5 ppm (1.6 mg/m³) [15-min] OSHA none	N.D.	Colorless liquid with an offensive, cabbage-like odor.	MW: 76.2 BP: 153°F Sol: Slight Fl.P: -5°F IP: 9.195 eV	VP(77°F): 156mm FRZ: -172°F UEL: 7 LEL: 7	Oxidizers, reducing agents, strong acids & bases, alkali metals, calcium hypochlorite	None available
					Sp.Gr: 0.84 Class IB Flammable Liquid			
2402 27	1 ppm = 3.17 mg/m³							
Propargyl alcohol <chem>HC#CCH2OH</chem> 107-19-7 UK5075000	1-Propyn-3-ol; 2-Propyn-1-ol; 2-Propynyl alcohol	NIOSH 1 ppm (2 mg/m³) [skin] OSHA† none	N.D.	Colorless to straw- colored liquid with an acid, geranium odor.	MW: 56.1 BP: 237°F Sol: Miscible Fl.P(oc): 97°F IP: 10.51 eV	VP: 12 mm FRZ: -62°F UEL: 7 LEL: 7	Phosphorus pentoxide, oxidizers	None available
					Sp.Gr: 0.97 Class IC Flammable Liquid			
1986 28	1 ppm = 2.33 mg/m³							
β-Propiolactone <chem>C3H4O2</chem> 57-57-8 RQ7350000	BPL; Hydroacrylic acid, β-lactone; 3-Hydroxy-β-lactone; 3-Hydroxy-propionic acid; β-Lactone; 2-Oxetanone; 3-Propiolactone	NIOSH Ca See Appendix A OSHA(1910.1013) See Appendix B	Ca [N.D.]	Colorless liquid with a slightly sweet odor.	MW: 72.1 BP: 323°F (Decomposes) Sol: 37% Fl.P: 165°F IP: 7	VP(77°F): 3 mm FRZ: -28°F UEL: 7 LEL: 2.9%	Acetates, halogens, thiocyanates, thiosulfates [Note: May polymerize upon storage.]	None available
					Sp.Gr: 1.15 Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	In animals: irrit eyes, skin, muc memb; [carc]	Eye:	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	✕: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs		Skin:	Water flush immed	[in animals: skin tumors, leukemias, gliomas]
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Propane sultone]							
Skin:	N.R.	NIOSH	Inh	Irrit eyes, skin, nose, throat, resp sys; head, neu, dizz, cyan; in animals: liver, kidney damage	Eye:	Irrimed	Eyes, skin, resp sys, CNS, blood, liver, kidneys
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Abs		Skin:	Soap wash	
Wash skin:	N.R.	12.5 ppm: SA:CF/PAPROV	Ing		Breath:	Resp support	
Remove:	When wet (flamm)	25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF	Con		Swallow:	Medical attention immed	
Change:	N.R.	✕: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
Provide:	Eyewash	Escape: GMFOV/SCBAE					
[1-Propanethiol]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit skin, muc memb; CNS depres; in animals: liver, kidney damage	Eye:	Irrimed	Skin, resp sys, CNS, liver, kidneys
Eyes:	Prevent eye contact		Abs		Skin:	Water flush prompt	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Propargyl alcohol]							
Skin:	Prevent skin contact	NIOSH	Inh	Skin irrit, blistering, burns, com opac, frequent urination, dysuria, hema; [carc]	Eye:	Irrimed	Kidneys, skin, lungs, eyes
Eyes:	Prevent eye contact	✕: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs		Skin:	Soap wash immed	[in animals: tumors of the liver, skin & stomach]
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[β-Propiolactone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Propionic acid <chem>CH3CH2COOH</chem> 79-09-4 UE5950000	Carboxyethane, Ethanecarboxylic acid, Ethylformic acid, Metacetic acid, Methylacetic acid, Propanoic acid	NIOSH 10 ppm (30 mg/m³) ST 15 ppm (45 mg/m³) OSHA† none	N.D.	Colorless, oily liquid with a pungent, disagree- able, rancid odor. [Note: A solid below 5°F.]	MW: 74.1 BP: 286°F Sol: Miscible Fl.P: 126°F IP: 10.24 eV	VP: 3 mm FRZ: 5°F UEL: 12.1% LEL: 2.9%	Alkalis, strong oxidizers (e.g., chromium trioxide) [Note: Corrosive to steel.]	None available
1848 60	1 ppm = 3.08 mg/m³				Sp.Gr: 0.99 Class II Combustible Liquid			
Propionitrile <chem>CH3CH2CN</chem> 107-12-0 UF9625000	Cyanoethane, Ethyl cyanide, Propanenitrile, Propionic nitrile, Propionitrile	NIOSH 6 ppm (14 mg/m³) OSHA none	N.D.	Colorless liquid with a pleasant, sweetish, ethereal odor. [Note: Forms cyanide in the body.]	MW: 55.1 BP: 207°F Sol: 11.9% Fl.P: 36°F IP: 11.84 eV	VP: 35 mm FRZ: -133°F UEL: ? LEL: 3.1%	Strong oxidizers & reducing agents, strong acids & bases [Note: Hydrogen cyanide is produced when propionitrile is heated to decomposition.]	Char; Benzene; GC/FID; III [Adapt #1606]
2404 28	1 ppm = 2.29 mg/m³				Sp.Gr: 0.78 Class IB Flammable Liquid			
Propoxur <chem>CH3NHCOOC6H4OCH(CH3)2</chem> 114-26-1 FC3150000	Aprocarb®, Baygon®, o-Isopropoxyphenyl- N-methylcarbamate, N-Methyl-2-isopropoxyphenyl- carbamate	NIOSH 0.5 mg/m³ OSHA† none	N.D.	White to tan, crystalline powder with a faint, characteristic odor. [Insecticide]	MW: 209.3 BP: Decomposes Sol: 0.2% Fl.P: >300°F IP: ?	VP: 0.000007 mm MLT: 197°F UEL: ? LEL: ?	Strong oxidizers, alkalis [Note: Emits highly toxic methyl isocyanate fumes when heated to decomposition.]	None available
					Sp.Gr: ? Class IIIB Combustible Liquid			
n-Propyl acetate <chem>CH3COOCH2CH2CH3</chem> 109-60-4 AJ3675000	Propylacetate, n-Propyl ester of acetic acid	NIOSH 200 ppm (840 mg/m³) ST 250 ppm (1050 mg/m³) OSHA† 200 ppm (840 mg/m³)	1700 ppm	Colorless liquid with a mild, fruity odor.	MW: 102.2 BP: 215°F Sol: 2% Fl.P: 55°F IP: 10.04 eV	VP: 25 mm FRZ: -134°F UEL: 8% LEL(100°F): 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char; CS; GC/FID; III [#1450, Esters I]
1276 26	1 ppm = 4.25 mg/m³				Sp.Gr: 0.84 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irritate eyes, skin, nose,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	throat; blurred vision,	Skin:	Water flush immed
Wash skin:	When contam		Ing	com burns; skin burns;	Breath:	Resp support
Remove:	When wet or contam		Con	abdom pain, nau, vomit	Swallow:	Medical attention immed
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Propionic acid]						
Skin:	Prevent skin contact	NIOSH	Inh	Irritate eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	60 ppm: CCROV/SA	Abs	nau, vomit; chest pain;	Skin:	CVS, CNS, liver,
Wash skin:	When contam	150 ppm: SA:CF/PAPROV	Ing	weak; stupor, convuls;	Breath:	kidneys
Remove:	When wet or contam	300 ppm: CCRFOV/GMFOV/PAPRTOV/	Con	in animals: liver, kidney	Swallow:	
Change:	N.R.	SCBAF/SAF		damage		
Provide:	Quick drench	1000 ppm: SAF:PD,PP				
		5: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Propionitrile]						
Skin:	Prevent skin contact	TBAL	Inh	Miosis, blurred vision;	Eye:	CNS, liver, kidneys,
Eyes:	Prevent eye contact		Abs	sweat, saliv; abdom cramps,	Skin:	GI tract, blood chol
Wash skin:	Daily		Ing	nau, diarr, vomit; head,	Breath:	
Remove:	When wet or contam		Con	weak, musc twitch	Swallow:	
Change:	Daily					
[Propoxur]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	In animals: irrit eyes,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1700 ppm: SA:CF/CCRFOV/GMFOV/	Ing	nose, throat; derm; narco	Skin:	CNS
Wash skin:	When contam	PAPROV/SCBAF/SAF	Con		Breath:	
Remove:	When wet (flam)	5: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE				
[n-Propyl acetate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
n-Propyl alcohol <chem>CH3CH2CH2OH</chem> 71-23-8 UH8225000	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol	NIOSH/OSHA 200 ppm (500 mg/m ³) ST 250 ppm (625 mg/m ³) [skin] OSHA† 200 ppm (500 mg/m ³)	800 ppm	Colorless liquid with a mild, alcohol-like odor.	MW: 60.1 BP: 207°F Sol: Miscible FLP: 72°F IP: 10.15 eV	VP: 15 mm FRZ: -196°F UEL: 13.7% LEL: 2.2%	Strong oxidizers	Char, 2-Propanol/ CS, GC/FID, III [#1401, Alcohols II]
1274 26	1 ppm = 2.50 mg/m ³				Sp Gr: 0.81 Class IB Flammable Liquid			
Propylene dichloride <chem>CH3CHClCH2Cl</chem> 78-87-5 TX9625000	Dichloro-1,2-propane; 1,2-Dichloropropane	NIOSH Ca See Appendix A OSHA† 75 ppm (350 mg/m ³)	Ca [400 ppm]	Colorless liquid with a chloroform- like odor. [pesticide]	MW: 113.0 BP: 206°F Sol: 0.3% FLP: 60°F IP: 10.87 eV	VP: 40 mm FRZ: -149°F UEL: 14.5% LEL: 3.4%	Strong oxidizers, strong acids, active metals	Char(pet); Acetone/ Cyclo- hexane; GC/ECD; III [#1013, 1,2-Di- chloro- propane]
1279 27	1 ppm = 4.70 mg/m ³				Sp Gr: 1.16 Class IB Flammable Liquid			
Propylene glycol dinitrate <chem>CH3CNO3OHCNO3OH</chem> 6423-43-4 TY6300000	PGDN; Propylene glycol- 1,2-dinitrate; 1,2-Propylene glycol dinitrate	NIOSH 0.05 ppm (0.3 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid with a disagreeable odor. [Note: A solid below 18°F.]	MW: 166.1 BP: ? Sol: 0.1% FLP: ? IP: ?	VP(77°F): 0.07 mm FRZ: 18°F UEL: ? LEL: ?	Ammonia compounds, amines, oxidizers, reducing agents, combustible materials [Note: Similar to Ethylene glycol dinitrate in explosion potential.]	None available
	1 ppm = 6.90 mg/m ³				Sp Gr(77°F): 1.23 Combustible Liquid			
Propylene glycol monomethyl ether <chem>CH3OCH2CHCH3</chem> 107-98-2 UB7700000	Dowtherm® 209, 1-Methoxy-2-hydroxypropane, 1-Methoxy-2-propanol, 2-Methoxy-1-methylethanol, Propylene glycol methyl ether	NIOSH 100 ppm (360 mg/m ³) ST 100 ppm (540 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a mild, ethereal odor.	MW: 90.1 BP: 248°F Sol: Miscible FLP: 97°F IP: ?	VP(77°F): 12 mm FRZ: -139°F (Sets to glass) UEL(calc): 13.8% LEL(calc): 1.8%	Oxidizers, strong acids [Note: Hygroscopic (i.e. absorbs moisture from the air). May slowly form reactive peroxides during prolonged storage.]	None available
	1 ppm = 3.75 mg/m ³				Sp Gr: 0.96 Class IC Flammable Liquid			

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				Target organs (See Table 5)
		Route	Symptoms (See Table 5)	First aid (See Table 6)		
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH/OSHA 800 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF S: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; dry cracking skin; drow, head; ataxia, GI pain; abdom cramps, nau, vomit, vomit, diarr; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush Resp support Medical attention immed	Eyes, skin, resp sys, GI tract, CNS
[n-Propyl alcohol]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench	NIOSH X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; drow, li-head, liver, kidney damage; in animals: CNS depres; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, CNS [in animals: liver & mammary gland tumors]
[Propylene dichloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: N.R. Remove: N.R. Change: N.R.	TBAL	Inh Abs Ing Con	Irrit eyes; con; methemo; head, impaired balance, vis dist; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, CNS, blood, liver, kidneys
[Propylene glycol dinitrate]						
Skin: N.R. Eyes: Prevent eye contact Wash skin: N.R. Remove: When wet (flamm) Change: N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; head, nau, li-head, drow, inco; vomit, diarr	Eye: Skin: Breath: Swallow:	Irr immed Water wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Propylene glycol monomethyl ether]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Propyleneimine C_3H_5N 75-55-8 CM8050000	2-Methylaziridine, 2-Methylethyleneimine, Propyleneimine, Propylene imine (inhibited) Propylenimine	NIOSH Ca See Appendix A 2 ppm (5 mg/m ³) [skin] OSHA 2 ppm (5 mg/m ³) [skin]	Ca [100 ppm]	Colorless, oily liquid with an ammonia-like odor.	MW: 57.1 BP: 152°F Sol: Miscible Fl, P: 25°F IP: 9.00 eV	VP: 112 mm FRZ: -85°F UEL: ? LEL: ?	Acids, strong oxidizers, water, carbonyl compounds, quinones, sulfonyl halides [Note: Subject to violent polymerization in contact with acids. Hydrolyzes in water to form methylethanolamine.]	None available
1921 30 (inhibited)	1 ppm = 2.37 mg/m ³				Sp. Gr: 0.80 Class IB Flammable Liquid			
Propylene oxide C_3H_4O 75-56-9 TZ2975000	1,2-Epoxy propane, Methyl ethylene oxide; Methyloxirane; Propene oxide; 1,2-Propylene oxide	NIOSH Ca See Appendix A OSHA† 100 ppm (240 mg/m ³)	Ca [400 ppm]	Colorless liquid with a benzene- like odor. [Note: A gas above 94°F.]	MW: 58.1 BP: 94°F Sol: 41% Fl, P: -35°F IP: 9.81 eV	VP: 445 mm FRZ: -170°F UEL: 36% LEL: 2.3%	Anhydrous metal chlorides; iron; strong acids, caustics & peroxides [Note: Polymerization may occur due to high temperatures or contamination with alkalis, aqueous acids, amines & acidic alcohols.]	Char; CS; GC/FID; III [#1612]
1280 26	1 ppm = 2.42 mg/m ³				Sp. Gr: 0.83 Class IA Flammable Liquid			
n-Propyl nitrate $CH_3CH_2CH_2ONO_2$ 627-13-4 UK0350000	Propyl ester of nitric acid	NIOSH 25 ppm (105 mg/m ³) ST 40 ppm (170 mg/m ³) OSHA† 25 ppm (110 mg/m ³)	500 ppm	Colorless to straw-colored liquid with an ether-like odor.	MW: 105.1 BP: 231°F Sol: Slight Fl, P: 68°F IP: 11.07 eV	VP: 18 mm FRZ: -148°F UEL: 100% LEL: 2%	Strong oxidizers, combustible materials [Note: Forms explosive mixtures with combustible materials.]	Char; CS; GC/FID; II(3) [#5227]
1865 30	1 ppm = 4.37 mg/m ³				Sp. Gr: 1.07 Class IB Flammable Liquid			
Pyrethrum $C_{21}H_{35}O_2/C_{21}H_{33}O_2$ $C_{21}H_{33}O_2/C_{21}H_{31}O_2$ $C_{21}H_{31}O_2/C_{21}H_{29}O_2$ 8003-34-7 UR4200000	Cinerin I or II, Jasmolin I or II, Pyrethrin I or II, Pyrethrum I or II [Note: Pyrethrum is a variable mixture of Cinerin, Jasmolin, and Pyrethrin.]	NIOSH/OSHA 5 mg/m ³	5000 mg/m ³	Brown, viscous oil or solid. [insecticide]	MW: 316-374 BP: ? Sol: Insoluble Fl, P: 180-190°F IP: ?	VP: Low MLT: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH, CN; HPLC/UVD; III [#5008]
					Sp. Gr: 1 (approx) Class IIIA Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Eye, skin burns; [carc]	Eye:	Irrimed	Eyes, skin
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs		Skin:	Water flush immed	[in animals:
Wash skin:	When contam	Escape: GMFS/SCBAE	Ing		Breath:	Resp support	nasal tumors]
Remove:	When wet (flamm)		Con		Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Propylene imine]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys; blisters, burns; [carc]	Eye:	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Ing		Skin:	Water flush immed	[in animals:
Wash skin:	When contam	Escape: GMFS/SCBAE	Con		Breath:	Resp support	nasal tumors]
Remove:	When wet (flamm)				Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Quick drench						
[Propylene oxide]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	In animals: irrit eyes, skin; methemo, anoxia, cyan; dysp. weak, dizz, head	Eye:	Irrimed	Eyes, skin, blood
Eyes:	Prevent eye contact	250 ppm: SA	Ing		Skin:	Water wash prompt	
Wash skin:	When contam	500 ppm: SA:CF/SCBAF/SAF	Con		Breath:	Resp support	
Remove:	When wet (flamm)	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA			Swallow:	Medical attention immed	
Change:	N.R.	Escape: GMFS/SCBAE					
[n-Propyl nitrate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Erythema, derm, papules, pruritus; rhin; sneez; asthma	Eye:	Irrimed	Resp sys, skin, CNS
Eyes:	Prevent eye contact	50 mg/m ³ : CCROVDMFu*/SA*	Ing		Skin:	Soap wash immed	
Wash skin:	When contam	125 mg/m ³ : SA:CF*/PAPROVDMFu*	Con		Breath:	Resp support	
Remove:	When wet or contam	250 mg/m ³ : CCRFOVHiE/PAPRTOVHiE*/SCBAF/SAF			Swallow:	Medical attention immed	
Change:	Daily	5000 mg/m ³ : SAF:PD,PP					
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOVHiE/SCBAE					
[Pyrethrum]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Pyridine C_5H_5N 110-86-1 UR8400000	Azabenzene, Azine	NIOSH/OSHA 5 ppm (15 mg/m ³)	1000 ppm	Colorless to yellow liquid with a nauseating, fish-like odor.	MW: 79.1 BP: 240°F Sol: Miscible Fl.P: 68°F IP: 9.27 eV	VP: 16 mm FRZ: -44°F UEL: 12.4% UEL: 1.8%	Strong oxidizers, strong acids	Char. CH ₂ CL GC/FID: III [#1613]
1282 26	1 ppm = 3.29 mg/m ³				Sp.Gr: 0.98 Class IB Flammable Liquid			
Quinone OC_6H_4O 106-51-4 DK2625000	1,4-Benzoquinone; p-Benzoquinone; 1,4-Cyclohexadiene dioxide; p-Quinone	NIOSH/OSHA 0.4 mg/m ³ (0.1 ppm)	100 mg/m ³	Pale-yellow solid with an acid, chlorine-like odor.	MW: 108.1 BP: Sublimes Sol: Slight Fl.P: 100-200°F IP: 9.68 eV	VP(77°F): 0.1 mm MLT: 240°F UEL: ? LEL: ?	Strong oxidizers	XAD-2; Ethanol/ Hexane; HPLC/UV/D: II(4) [#S181]
2587 55	1 ppm = 4.49 mg/m ³				Sp.Gr: 1.32 Combustible Solid			
Resorcinol $C_6H_4(OH)_2$ 108-46-3 VG9625000	1,3-Benzenediol; m-Benzenediol; 1,3-Dihydroxybenzene; m-Dihydroxybenzene; 3-Hydroxyphenol; m-Hydroxyphenol	NIOSH 10 ppm (45 mg/m ³) ST 20 ppm (90 mg/m ³) OSHA† none	N.D.	White needles, plates, crystals, flakes, or powder with a faint odor. [Note: Turns pink on exposure to air or light, or contact with iron.]	MW: 110.1 BP: 531°F Sol: 110% Fl.P: 261°F IP: 8.63 eV Sp.Gr: 1.27 Class IIIB Combustible Liquid, but may be difficult to ignite.	VP(77°F): 0.0002 mm MLT: 228°F UEL: ? LEL: (392°F): 1.4%	Acetanilide, albumin, alkalis, antipyrine, camphor, ferric salts, menthol, spirit nitrous ether, strong oxidizers & bases [Note: Hygroscopic (i.e., absorbs moisture from the air).]	None available
2876 55	1 ppm = 4.58 mg/m ³							
Rhodium (metal fume and insoluble compounds, as Rh) Rh (Metal) 7440-16-6 (Metal) VI9355000 (Metal)	Rhodium metal; Elemental rhodium Synonyms of other insoluble rhodium compounds vary depending upon the specific compound.	NIOSH/OSHA 0.1 mg/m ³	100 mg/m ³ (as Rh)	Metal: White, hard, ductile, malleable solid with a bluish-gray luster.	MW: 102.9 BP: 6741°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 12.41 (Metal) Metal: Noncombustible Solid, but flammable in form of dust or powder.	VP: 0 mm (approx) MLT: 3571°F UEL: NA LEL: NA	None reported for rhodium metal	Filter; Acid; AAS; II(3) [#S188]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl, P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Rhodium (soluble compounds, as Rh)	Synonyms vary depending upon the specific soluble rhodium compound	NIOSH/OSHA 0.001 mg/m ³	2 mg/m ³ (as Rh)	Appearance and odor vary depending upon the specific soluble rhodium compound.	Properties vary depending upon the specific soluble rhodium compound		Varies	Filter; Acid; AAS/GF; II(3) [#S189]
Ronnel (CH ₃ O) ₂ P(S)OC ₆ H ₄ Cl ₃ 299-84-3 TG0525000	O,O-Dimethyl O-(2,4,5-tri- chlorophenyl) phosphoro- thioate; Fenchlorophos	NIOSH 10 mg/m ³ OSHA† 15 mg/m ³	300 mg/m ³	White to light tan, crystalline solid. [Insecticide] [Note: A liquid above 106°F.]	MW: 321.6 BP: Decomposes Sol(77°F): 0.004% Fl P: NA IP: ? Sp Gr: 1.49 Noncombustible Solid	VP(77°F) 0.0008 mm MLT: 106°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Chrom-102, Toluene; GC/FPD, III [#S299]
Rosin core solder, pyrolysis products (as formaldehyde)	Rosin flux pyrolysis products, Rosin core soldering flux pyrolysis products	NIOSH* 0.1 mg/m ³ [*Note: "Ca" in the presence of formaldehyde, acetaldehyde, or malonaldehyde. See Appendices A & C (Aldehydes).] OSHA† none	N.D.	Pyrolysis products of rosin core solder include acetone, aliphatic aldehydes, methyl alcohol, methane, ethane, various abietic acids (the major components of rosin), CO & CO ₂ .	Properties vary depending upon the specific rosin core solder being used.		Varies	Filter/ Imp(2); none; Vis; III [#3500, Formalde- hyde]
Rotenone C ₂₃ H ₂₂ O ₆ 83-79-4 DJ2800000	1,2,12,12a-Tetrahydro-8,9- dimethoxy-2-(1-methyl- ethenyl)-[1]benzopyrano [3,4-b]furo[2,3-h][1] benzopyran-6(6aH)-one	NIOSH/OSHA 5 mg/m ³	2500 mg/m ³	Colorless to red, odorless, crystalline solid. [Insecticide]	MW: 394.4 BP: Decomposes Sol: Insoluble Fl P: ? IP: ? Sp Gr: 1.27 Combustible Solid	VP: <0.00004 mm MLT: 330°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; CH ₃ CN; HPLC/UVD; III [#5007]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 0.010 mg/m ³ : HiE*/SA* 0.025 mg/m ³ : SA:CF*/PAPRHiE* 0.050 mg/m ³ : HiEF/PAPRTHiE*/SCBAF/SAF 2 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	In animals: irrit eyes; CNS damage	Eye Skin Breath Swallow:	Irr immed Water flush Resp support Medical attention immed	Eyes, CNS
[Rhodium (soluble compounds, as Rh)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 100 mg/m ³ : CCROVDMFu/SA 250 mg/m ³ : SA:CF/PAPROVDMFu 300 mg/m ³ : CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	In animals: irrit eyes; chol inhibition, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, liver, kidneys, blood plasma
[Ronnell]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL In presence of Formaldehyde, Acetaldehyde, or Malonaldehyde: NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh	Irrit eyes, nose, throat, upper resp sys	Eye: Breath:	Irr immed Resp support	Eyes, resp sys [nasal cancer; thyroid gland tumors in animals (in presence of Formaldehyde, Acetaldehyde, or Malonaldehyde)]
[Rosin core solder, pyrolysis products (as formaldehyde)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 5 mg/m ³ : CCROVDMFu/SA 125 mg/m ³ : SA:CF/PAPROVDMFu 250 mg/m ³ : CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF 2500 mg/m ³ : SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; numb muc memb; nau, vomit, abdom pain; musc tremor, inco, clonic convuls, stupor	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Rotenone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Rouge <chem>Fe2O3</chem> 1309-37-1 NO7400000	Iron(III)oxide, Iron oxide red, Red iron oxide, Red oxide	NIOSH See Appendix D OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	A fine, red powder of ferric oxide. [Note: Usually used in cake form or impregnated in paper or cloth.]	MW: 159.7 BP: ? Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2849°F UEL: NA LEL: NA	Calcium hypochlorite, carbon monoxide, hydrogen peroxide	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Selenium Se 7782-49-2 VS7700000	Elemental selenium, Selenium alloy	NIOSH*OSHA* 0.2 mg/m³ [*Note: The REL and PEL also apply to other selenium compounds (as Se) except Selenium hexafluoride.]	1 mg/m³ (as Se)	Amorphous or crystalline, red to gray solid. [Note: Occurs as an impurity in most sulfide ores.]	MW: 79.0 BP: 1265°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.28 Combustible Solid	VP: 0 mm (approx) MLT: 392°F UEL: NA LEL: NA	Acids, strong oxidizers, chromium trioxide, potassium bromate, cadmium	Filter; Acid; AAS; II(7) [#S190]
2658 53 (powder)								
Selenium hexafluoride (as Se) <chem>SeF6</chem> 7783-79-1 VS9450000	Selenium fluoride	NIOSH 0.05 ppm (0.16 mg/m³) OSHA 0.05 ppm (0.4 mg/m³)	2 ppm	Colorless gas.	MW: 193.0 BP: -30°F Sol: Insoluble Fl.P: NA IP: ? RGasD: 6.66 Nonflammable Gas	VP: >1 atm FRZ: -59°F UEL: NA LEL: NA	Water [Note: Hydrolyzes very slowly in cold water.]	None available
2194 15	1 ppm = 3.28 mg/m³ (as Se)							
Silica, amorphous <chem>SiO2</chem> 7631-86-9 VV7310000	Diatomaceous earth, Diatomaceous silica, Diatomite, Precipitated amorphous silica, Silica gel, Silicon dioxide (amorphous)	NIOSH 6 mg/m³ OSHA† See Appendix C (Mineral Dusts)	3000 mg/m³	Transparent to gray, odorless powder. [Note: Amorphous silica is the non-crystalline form of <chem>SiO2</chem> .]	MW: 60.1 BP: 4046°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.20 Noncombustible Solid	VP: 0 mm (approx) MLT: 3110°F UEL: NA LEL: NA	Fluorine, oxygen difluoride, chlorine trifluoride	Filter; LTA; XRD; III [#7501]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh	Irritate eyes, skin, resp sys	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.		Con		Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Rouge]							
Skin:	Prevents skin contact	NIOSH/OSHA	Inh	Irritate eyes, skin, nose,	Eye:	Irrigated	Eyes, skin, resp sys,
Eyes:	N.R.	1 mg/m ³ : DM ⁺ /DMFu ⁺ /HIEF/PAPRDM ⁺ /	Ing	throat; vis dist, head,	Sun	Soap wash immed	liver, kidneys,
Wash skin:	When contam	PAPRDMFu ⁺ /SA ⁺ /SCBAF	Con	chills, fever, dysp, bron	Breath:	Resp support	blood, spleen
Remove:	When wet or contam	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA		chills, fever, dysp, bron	Swallow	Medical attention	
Change:	N.R.	Escape: HIEF/SCBAE		metallic taste, garlic		immed	
Provide:	Quick drench			breath, GI dist, derm, eye,			
				skin burns;			
				in animals: anemia, liver			
				nec, clrr; kidney, spleen			
				damage			
[Selenium]							
Skin:	N.R.	NIOSH/OSHA	Inh	In animals: pulm irrit,	Breath:	Resp support	Respsys
Eyes:	N.R.	0.5 ppm: SA		edema			
Wash skin:	N.R.	1.25 ppm: SA:CF					
Remove:	N.R.	2 ppm: SAT:CF/SCBAF/SAF					
Change:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFS/SCBAE					
[Selenium hexafluoride (as Se)]							
Skin:	N.R.	NIOSH	Inh	Irritate eyes, pneumoconiosis	Eye:	Irrigated	Eyes, resp sys
Eyes:	N.R.	30 mg/m ³ : DM	Con		Breath:	Fresh air	
Wash skin:	N.R.	60 mg/m ³ : DMXSO/SA					
Remove:	N.R.	150 mg/m ³ : SA:CF/PAPRDM					
Change:	N.R.	300 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/					
		SCBAF/SAF					
		3000 mg/m ³ : SA:PD,PP					
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: HIEF/SCBAE					
[Silica, amorphous]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Silica, crystalline (as respirable dust) SiO ₂ 14808-60-7 VV7330000	Cristobalite, Fused silica, Quartz, Tridymite, Tripoli	NIOSH Ca See Appendix A 0.05 mg/m ³ OSHA† See Appendix C (Mineral Dusts)	Ca [*] IDLHs: 25 mg/m ³ (quartz, tripoli) 50 mg/m ³ (cristobalite, tridymite) N.D. (fused)	Colorless, odorless solid [Note: A component of many mineral dusts.]	MW: 60.1 BP: 4046°F Sol: Insoluble FLP: NA IP: NA Sp. Gr: 2.66 Noncombustible Solid	VP: 0 mm (approx) MLT: 3110°F UEL: NA LEL: NA	Powerful oxidizers: fluorine, chlorine trifluoride, manganese trioxide, oxygen difluoride, hydrogen peroxide, etc.; acetylene, ammonia	Filter; LTA; XRD; III [#7500]
Silicon Si 7440-21-3 VW0400000 1346 32 (amorphous powder)	Elemental silicon [Note: Does not occur free in nature, but is found in silicon dioxide (silica) & in various silicates.]	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Black to gray, lustrous, needle- like crystals. [Note: The amorphous form is a dark-brown powder.]	MW: 28.1 BP: 4271°F Sol: Insoluble FLP: NA IP: NA Sp. Gr: 2.33 Combustible Solid in powder form.	VP: 0 mm (approx) MLT: 2570°F UEL: NA LEL: NA MEC: 160 g/m ³	Chlorine, fluorine, oxidizers, calcium, cesium carbide, alkaline carbonates	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Silicon carbide SiC 409-21-2 VW0450000	Carbon silicide, Carborundum®, Silicon monocarbide	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Yellow to green to bluish-black, iridescent crystal...	MW: 40.1 BP: Sublimes Sol: Insoluble FLP: NA IP: 9.30 eV Sp. Gr: 3.23 Noncombustible Solid	VP: 0 mm (approx) MLT: 4892°F (Sublimes) UEL: NA LEL: NA	None reported [Note: Sublimes with decomposition at 4892°F.]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Silicon tetrahydride SiH ₄ 7803-62-5 VV1400000 2203 17	Monosilane, Silane, Silicane	NIOSH 5 ppm (7 mg/m ³) OSHA† none	N.D.	Colorless gas with a repulsive odor.	MW: 32.1 BP: -169°F Sol: Decomposes FLP: NA (Gas) IP: ? RGasD: 1.11 Flammable Gas (may ignite SPONTANEOUSLY in air).	VP: >1 atm FRZ: -301°F UEL: ? LEL: ?	Halogens (bromine, chlorine, carbonyl chloride, antimony pentachloride, tin(IV) chloride), water	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	NIOSH	Inh	Cough, dysp, wheez; decr	Eye	Irrigated	Eyes, resp sys
Eyes:	N.R.	0.5 mg/m ³ :HIE	Con	pulm func, progressive	Breath:	Fresh air	[in animals: lung cancer]
Wash skin:	N.R.	1.25 mg/m ³ :PAPR/HIE/SA:CF		resp symptoms (silicosis);			
Remove:	N.R.	2.5 mg/m ³ :HIEF/PAPR/HIE		irrit eyes; [carc]			
Change:	N.R.	25 mg/m ³ :SA:PD,PP					
		6:SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape:HIEF/SCBAE					
[Silica, crystalline (as respirable dust)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing	resp sys; cough	Breath:	Fresh air	
Wash skin:	N.R.		Con		Swallow:	Medical attention	
Remove:	N.R.					Irrigated	
Change:	N.R.						
[Silicon]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.		Ing	resp sys; cough	Breath:	Fresh air	
Wash skin:	N.R.		Con		Swallow:	Medical attention	
Remove:	N.R.					Irrigated	
Change:	N.R.						
[Silicon carbide]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb;	Breath:	Resp support	Eyes, skin, resp sys,
Eyes:	N.R.			nau, head			CNS
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Silicon tetrahydride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Silver (metal dust and soluble compounds, as Ag) Ag (Metal) 7440-22-4 (Metal) VW3500000 (Metal)	Silver metal: <i>Argentum</i> Synonyms of soluble silver compounds such as Silver nitrate (AgNO_3) vary depending upon the specific compound	NIOSH/OSHA 0.01 mg/m ³	10 mg/m ³ (as Ag)	Metal: White, lustrous solid.	MW: 107.9 BP: 3632°F Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1761°F UEL: NA LEL: NA	Acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethyleneimine, oxalic acid, tartaric acid	Filter; Acid; ICP; III [#7300, Elements]
Soapstone (containing less than 1% quartz) 3MgO-4SiO ₂ -H ₂ O VV8780000	Massive talc, Soapstone silicate, Steatite	NIOSH 6 mg/m ³ (total) 3 mg/m ³ (resp) OSHA† 25 mppcf	3000 mg/m ³	Odorless, white- gray powder.	MW: 379.3 BP: ? Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Sodium aluminum fluoride (as F) Na ₃ AlF ₆ 15096-52-3 VVA9625000	Cryocide, Cryodust, Cryolite, Sodium hexafluoroaluminate	NIOSH/OSHA* 2.5 mg/m ³ [*Note: The REL and PEL also apply to other inorganic, solid fluorides (as F).]	250 mg/m ³ (as F)	Colorless to dark, odorless solid [pesticide] [Note: Loses color on heating.]	MW: 209.9 BP: Decomposes Sol: 0.04% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1832°F UEL: NA LEL: NA	Strong oxidizers	Pad*/pre- Filter; Reagents; ISE; III [#7902, Fluorides]
Sodium azide NaN ₃ 26628-22-8 VY8050000 1687 56	Azide, Azium, Sodium salt of hydrazoic acid	NIOSH C 0.1 ppm (as HN ₃) [skin] C 0.3 mg/m ³ (as NaN ₃) [skin] OSHA† none	N.D.	Colorless to white, odorless, crystalline solid. [pesticide] [Note: Forms hydrazoic acid (HN ₃) in water.]	MW: 65.0 BP: Decomposes Sol(63°F): 42% Fl.P: ? IP: 11.70 eV	VP: ? MLT: 527°F (Decomposes) UEL: ? LEL: ?	Acids, metals, water [Note: Over a period of time, sodium azide may react with copper, lead, brass, or solder in plumbing systems to form an accumulation of the HIGHLY EXPLOSIVE compounds of lead azide & copper azide.]	None available

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Sodiumbisulfite <chem>NaHSO3</chem> 7631-90-5 VZ2000000	Monosodium salt of sulfurous acid, Sodium acid bisulfite, Sodiumbisulphite, Sodiumhydrogen sulfite	NIOSH 5 mg/m ³ OSHA† none	N.D.	White crystals or powder with a slight odor of sulfur dioxide.	MW: 104.1 BP: Decomposes Sol: 29% Fl.P: NA IP: NA	VP: ? MLT: Decomposes UEL: NA LEL: NA	Heat (decomposes) [Note: Slowly oxidized to the sulfate on exposure to air.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
2693 60 (solution)					Sp.Gr: 1.48 Noncombustible Solid			
Sodium cyanide (as CN) <chem>NaCN</chem> 143-33-9 VZ7530000	Sodium salt of hydrocyanic acid	NIOSH* C 5 mg/m ³ (4.7 ppm) [10-min] OSHA* 5 mg/m ³ [†Note: The REL and PEL also apply to other cyanides (as CN) except Hydrogen cyanide.]	25 mg/m ³ (as CN)	White, granular or crystalline solid with a faint, almond-like odor.	MW: 49.0 BP: 2725°F Sol(77°F): 58% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1047°F UEL: NA LEL: NA	Strong oxidizers (such as acids, acid salts, chlorates & nitrates) [Note: Absorbs moisture from the air forming a syrup.]	Filter/Bub; KOH, ISE; III [#7904, Cyanides] [Also #6010, Hydrogen Cyanide.]
1689 55					Sp.Gr: 1.60 Noncombustible Solid, but contact with acids releases highly flammable hydrogen cyanide.			
Sodium fluoride (as F) <chem>NaF</chem> 7681-49-4 WB0350000	Floridine, Sodium monofluoride	NIOSH/OSHA 2.5 mg/m ³ [†Note: The REL and PEL also apply to other inorganic, solid fluorides (as F).]	250 mg/m ³ (as F)	Odorless, white powder or colorless crystals. [pesticide] [Note: Pesticide grade is often dyed blue.]	MW: 42.0 BP: 3099°F Sol: 4% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1819°F UEL: NA LEL: NA	Strong oxidizers	Pad*/pre- Filter; Reagents; ISE; III [#7902, Fluorides]
1690 54					Sp.Gr: 2.78 Noncombustible Solid			
Sodium fluoroacetate <chem>FCF3COONa</chem> 62-74-8 AH9100000	SFA, Sodium monofluoroacetate	NIOSH 0.05 mg/m ³ ST 0.15 mg/m ³ [skin] OSHA† 0.05 mg/m ³ [skin]	2.5 mg/m ³	Fluffy, colorless to white (sometimes dyed black), odorless powder. [rodenticide] [Note: A liquid above 95°F.]	MW: 100.0 BP: Decomposes Sol: Miscible Fl.P: NA IP: ?	VP: Low MLT: 392°F UEL: NA LEL: NA	None reported	Filter; Water, IC; II(5) [#S301]
2629 53					Sp.Gr: ? Noncombustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Ing Con	Irr iteyes, skin, muc memb	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
[Sodium bisulfite]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH/OSHA 25 mg/m ³ : SA/SCBAF §: SCBAF PD, PP/SAF: PD, PP: ASCBA Escape: GMFSHIE/SCBAE	Inh Abs Ing Con	Irr iteyes, skin; asphy; weak, head, conf, nau, vomit, incr resp rate; slow gasping respiration; thyroid, blood changes	Eye Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CVS, CNS, thyroid, blood
[Sodium cyanide (as CN)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 12.5 mg/m ³ : DM 25 mg/m ³ : DMXSQ*/SA* 62.5 mg/m ³ : SA, CF*/PAPRDM*+ 125 mg/m ³ : HIEF+/SCBAF/SAF 250 mg/m ³ : SAF:PD, PP §: SCBAF PD, PP/SAF: PD, PP: ASCBA Escape: HIEF+/SCBAE	Inh Abs Ing Con	Irr iteyes, resp sys; nau, abdom pain, diarr; saliv, thirst, sweat; stiff spine; derm; calcification of ligaments of ribs, pelvis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Fresh air Medical attention immed	Eyes, skin, resp sys, CNS, skeleton, kidneys
[Sodium fluoride (as F)]							
		+Note: May need acid gas sorbent					
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	NIOSH/OSHA 0.25 mg/m ³ : DM 0.5 mg/m ³ : DMXSQ/SA 1.25 mg/m ³ : SA, CF/PAPRDM 2.5 mg/m ³ : HIEF/SAT: CF/PAPRTHIE/ SCBAF/SAF §: SCBAF PD, PP/SAF: PD, PP: ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Vomit; appre, auditory hallu; facial pares; twitch face musc; pulsus alternans, ectopic heartbeat, tacar, verfibr; pulm edema; nystagmus; convuls; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, CVS, liver, kidneys, CNS
[Sodium fluoroacetate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Sodium hydroxide NaOH 1310-73-2 WB4900000 1823 60 (solid) 1824 60 (solution)	Caustic soda, Lye, Soda lye, Sodium hydrate	NIOSH C 2 mg/m ³ OSHA† 2 mg/m ³	10 mg/m ³	Colorless to white, odorless solid (flakes, beads, granular form).	MW: 40.0 BP: 2534°F Sol: 111% Fl.P: NA IP: NA Sp.Gr: 2.13 Noncombustible Solid, but when in contact with water may generate sufficient heat to ignite combustible materials.	VP: 0 mm (approx) MLT: 605°F UEL: NA LEL: NA	Water, acids; flammable liquids; organic halogens; metals such as aluminum, tin & zinc; nitromethane [Note: Corrosive to metals.]	Filter; HCl; Titrate; III [#7401, Alkaline Dusts]
Sodium metabisulfite Na ₂ S ₂ O ₄ 7681-57-4 UX6225000	Disodium pyrosulfite, Sodium metabisulphite, Sodium pyrosulfite	NIOSH 5 mg/m ³ OSHA† none	N.D.	White to yellowish crystals or powder with an odor of sulfur dioxide.	MW: 190.1 BP: Decomposes Sol: 54% Fl.P: NA IP: NA Sp.Gr: 1.4 Noncombustible Solid	VP: ? MLT: >302°F (Decomposes) UEL: NA LEL: NA	Heat (decomposes) [Note: Slowly oxidized to the sulfate on exposure to air & moisture.]	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Starch (C ₆ H ₁₀ O ₅) _n 9005-25-8 GM5090000	Corn starch, Rice starch, Sorghum gum, α-Starch, Starch gum, Tapioca starch	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Fine, white, odor- less powder. [Note: A carbohy- drate polymer composed of 25% amylose & 75% amylopectin.]	MW: varies BP: Decomposes Sol: insoluble Fl.P: NA IP: NA Sp.Gr: 1.45 Noncombustible Solid, but may form explosive mixture with air.	VP: 0 mm (approx) MLT: Decomposes UEL: NA LEL: NA MEC: 50 g/m ³	Oxidizers, acids, iodine, alkalis	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Stibine SbH ₃ 7803-52-3 WJ0700000 2676 18	Antimony hydride, Antimony trihydride, Hydrogen antimonide	NIOSH/OSHA 0.1 ppm (0.5 mg/m ³)	5 ppm	Colorless gas with a disagreeable odor like hydrogen sulfide.	MW: 124.8 BP: -1°F Sol: Slight Fl.P: NA (Gas) IP: 9.51 eV RGasD: 4.31 Flammable Gas	VP: >1 atm FRZ: -126°F UEL: ? LEL: ?	Acids, halogenated hydrocarbons, oxidizers, moisture, chlorine, ozone, ammonia	Si gel*; HCl; Vis; III [#6008]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH/OSHA 10mg/m ³ : SA:CF ¹ /HIEF/PAPRDM ¹ / SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irr eyes, skin, muc memb; pneutis; eye, skin burns; temporary loss of hair	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Sodium hydroxide]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		TBAL	Inh Ing Con	Irr eyes, skin, muc memb	Eye: Irr immed Breath: Fresh air Swallow: Medical attention immed	Eyes, skin, resp sys
[Sodium metabisulfite]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contam Change: Daily		TBAL	Inh Ing Con	Irr eyes, skin, muc memb; cough, chest pain; derm; rhin	Eye: Irr immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed	Eyes, skin, resp sys
[Starch]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 1 ppm: SA 2.5 ppm: SA:CF 5 ppm: SAT:CF/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head, weak; nau, abdom pain; lumbar pain, hemog, hema, hemolytic anemia; jaun; pulm irrit	Breath: Resp support	Blood, liver kidneys, resp sys
[Stibine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Stoddard solvent 8052-41-3 WJ8925000 1268 27 (petroleum distillate)	Dry cleaning safety solvent, Mineral spirits, Petroleum solvent, Spotting naphtha [Note: A refined petroleum solvent with a flash point of 102-110°F, boiling point of 309-398°F, and containing >65% C ₁₀ or higher hydrocarbons.]	NIOSH 350 mg/m ³ C 1800 mg/m ³ [15-min] OSHA† 500 ppm (2900 mg/m ³)	20,000 mg/m ³	Colorless liquid with a kerosene- like odor.	MW: Varies BP: 309-396°F Sol: Insoluble F.P.: 102-110°F IP: ? Sp Gr: 0.78 Class II Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char; CS; GC/FID; III [#1550]
Strychnine C ₂₁ H ₂₂ N ₂ O ₂ 57-24-9 WL2275000 1692 53	Nuxvomica, Strychnos	NIOSH/OSHA 0.15 mg/m ³	3 mg/m ³	Colorless to white, odorless, crystalline solid. [pesticide]	MW: 334.4 BP: Decomposes Sol: 0.02% F.P. ? IP: ? Sp Gr: 1.36 Combustible Solid, but difficult to ignite	VP: Low MLT: 514°F UEL: ? LEL: ?	Strong oxidizers	Filter; Reagent; HPLC/UV/D; III [#5016]
Styrene C ₆ H ₅ CH=CH ₂ 100-42-5 WL3675000 2055 27 (inhibited)	Ethenyl benzene, Phenylethylene, Styrene monomer, Styrol, Vinyl benzene	NIOSH 50 ppm (215 mg/m ³) ST 100 ppm (425 mg/m ³) OSHA† 100 ppm C 200 ppm 600 ppm (5-min max peak in any 3 hrs)	700 ppm	Colorless to yellow, oily liquid with a sweet, floral odor.	MW: 104.2 BP: 293°F Sol: 0.03% F.P.: 88°F IP: 6.40 eV Sp Gr: 0.91 Class IC Flammable Liquid	VP: 5 mm FRZ: -23°F UEL: 6.8% LEL: 0.9%	Oxidizers, catalysts for vinyl polymers, peroxides, strong acids, aluminum chloride [Note: May polymerize if contaminated or subjected to heat. Usually contains an inhibitor such as tert-butylcatechol.]	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]
Subtilisins 1395-21-7 (BPN) 9014-01-1 (Carlsburg) CO9450000 (BPN) CO9550000 (Carlsburg)	Bacillus subtilis, Bacillus subtilis BPN, Bacillus subtilis Carlsburg, Proteolytic enzymes, Subtilisin BPN, Subtilisin Carlsburg [Note: Commercial proteolytic enzymes are used in laundry detergents.]	NIOSH ST 0.00006 mg/m ³ [60-min] OSHA† none	N.D.	Light-colored, free-flowing powders. [Note: A protein containing numerous amino acids.]	MW: 28,000 (approx) BP: ? Sol: ? F.P.: NA IP: NA Sp Gr: ?	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat;	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	3500 mg/m ³ : CCROV/SA*	Ing	dizz, derm; chemical pneu	Skin:	CNS, kidneys
Wash skin:	When contam	8750 mg/m ³ : SA:CF*/PAPROV*	Con	(aspiriliq);	Breath:	
Remove:	When wet or contam	17,500 mg/m ³ : CCRFOV/GMFOV/		in animals: kidney damage	Swallow:	
Change:	N.R.	PAPRTOV*/SCBAF/SAF				
		20,000 mg/m ³ : SAF:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Stoddard solvent]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Stiff neck, facial musc;	Eye:	CNS
Eyes:	N.R.	0.75 mg/m ³ : DM	Ing	restless, appre, incr	Skin:	
Wash skin:	When contam	1.5 mg/m ³ : LMXSQ/SA	Con	acuity of perception; incr	Breath:	
Remove:	N.R.	3 mg/m ³ : SA:CF/PAPRDM/HIEF/		reflex excitability: cyan;	Swallow:	
Change:	Daily	SCBAF/SAF		tetanic convults with		
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		opisthotonos		
		Escape: HIEF/SCBAE				
[Strychnine]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, resp sys;	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	500 ppm: CCROV/SA*	Abs	head, fig, dizz, conf, mal,	Skin:	CNS, liver, repro sys
Wash skin:	When contam	700 ppm: SA:CF*/CCRFOV/GMFOV/	Ing	drow, weak, unsteady gait;	Breath:	
Remove:	When wet (flamm)	PAPROV*/SCBAF/SAF	Con	narco, deflating derm;	Swallow:	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		possible liver inj, repro		
		Escape: GMFOV/SCBAE		effects		
[Styrene]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing	resp sens (enzyme asthma);	Skin:	
Wash skin:	When contam		Con	sweat, head, chest pain,	Breath:	
Remove:	When wet or contam			flu-like symptoms, cough,	Swallow:	
Change:	Daily			breathlessness, wheez		
[Subtilisins]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Succinonitrile <chem>NCCH2CH2CN</chem> 110-61-2 WN3850000	Butanedinitrile; 1,2-Dicyanoethane; Dinile; Ethylene cyanide; Ethylene dicyanide; Succinic dinitrile	NIOSH 6 ppm (20 mg/m ³) OSHA none	N.D.	Colorless, waxy solid. [Note: Forms cyanide in the body.]	MW: 80.1 BP: 509°F Sol: 13% Fl.P: 270°F IP: ? Sp.Gr: 0.99	VP(212°F): 2 mm MLT: 134°F UEL: ? LEL: ?	Oxidizers	Char; Toluene; GC/FID; NIOSH Nitriles
	1 ppm = 3.33 mg/m ³				Combustible Solid			
Sucrose <chem>C12H22O11</chem> 57-50-1 WN6500000	Beets sugar, Cane sugar, Confectioner's sugar, Granulated sugar, Rock candy, Saccharose, Sugar, Table sugar	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Hard, white, odorless crystals, lumps, or powder. [Note: May have a characteristic, caramel odor when heated.]	MW: 342.3 BP: Decomposes Sol: 200% Fl.P: NA IP: NA Sp.Gr: 1.59 Noncombustible Solid, but fine airborne dust may explode.	VP: 0 mm (approx) MLT: 320-367°F (Decomposes) UEL: NA LEL: NA MEC: 45 g/m ³	Oxidizers, sulfuric acid, nitric acid	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Sulfur dioxide <chem>SO2</chem> 7446-09-5 WS4550000	Sulfurous acid anhydride, Sulfurous oxide, Sulfur oxide	NIOSH 2 ppm (5 mg/m ³) ST 5 ppm (13 mg/m ³) OSHA† 5 ppm (13 mg/m ³)	100 ppm	Colorless gas with a characteristic, irritating, pungent odor. [Note: A liquid below 14°F. Shipped as a liquefied compressed gas.]	MW: 64.1 BP: 14°F Sol: 10% Fl.P: NA IP: 12.30 eV RGasD: 2.26 Nonflammable Gas	VP: 3.2 atm FRZ: -104°F UEL: NA LEL: NA	Powdered alkali metals (such as sodium & potassium), water, ammonia, zinc, aluminum, brass, copper III [Note: Reacts with water to form sulfurous acid (H ₂ SO ₃).]	Filters(2); NaHCO ₃ / Na ₂ CO ₃ ; IC; III [#6004]
Sulfurhexafluoride <chem>SF6</chem> 2551-62-4 WS4900000	Sulfurfluoride [Note: May contain highly toxic sulfur pentafluoride as an impurity.]	NIOSH/OSHA 1000 ppm (6000 mg/m ³)	N.D.	Colorless, odorless gas. [Note: Shipped as a liquefied compressed gas. Condenses directly to a solid upon cooling.]	MW: 146.1 BP: Sublimes Sol(77°F): 0.003% Fl.P: NA IP: 19.30 eV RGasD: 5.11 Nonflammable Gas	VP: 21.5 atm FRZ: -83°F (Sublimes) UEL: NA LEL: NA	Disilane	Bag; none; GC/TEA; II(5) [#S244]
	1 ppm = 6.07 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr Immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	60 ppm: SA	Abs	head, dizz, weak, gidd,	Skin:	Water flush immed	CNS, CVS
Wash skin:	When contam	150 ppm: SA:CF	Ing	conf, convuls; blurred	Breath:	Resp support	
Remove:	When wet or contam	250 ppm: SCBAF/SAF	Con	vision; dysp; abdom pain,	Swallow:	Medical attention	
Change:	Daily	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		nau, vomit		immed	
Provide:	Eyewash	Escape: GMFOV/SCBAE					
[Succinonitrile]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irr Immed	Eyes, resp sys
Eyes:	N.R.		Con	resp sys; cough	Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Sucrose]							
Skin:	Frostbite	NIOSH	Inh	Irrit eyes, nose, throat;	Eye:	Frostbite	Eyes, skin, resp sys
Eyes:	Frostbite	20 ppm: CCRS*/SA*	Con	rhin; choking, cough;	Skin:	Frostbite	
Wash skin:	N.R.	50 ppm: SA:CF*/PAPRS*		reflex bronchoconstriction;	Breath:	Resp support	
Remove:	When wet or contam (liq)	100 ppm: CCRFS/GMFS/PAPRTS*/		liq: frostbite			
Change:	N.R.	SA:CF*/SCBAF/SAF					
Provide:	Frostbite	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFS/SCBAE					
[Sulfur dioxide]							
Skin:	Frostbite	TBAL	Inh	Asphy: Incr breath rate,	Eye:	Frostbite	Resp sys
Eyes:	Frostbite			pulse rate; slight musc	Skin:	Frostbite	
Wash skin:	N.R.			inco, emotional upset;	Breath:	Resp support	
Remove:	N.R.			fig, nau, vomit, convuls			
Change:	N.R.						
Provide:	Frostbite						
[Sulfur hexafluoride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Sulfuric acid H_2SO_4 7664-93-9 WS5600000 1830 39 (51-95% acid) 1831 39 (fuming) 1832 39 (spent)	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous) 1 ppm = 4.08 mg/m ³	NIOSH/OSHA 1 mg/m ³	15 mg/m ²	Colorless to dark- brown, oily, odorless liquid. [Note: Pure compound is a solid below 51°F. Often used in an aqueous solution.]	MW: 98.1 BP: 554°F Sol: Miscible FLP: NA IP: ? Sp. Gr: 1.84 (96-98% acid) Noncombustible Liquid, but capable of igniting finely divided combustible materials.	VP: 0.001 mm FRZ: 51°F UEL: NA LEL: NA	Organic materials, chlorates, carbides, fulminates, water, powdered metals [Note: Reacts violently with water with evolution of heat. Corrosive to metals.]	Sig. gel, NaHCO_3 / Na_2CO_3 , IC, III [*7903, Inorganic Acids]
Sulfur monochloride S_2Cl_2 10025-67-9 WS4300000 1828 39	Sulfur chloride, Sulfur subchloride, Thiosulfurous dichloride 1 ppm = 5.61 mg/m ³	NIOSH C 1 ppm (6 mg/m ³) OSHA† 1 ppm (6 mg/m ³)	5 ppm	Light-amber to yellow-red, oily liquid with a pungent, nauseating, irritating odor.	MW: 135.0 BP: 280°F Sol: Decomposes FLP: 245°F IP: 9.40 eV Sp. Gr: 1.68 Class IIIB Combustible Liquid	VP: 7 mm FRZ: -107°F UEL: ? LEL: ?	Peroxides, oxides of phosphorus, organics, water [Note: Decomposes violently in water to form hydrochloric acid, sulfur dioxide, sulfur, sulfite, thiosulfate, and hydrogen sulfide. Corrosive to metals.]	None available
Sulfur pentafluoride S_2F_{10} 5714-22-7 WS4480000 1 ppm = 10.56 mg/m ³	Disulfur decafluoride, Sulfur decafluoride 1 ppm = 10.56 mg/m ³	NIOSH C 0.01 ppm (0.1 mg/m ³) OSHA† 0.025 pp (0.25 mg/m ³)	1 ppm	Colorless liquid or gas (above 84°F) with an odor like sulfur dioxide.	MW: 254.1 BP: 84°F Sol: Insoluble FLP: NA IP: ? Sp. Gr(32°F): 2.08 RGasD: 8.77 Noncombustible Liquid Nonflammable Gas	VP: 561 mm FRZ: -134°F UEL: NA LEL: NA	None reported	None available
Sulfur tetrafluoride SF_4 7783-60-0 WT4800000 2418 15	Tetrafluoro-sulfurane 1 ppm = 4.49 mg/m ³	NIOSH C 0.1 ppm (0.4 mg/m ³) OSHA† note	N.D.	Colorless gas with an odor like sulfur dioxide. [Note: Shipped as a liquefied compressed gas.]	MW: 108.1 BP: -41°F Sol: Reacts FLP: NA IP: 12.63 eV RGasD: 3.78 Nonflammable Gas	VP(70°F): 10.5 mm FRZ: -185°F UEL: NA LEL: NA	Moisture, concentrated sulfuric acid, dioxygen difluoride [Note: Readily hydrolyzed by moisture, forming hydrofluoric acid & thionyl fluoride.]	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash (>1%), Quick drench (>1%)		NIOSH/OSHA 25 mg/m ³ : SA: CF/PAPRAGHIE [†] 50 mg/m ³ : CCRFAGHIE/GMFAGHIE/ SCBAF/SAF 80 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAGHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; pulm edema, bronch, emphy, conj, stomatis, dental erosion; trachbronc; eye, skin burns; derm	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, teeth
[Sulfuric acid]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH/OSHA 5 ppm: CCRFS/GMFS/PAPRS/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; lac; cough; eye, skin burns; pulm edema	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Sulfur monochloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: N.R. Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH 0.1 ppm: SA 0.25 ppm: SA:CF 0.5 ppm: SAT:CF/SCBAF/SAF 1 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; in animals: pulm edema, hemorrh	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
[Sulfur pentafluoride]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite		TBAL	Inh Con	Irrit eyes, muc memb; eye, skin burns (from SF ₆ releasing hydrofluoric acid on exposure to moisture); lig: frostbite; in animals: dysp, weak, thin	Eye: Frostbite Skin: Frostbite Breath: Resp support	Eyes, skin, resp sys
[Sulfur tetrafluoride]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Sulfuryl fluoride SO_2F_2 2699-79-8 WT5075000	Sulfur difluoride dioxide, Vikane®	NIOSH 5 ppm (20 mg/m³) ST 10 ppm (40 mg/m³) OSHA† 5 ppm (20 mg/m³)	200 ppm	Colorless, odorless gas. [insecticide/ fumigant] [Note: Shipped as a liquefied compressed gas.]	MW: 102.1 BP: -68°F Sol(32°F): 0.2% Fl.P: NA IP: 13.04 eV	VP(70°F): 15.8 atm FRZ: -212°F UEL: NA LEL: NA	None reported	Char; NaOH; IC; III [#5012]
2191 15	1 ppm = 4.24 mg/m³				RGSD: 3.72 Nonflammable Gas			
Sulprofos $\text{C}_{12}\text{H}_{18}\text{O}_2\text{PS}_3$ 35400-43-2 TE4165000	Bolstar®, O-Ethyl O-(4-methylthio)- phenyl S-propyl- phosphorodithioate	NIOSH 1 mg/m³ OSHA† none	N.D.	Tan-colored liquid with a sulfide-like odor.	MW: 322.5 BP: ? Sol: Low Fl.P: ? IP: ?	VP: <8 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
	1 ppm = 13.40 mg/m³				Sp.Gr: 1.20			
2,4,5-T $\text{Cl}_3\text{C}_6\text{H}_3\text{OCH}_2\text{COOH}$ 93-76-5 AJ8400000	2,4,5-Trichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m³	250 mg/m³	Colorless to tan, odorless, crystalline solid. [herbicide]	MW: 255.5 BP: Decomposes Sol(77°F): 0.03% Fl.P: ? IP: ?	VP: <1 x 10⁻⁷ mm MLT: 307°F UEL: ? LEL: ?	None reported	Filter; Methanol, HPLC/UVD, III [#5001]
2765 55					Sp.Gr: 1.80 Combustible Solid, but burns with difficulty.			
Talc (containing no asbestos and less than 1% quartz) $\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$ 14807-96-6 WW2710000	Hydrous magnesium silicate, Serpentine talc	NIOSH 2 mg/m³ (resp) OSHA† 20 mppcf	1000 mg/m³	Odorless, white powder.	MW: Varies BP: ? Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1652- 1832°F UEL: NA LEL: NA	None reported	Filter; LTA; XRD; III [P&CAM #355]
					Sp.Gr: 2.70-2.80 Noncombustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	NIOSH/OSHA 50 ppm: SA* 125 ppm: SA/CF* 200 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (lq)	Corj, rhinitis, pharyngitis, pares; lq; frostbite; in animals: narco, tremor, convuls; pulm edema; kidney inj	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys, CNS, kidneys
[Sulfuryl fluoride]							
Skin: Eyes: Wash skin: Remove: Change:	Prevents skin contact N.R. When contam When wet or contam N.R.	TBAL	Inh Ing	Nau, vomit, abdom cramps, diarr, saliv; head, gidd, verti, weak r/t lin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Immed Resp support Medical attention immed	Resp sys, CNS, CVS, blood chol
[Sulprofos]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 50 mg/m³: DM 100 mg/m³: DMXSQ/SA 250 mg/m³: SA:CF/HIEF/PAPRDM/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	in animals: ataxia; skin irrit, acne-like rash, liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Skin, liver, GI tract
[2, 4, 5-T]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH 10 mg/m³: DM 20 mg/m³: DMXSQ/SA 50 mg/m³: PAPRDM/SA:CF 100 mg/m³: HIEF/SAT.CF/PAPRTHIE/SCBAF/SAF 1000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Fibrotic pneumoconiosis, irrit eyes	Eye: Breath:	Irr immed Fresh air	Eyes, resp sys, CVS
[Talc (containing no asbestos and less than 1% quartz)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Tantalum (metal and oxide dust, as Ta) Ta (Metal) 7440-25-7 (Metal) WW5505000 (Metal)	Tantalum metal; Tantalum-181 Synonyms of other tantalum dusts (including oxide dusts) vary depending upon the specific compound.	NIOSH 5 mg/m ³ ST 10 mg/m ³ OSHA 5 mg/m ³	2500 mg/m ³ (as Ta)	Metal: Steel-blue to gray solid or black colorless powder.	MW: 180.9 BP: 9797°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 16.65 (Metal) 14.40 (Powder) Metal: Combustible Solid; powder ignites SPONTANEOUSLY in air.	VP: 0 mm (approx) MLT: 5425°F UEL: NA LEL: NA MEC: <200 g/m ³	Strong oxidizers, bromine trifluoride, fluorine	Filter: none, Grav, III [#0500, Nuisance Dust (total)]
TEDP [(CH ₃ CH ₂ O) ₂ PS] ₂ O 3689-24-5 XN4375030 1704 55	Bladafum®, Dithion, Sulfotep, Tetraethyl dithiono- pyrophosphate, Tetraethyl dithiopyro- phosphate, Thiotep® 1 ppm = 13.40 mg/m ³	NIOSH/OSHA 0.2 mg/m ³ [skin]	10 mg/m ³	Pale-yellow liquid with a garlic-like odor. [Note: A pesticide that may be absorbed on a solid carrier or mixed in a more flammable liquid.]	MW: 322.3 BP: Decomposes Sol: 0.0007% Fl.P: ? IP: ? Sp.Gr(77°F): 1.20 Combustible Liquid	VP: 0.0002 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, iron [Note: Corrosive to iron.]	None available
Tellurium Te 13494-80-9 WY2625000	Aurum paradoxum, Metallum problematum	NIOSH*OSHA* 0.1 mg/m ³ [Note: The REL and PEL also apply to other tellurium compounds (as Te) except Tellurium hexafluoride, and Bismuth telluride.]	25 mg/m ³ (as Te)	Odorless, dark-gray to brown, amorphous powder or grayish- white, brittle solid.	MW: 127.6 BP: 1814°F Sol: Insoluble Fl.P: NA IP: NA Sp Gr: 6.24 Combustible Solid	VP: 0 mm (approx) MLT: 642°F UEL: NA LEL: NA	Oxidizers, chlorine, cadmium	Filter: Acid: AAS; II(3) [#S204]
Tellurium hexafluoride (as Te) TeF ₆ 7783-80-4 WY2800000 2195 15	Tellurium fluoride 1 ppm = 5.30 mg/m ³ (as Te)	NIOSH/OSHA 0.02 ppm (0.2 mg/m ³)	1 ppm	Colorless gas with a repulsive odor.	MW: 241.6 BP: Sublimes Sol: Decomposes Fl.P: NA IP: ? RGasD: 8.34 Nonflammable Gas	VP: >1 atm FRZ: -36°F (Sublimes) UEL: NA LEL: NA	Water [Note: Hydrolyzes slowly in water to telluric acid.]	Char: NaOH, AAS; II(3) [#S187]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 6)
Skin:	N.R.	NIOSH/OSHA	Inh	Irritates, skin;	Eye:	Eyes, skin, resp sys
Eyes:	N.R.	25 mg/m ³ : DM ^a	Con	in animals: pulm irrit	Breath:	
Wash skin:	N.R.	50 mg/m ³ : DMXSO ^a /DMFu/SA			Irr immed	
Remove:	N.R.	125 mg/m ³ : SA/CF/PAPRDM ^a			Resp support	
Change:	N.R.	250 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF				
		2500 mg/m ³ : SA:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Tantalum (metal and oxide dust, as Ta)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin; eye pain,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	2 mg/m ³ : SA	Abs	blurred vision, lac; rin;	Skin:	CNS, CVS, blood chol
Wash skin:	When contam	5 mg/m ³ : SA/CF	Ing	head; cyan; anor; nau;	Breath:	
Remove:	When wet or contam	10 mg/m ³ : SCBAF/SAF	Con	vomit, diarr; local sweat,	Swallow:	
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		weak, twitch, para,		
Provide:	Eyewash, Quick drench	Escape: GMFOVHIE/SCBAE		Chayne-Stokes respiration,		
				convuls, low BP, card irreg		
[TEDP]						
Skin:	N.R.	NIOSH/OSHA	Inh	Garlic breath, sweat; dry	Eye:	Skin, CNS, blood
Eyes:	N.R.	0.5 mg/m ³ : DM ^a	Ing	mouth, metallic taste; som;	Skin:	
Wash skin:	N.R.	1 mg/m ³ : DMXSO ^a /DMFu/SA	Con	anor, nau, no sweat; derm;	Breath:	
Remove:	N.R.	2.5 mg/m ³ : SA/CF/PAPRDM ^a		in animals: CNS, red	Swallow:	
Change:	N.R.	5 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF		blood cell effects		
		25 mg/m ³ : SA:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Tellurium]						
Skin:	N.R.	NIOSH/OSHA	Inh	Head; dysp; garlic breath;	Breath:	Resp sys
Eyes:	N.R.	0.2 ppm: SA		in animals: pulm edema	Resp support	
Wash skin:	N.R.	0.5 ppm: SA/CF				
Remove:	N.R.	1 ppm: SAT:CF/SCBAF/SAF				
Change:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFS/SCBAE				
[Tellurium hexafluoride (as Te)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Temephos $S(C_6H_4OP(S)(OCH_3))_3$ 3383-96-8 TF6890000	Abate®; Temefos; O,O,O',O'-Tetramethyl O,O'- thioldi-p-phenylene phosphorothioate	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	White, crystalline solid or liquid (above 87°F). [insecticide] [Note: Technical grade is a viscous, brown liquid.]	MW: 466.5 BP: 248-257°F (Decomposes) Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.32 Combustible Solid	VP(77°F): 0.0000007 mm MLT: 87°F UEL: ? LEL: ?	None reported	None available
TEPP $[(CH_3CH_2O)_2P(O)]_2O$ 107-49-3 UX6825000	Ethyl pyrophosphate, Tetraethyl pyrophosphate, Tetron®	NIOSH/OSHA 0.05 mg/m³ [skin]	5 mg/m³	Colorless to amber liquid with a faint, fruity odor. [insecticide] [Note: A solid below 32°F]	MW: 290.2 BP: Decomposes Sol: Miscible Fl.P: NA IP: ? Sp.Gr: 1.19 Noncombustible Liquid	VP: 0.00015 mm FRZ: 32°F UEL: NA LEL: NA	Strong oxidizers, alkalis, water [Note: Hydrolyzes quickly in water to form pyrophosphoric acid.]	Chrom-102 (2); Toluene; GC/FID; III [2504, Tetraethyl Pyrophos- phate]
2783 55 o-Terphenyl $C_6H_5C_6H_4C_6H_5$ 84-15-1 WZ6472000	o-Diphenylbenzene; 1,2-Diphenylbenzene; 2-Phenylbiphenyl; 1,2-Terphenyl; ortho-Terphenyl; o-Triphenyl	NIOSH C5 mg/m³ (0.5 ppm) OSHA† C9 mg/m³ (1 ppm)	500 mg/m³	Colorless or light- yellow solid.	MW: 230.3 BP: 630°F Sol: Insoluble Fl.P(oc): 325°F IP: 7.99 eV Sp.Gr: 1.1 Combustible Solid	VP: Very low MLT: 136°F UEL: ? LEL: ?	None reported	Filter; CS; GC/FID; III [#5021]
1 ppm = 12.06 mg/m³ m-Terphenyl $C_6H_5C_6H_4C_6H_5$ 92-06-8 WZ6470000	m-Diphenylbenzene; 1,3-Diphenylbenzene; Isodiphenylbenzene; 3-Phenylbiphenyl; 1,3-Terphenyl; meta-Terphenyl; m-Triphenyl	NIOSH C5 mg/m³ (0.5 ppm) OSHA† C9 mg/m³ (1 ppm)	500 mg/m³	Yellow solid (needles).	MW: 230.3 BP: 689°F Sol: Insoluble Fl.P(oc): 375°F IP: 8.01 eV Sp.Gr: 1.23 Combustible Solid	VP: Very low MLT: 192°F UEL: ? LEL: ?	None reported	Filter; CS; GC/FID; III [#5021]
1 ppm = 9.57 mg/m³								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	TBAL	Inh	Irrite eyes, blurred vision;	Eye:	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact		Abs	dizz, conf; dysp; saliv;	Skin:	CVS, blood chol
Wash skin:	When contam		Ing	abdom cramps, nau, diarr,	Breath:	
Remove:	When wet or contam		Con	vomit	Swallow:	
Change:	Daily					
[Temephos]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Eye pain, blurred vision,	Eye:	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact	0.5 mg/m ³ : SA	Abs	lac, rin; head, chest tight,	Skin:	CVS, GI tract,
Wash skin:	When contam	1.25 mg/m ³ : SA/CF	Ing	cyan, anor, nau, vomit,	Breath:	blood chol
Remove:	When wet or contam	2.5 mg/m ³ : SA/CF/SCBAF/SAF	Con	diarr; weak, twitch, para,	Swallow:	
Change:	N.R.	5 mg/m ³ : SA/PD,PP		Cheyne-Stokes respiration,		
Provide:	Eyewash, Quick drench	§: SCBAF/PD,PP/SAF/PD,PP:ASCBA		convuls; low BP, card		
		Escape: GMFOVHIE/SCBAE		irreg; sweat		
[TEPP]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrite eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 mg/m ³ : DM [†]	Ing	thermal skin burns; head;	Skin:	liver, kidneys
Wash skin:	When contam	50 mg/m ³ : DMXSQ/SA [†]	Con	sore throat;	Breath:	
Remove:	When wet or contam	125 mg/m ³ : SA/CF/PAPRDM [†]		in animals: liver, kidney	Swallow:	
Change:	Daily	250 mg/m ³ : HIEF/SCBAF/SAF		damage		
Provide:	Eyewash, Quick drench	500 mg/m ³ : SAF/PD,PP				
		§: SCBAF/PD,PP/SAF/PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[o-Terphenyl]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrite eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 mg/m ³ : DM [†]	Ing	thermal skin burns; head;	Skin:	liver, kidneys
Wash skin:	When contam	50 mg/m ³ : DMXSQ/SA [†]	Con	sore throat;	Breath:	
Remove:	When wet or contam	125 mg/m ³ : SA/CF/PAPRDM [†]		in animals: liver, kidney	Swallow:	
Change:	Daily	250 mg/m ³ : HIEF/SCBAF/SAF		damage		
Provide:	Eyewash, Quick drench	500 mg/m ³ : SAF/PD,PP				
		§: SCBAF/PD,PP/SAF/PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[m-Terphenyl]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
p-Terphenyl $C_{18}H_{14}$ 92-94-4 WZ6475000	p-Diphenylbenzene; 1,4-Diphenylbenzene; 4-Phenylbiphenyl; 1,4-Terphenyl; para-Terphenyl; p-Triphenyl	NIOSH C 5 mg/m ³ (0.5 ppm) OSHA† C 8 mg/m ³ (1 ppm)	500 mg/m ³	White or light- yellow solid.	MW: 230.3 BP: 761°F Sol: Insoluble FLP: 405°F IP: 7.78 eV Sp.Gr: 1.23 Combustible Solid	VP: Very low MLT: 415°F UEL: ? LEL: ?	None reported	Filter; CS; GC/FID; III [#5021]
2,3,7,8-Tetrachloro- dibenzo-p-dioxin $C_{12}H_4Cl_4O_2$ 1746-01-6 HP3500000	Dioxin; Dioxine; TCDBD; TCDD; 2,3,7,8-TCDD [Note: Formed during past production of 2,4,5-tri- chlorophenol, 2,4,5-T & 2(2,4,5-trichlorophenoxy)- propionic acid.]	NIOSH Ca See Appendix A OSHA none	Ca [N.D.]	Colorless to white, crystalline solid. [Note: Exposure may occur through contact at previously contaminated worksites.]	MW: 322.0 BP: Decomposes Sol: 0.00000002% FLP: ? IP: ? Sp.Gr: ?	VP(77°F): 0.000002 mm MLT: 581°F UEL: ? LEL: ?	UV light (decomposes)	None available
1,1,1,2-Tetrachloro- 2,2-difluoroethane CCl_3CClF_2 76-11-9 KI1425000	2,2-Difluoro-1,1,1,2- tetrachloroethane; Freon® 112a; Halocarbon 112a; Refrigerant 112a	NIOSH/OSHA 500 ppm (4170 mg/m ³)	2000 ppm	Colorless solid with a slight, ether-like odor. [Note: A liquid above 105°F.]	MW: 203.8 BP: 197°F Sol: 0.01% FLP: NA IP: ? Sp.Gr: 1.65 Noncombustible Solid	VP: 40 mm MLT: 105°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium, calcium & sodium; acids	Char; CS; GC/FID; III [#1016]
1,1,2,2-Tetrachloro- 1,2-difluoroethane CCl_2FCCl_2F 76-12-0 KI1420000	1,2-Difluoro-1,1,2,2- tetrachloroethane; Freon® 112; Halocarbon 112; Refrigerant 112	NIOSH/OSHA 500 ppm (4170 mg/m ³)	2000 ppm	Colorless solid or liquid (above 77°F) with a slight, ether-like odor.	MW: 203.8 BP: 199°F Sol(77°F): 0.01% FLP: NA IP: 11.30 eV Sp.Gr: 1.65 Noncombustible Solid	VP: 40 mm MLT: 77°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium, calcium & sodium; acids	Char; CS; GC/FID; III [#1016]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1,1,1,2-Tetrachloro- ethane <chem>CCl3CH2Cl</chem> 630-20-6 K18450000	None	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes) OSHA none	N.D.	Yellowish-red liquid.	MW: 167.9 BP: 267°F Sol: 0.1% Fl.P: ? IP: ? Sp.Gr: 1.54	VP(77°F): 14 mm FRZ: -94°F UEL: ? LEL: ?	Potassium; sodium; dinitrogen tetroxide; potassium hydroxide; nitrogen tetroxide; sodium potassium alloy; 2,4-dinitrophenyl disulfide	None available
1702 55	1 ppm = 7.00 mg/m ³							
1,1,2,2-Tetrachloro- ethane <chem>CHCl2CHCl2</chem> 79-34-5 K18575000	Acetylene tetrachloride, Symmetrical tetrachloro- ethane	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 1 ppm (7 mg/m ³) [skin] OSHA† 5 ppm (35 mg/m ³) [skin]	Ca [100 ppm]	Colorless to pale- yellow liquid with a pungent, chloroform-like odor.	MW: 167.9 BP: 296°F Sol: 0.3% Fl.P: NA IP: 11.10 eV Sp.Gr(77°F): 1.59 Noncombustible Liquid	VP: 5 mm FRZ: -33°F UEL: NA LEL: NA	Chemically-active metals, strong caustics, fuming sulfuric acid [Note: Degrades slowly when exposed to air.]	Char(pet); CS; GC/FID; III [#1019]
1702 55	1 ppm = 7.00 mg/m ³							
Tetrachloroethylene <chem>Cl2C=CCl2</chem> 127-18-4 KX3850000	Perchloroethylene, Perchloroethylene, Perk, Tetrachloroethylene	NIOSH Ca See Appendix A Minimize workplace odor, exposure concentrations limit number of workers exposed OSHA† 100 ppm C 200 ppm 300 ppm (5-min max peak in any 3 hrs)	Ca [150 ppm]	Colorless liquid with a mild, chloroform-like	MW: 165.8 BP: 250°F Sol: 0.02% Fl.P: NA IP: 9.32 eV Sp.Gr: 1.62 Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.	VP: 14 mm FRZ: -2°F UEL: NA LEL: NA	Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda, sodium hydroxide; potash	Char; CS; GC/FID; III [#1003, Haloge- nated Hydro- carbons]
1897 74	1 ppm = 6.89 mg/m ³							
Tetrachloronaphthalene <chem>C10H6Cl4</chem> 1335-88-2 QK3700000	Halowax®, Nibren wax, Seekay wax	NIOSH/OSHA 2 mg/m ³ [skin]	Unknown	Colorless to pale- yellow solid with an aromatic odor.	MW: 265.9 BP: 599-680°F Sol: Insoluble Fl.P(oc): 410°F IP: ? Sp.Gr: 1.59-1.65 Combustible Solid	VP: <1 mm MLT: 360°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; none; GC/FID; II(2) [#S130]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin; weak, restless, irreg respiration, muscle inco; in animals: liver changes	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CNS, liver
[1,1,1,2-Tetrachloroethane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH X: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, vomit, abdom pain, tremor/fingers, jaun, hepatitis, liver tend, derm, monoc, kidney damage, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, liver, kidneys, CNS, GI tract [in animals: liver tumors]
[1,1,2,2-Tetrachloroethane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH X: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, nau, flush face, neck, vert, dizz, inco: F&F, som; skin eryt, liver damage, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, CNS [in animals: liver tumors]
[Tetrachloroethylene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 20 mg/m ³ : SCBAF/SAF S: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Acne-form derm; head, ftg, anor, vert; jaun, liver inj	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Liver, skin, CNS
[Tetrachloronaphthalene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Tetraethyl lead (as Pb) $Pb(C_2H_5)_4$ 78-00-2 TP4550000	Lead tetraethyl, TEL, Tetraethylplumbane	NIOSH/OSHA 0.075 mg/m ³ [skin]	40 mg/m ³ (as Pb)	Colorless liquid (unless dyed red, orange, or blue) with a pleasant, sweet odor [Note: Main usage is in anti-knock additives for gasoline.]	MW: 323.5 BP: 228°F (Decomposes) Sol: 0.00002% Fl.P: 200°F IP: 11.10 eV	VP: 0.2 mm FRZ: -202°F UEL: ? LEL: 1.8%	Strong oxidizers, sulfuryl chloride, rust, potassium permanganate [Note: Decomposes slowly at room temperature and more rapidly at higher tempera- tures.]	XAD-2; Pentane; GC/PID; III [#2533]
1649 56	1 ppm = 13.45 mg/m ³				Sp Gr: 1.65 Class IIIB Combustible Liquid			
Tetrahydrofuran C_4H_8O 109-99-9 LU5950000	Diethylene oxide; 1,4-dioxane; Tetraethylene oxide; THF	NIOSH 200 ppm (590 mg/m ³) ST 250 ppm (735 mg/m ³) OSHA† 200 ppm (590 mg/m ³)	2000 ppm [LEL]	Colorless liquid with an ether-like odor.	MW: 72.1 BP: 151°F Sol: Miscible Fl.P: 6°F IP: 9.43 eV	VP: 132 mm FRZ: -163°F UEL: 11.8% LEL: 2%	Strong oxidizers, lithium-aluminum alloys [Note: Peroxides may accumulate upon prolonged storage in presence of air.]	Char; CS; GC/FID; III [#1609]
2056 26	1 ppm = 3.00 mg/m ³				Sp Gr: 0.69 Class IB Flammable Liquid			
Tetramethyl lead (as Pb) $Pb(CH_3)_4$ 75-74-1 TP4725000	Lead tetramethyl, Tetramethylplumbane, TML	NIOSH/OSHA 0.075 mg/m ³ [skin]	40 mg/m ³ (as Pb)	Colorless liquid (unless dyed red, orange, or blue) with a fruity odor. [Note: Main usage is in anti-knock additives for gasoline.]	MW: 267.3 BP: 212°F (Decomposes) Sol: 0.002% Fl.P: 100°F IP: 8.50 eV	VP: 23 mm FRZ: -15°F UEL: ? LEL: ?	Strong oxidizers such as sulfuryl chloride or potassium permanganate	XAD-2; Pentane; GC/PID; III [#2534]
1649 56	1 ppm = 11.11 mg/m ³				Sp Gr: 2.00 Class II Combustible Liquid			
Tetramethyl succinonitrile $(CH_3)_2C(CN)C(CN)(CH_3)_2$ 3333-52-6 WN4025000	Tetramethyl succino- dinitrile, TMSN	NIOSH/OSHA 3 mg/m ³ (0.5 ppm) [skin]	5 ppm	Colorless, odorless solid [Note: Forms cyanide in the body.]	MW: 136.2 BP: Sublimes Sol: Insoluble Fl.P: ? IP: ?	VP: ? MLT: 338°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers	Char; CS; GC/FID; II(3) [#S155]
	1 ppm = 5.66 mg/m ³				Sp Gr: 1.07 Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (>0.1%) Prevent eye contact When contam (>0.1%) When wet or contam (>0.1%) Daily Quick drench (>0.1%)	NIOSH/OSHA 0.75 mg/m ³ : SA 1.875 mg/m ³ : SA, CF 3.75 mg/m ³ : SAT, CF/SCBAF/SAF 40 mg/m ³ : SA, PD, PP § SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insom, lass, anxiety; tremor, hyper-reflexia, spasticity; bradycardia, hypotension, hypothermia, pallor, nau, anor, low-wgt; conf, disorientation, halu, psychosis, mania, convuls, coma; eye irrit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, CVS, kidneys, eyes
[Tetraethyl lead (as Pb)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: SA, CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF § SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys; nau, dizz, head, CNS depres	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, CNS
[Tetrahydrofuran]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (>0.1%) Prevent eye contact When contam (>0.1%) When wet or contam (>0.1%) Daily Quick drench (>0.1%)	NIOSH/OSHA 0.75 mg/m ³ : SA 1.875 mg/m ³ : SA, CF 3.75 mg/m ³ : SAT, CF/SCBAF/SAF 40 mg/m ³ : SA, PD, PP § SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insom, bad dreams, restless, anxious; hypotension, nau, anor; delirium, mania, convuls; coma	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, CVS, kidneys
[Tetramethyl lead (as Pb)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 28 mg/m ³ : SA/SCBAF § SCBAF, PD, PP/SAF, PD, PP: ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Head, nau; convuls, coma; liver, kidney, Gleffects	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	CNS, liver, kidneys, GI tract
[Tetramethyl succinonitrile]							

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Tetranitromethane $C(NO_2)_4$ 509-14-8 PB4025000	Tetan, TNM	NIOSH/OSHA 1 ppm (8 mg/m ³)	4 ppm	Colorless to pale-yellow liquid or solid (below 57°F) with a pungent odor.	MW: 196.0 BP: 259°F Sol: Insoluble Fl.P: ? IP: ?	VP: 8 mm FRZ: 57°F UEL: ? LEL: ?	Hydrocarbons, alkalis, metals, oxidizers, aluminum, toluene, cotton [Note: Combustible material wet with tetranitromethane may be highly explosive.]	Imp. none; GC/Alk-FID; II(3) [#S224]
1510 47	1 ppm = 8.15 mg/m ³				Sp Gr: 1.62 Combustible Liquid, but difficult to ignite.			
Tetrasodium pyrophosphate $Na_4P_2O_7$ 7722-88-5 UX7350000	Pyrophosphate, Sodiumpyrophosphate, Tetrasodium diphosphate, Tetrasodiumpyrophosphate (anhydrous), TSPP	NIOSH 5 mg/m ³ OSHA† none	N.D.	Odorless, white powder or granules. [Note: The decahydrate ($Na_4P_2O_7 \cdot 10H_2O$) is in the form of colorless, transparent crystals.]	MW: 265.9 BP: Decomposes Sol(77°F): 7% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1810°F UEL: NA LEL: NA	Strong acids	Filter; none; Grav; II [#0500, nuisance Dust (total)]
Tetryl $(NO_2)_2C_6H_2N(NO_2)CH_3$ 479-45-8 BY6300000	N-Methyl-N,2,4,6-tetranitroaniline; Nitramine; 2,4,6-Tetryl; 2,4,6-Trinitrophenyl-N-methylnitramine	NIOSH/OSHA 1.5 mg/m ³ [skin]	750 mg/m ³	Colorless to yellow, odorless, crystalline solid.	MW: 287.2 BP: 356-374°F (Explodes) Sol: 0.02% Fl.P: Explodes IP: ?	VP: <1 mm MLT: 268°F UEL: ? LEL: ?	Oxidizable materials, hydrazine	Filter; Reagent; Vis; II(3) [#S225]
					Sp. Gr: 1.57 Combustible Solid (Class A Explosive)			
Thallium (soluble compounds, as TI)	Synonyms vary depending upon the specific soluble thallium compound.	NIOSH/OSHA 0.1 mg/m ³ [skin]	15 mg/m ³ (as TI)	Appearance and odor or vary depending upon the specific soluble thallium compound.	Properties vary depending upon the specific soluble thallium compound.		Varies	Filter; Acid; AAS; II(3) [#S306]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) Daily Eyewash	NIOSH/OSHA 4 ppm: SA:CF ⁴ /CCRF ⁴ /GMFS ⁴ / PAPRS ⁴ /SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS ⁴ /SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; dizz; head; chest pain, dyp, methemo, cyan; skin burns	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, blood, CNS
[Tetraniromethane]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash (soln)	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; derm	Eye: Skin: Breath: Swallow: Irr immed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Tetrasodium pyrophosphate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	NIOSH/OSHA 7.5 mg/m ³ : DM 15 mg/m ³ : DMXSQ ⁴ /SA* 37.5 mg/m ³ : SA:CF ⁴ /PAPRDM* 75 mg/m ³ : HIEF/SCBAF/SAF 750 mg/m ³ : SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Sens derm, itch, eryt; edema on nasal folds, cheeks, neck; kera; sneez; anemia; fig; cough, coryza; irrity; mal, head, lass, insom; nau, vomit; liver, kidney damage	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Tetryl]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 0.5 mg/m ³ : DM* 1 mg/m ³ : DMXSQ ⁴ /SA 2.5 mg/m ³ : SA:CF ⁴ /PAPRDM* 5 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 15 mg/m ³ : SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Nau, diarr, abdom pain, vomit; ptosis, strabismus; peri neuritis, tremor; retster tight, chest pain, pulm edema; sez, chorea, psychosis; liver, kidney damage; alopecia; pares legs	Eye: Skin: Breath: Swallow: Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, CNS, liver, kidneys, GI tract, body hair
[Thallium (soluble compounds, as TI)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
4,4'-Thiobis(6-tert- butyl-m-cresol) [CH ₃ (OH)C ₆ H ₃ C(CH ₃) ₃] ₂ S 98-69-5 GP3150000	4,4'-Thiobis(3-methyl- 6-tert-butylphenol); 1,1'-Thiobis(2-methyl- 4-hydroxy-5-tert- butylbenzene)	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Light-gray to tan powder with a slightly aromatic odor.	MW: 358.6 BP: ? Sol: 0.08% Fl.P: 420°F IP: ? Sp.Gr: 1.10 Combustible Solid	VP: 0.0000006 mm MLT: 302°F UEL: NA LEL: NA	None reported	None available
Thioglycolic acid HSCH ₂ COOH 68-11-1 AI5950000	Acetyl mercaptan, Mercaptoacetate, Mercaptoacetic acid, 2-Mercaptoacetic acid, 2-Thioglycolic acid, Thiovanic acid	NIOSH 1 ppm (4 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid with a strong, disagreeable odor characteristic of mercaptans. [Note: Olfactory fatigue may occur after short exposures.]	MW: 92.1 BP: ? Sol: Miscible Fl.P: >230°F IP: ? Sp.Gr: 1.32 Class IIIB Combustible Liquid	VP(64°F): 10 mm FRZ: 2°F UEL: ? LEL: 5.9%	Air, strong oxidizers, bases, active metals (e.g., sodium potassium, magnesium, calcium) [Note: Readily oxidized by air.]	None available
Thionyl chloride SOCl ₂ 7719-09-7 XMS150000	Sulfinyl chloride, Sulfur chloride oxide, Sulfurous dichloride, Sulfurous oxychloride, Thionyl dichloride	NIOSH C1 ppm (5 mg/m ³) OSHA† none	N.D.	Colorless to yellow to reddish liquid with a pungent odor like sulfur dioxide. [Note: Fumes form when exposed to moist air.]	MW: 119.0 BP: 169°F Sol: Reacts Fl.P: NA IP: ? Sp.Gr: 1.64 Noncombustible Liquid	VP(70°F): 100 mm FRZ: -156°F UEL: NA LEL: NA	Water, acids, alkalis, ammonia, chloryl perchlorate [Note: Reacts violently with water to form sulfur dioxide & hydrogen chloride.]	None available
Thiram C ₆ H ₄ N ₂ S ₂ 137-26-8 JO1400000	bis(Dimethylthiocarbamoyl) disulfide, Tetramethylthiuram disulfide [(CH ₃) ₂ NC(S)SSC(S)N(CH ₃) ₂]	NIOSH/OSHA 5 mg/m ³	100 mg/m ³	Colorless to yellow, crystalline solid with a characteristic odor. [Note: Commercial pesticide products may be dyed blue.]	MW: 240.4 BP: Decomposes Sol: 0.003% Fl.P: ? IP: ? Sp.Gr: 1.29 Combustible Solid	VP: 0.000008 mm MLT: 312°F UEL: ? LEL: ?	Strong oxidizers, strong acids, oxidizable materials	Filter, CH ₃ CH, HPLC/UVD; III [#5005]
2771 55								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	TBAL	Inh Ing Con	Irrite eyes, skin, resp sys	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[4,4'-Thiobis(6-tert-butyl-m-cresol)]							
Skin:	Prevent skin contact	TBAL	Inh Abs Ing Con	Irrite eyes, skin, nose, throat; lac, com damage; skin burns, blisters; in animals: weak; gasping respirations; convuls	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Thioglycolic acid]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrite eyes, skin, muc memb; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact						
Wash skin:	When contam						
Remove:	When wet or contam						
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Thionyl chloride]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh Ing Con	Irrite eyes, skin, muc memb; dem; Antabuse-like effects	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	50 mg/m ³ : CCROVDMFu*/SA*					
Wash skin:	When contam	100 mg/m ³ : SA:CF*/CCRFOVHIE/					
Remove:	When wet or contam	GMFOVHIE/PAPROVDMFu*/					
Change:	Daily	SCBAF/SAF					
		§: SCBAF-PD, PP/SAF-PD, PP-ASCBA					
		Escape: GMFOVHIE/SCBAE					
[Thiram]							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 10 mg/m ³ : DM* 20 mg/m ³ : DMXSO**/SA* 50 mg/m ³ : SA:CF*/PAPRDM** 100 mg/m ³ : HIEF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin, resp sys, in animals: vomit, diarr, para with musc twitch	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys
[Tin]						
Recommendations vary depending upon the specific compound.		NIOSH/OSHA 1 mg/m ³ : CCROVDM/SA 2.5 mg/m ³ : SA:CF/PAPROVDM 5 mg/m ³ : CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SAT:CF/ SCBAF/SAF 25 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irr eyes, skin; resp sys; head, vert; psycho-neurologic dist; sore throat, cough; abdom pain, vomit; urine retention; paresis, focal anes; skin bums, pruritus; in animals: hemolysis; hepatic nec; kidney damage	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, urinary tract, blood
[Tin (organic compounds, as Sn)]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		TBAL	Inh Con	Stannosis (benign pneumoconiosis): dysp, decr pulm func	Eye: Breath: Irr immed Fresh air	Resp sys
[Tin(II) oxide (as Sn)]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		TBAL	Inh Con	Stannosis (benign pneumoconiosis): dysp, decr pulm func	Eye: Breath: Irr immed Fresh air	Resp sys
[Tin(IV) oxide (as Sn)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Titanium dioxide TiO_2 13463-67-7 XR2275000	Rutile, Titanium oxide, Titanium peroxide	NIOSH Ca See Appendix A OSHA† 15 mg/m³	Ca [5000 mg/m³]	White, odorless powder.	MW: 79.9 BP: 4532- 5432°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.26 Noncombustible Solid	VP: 0 mm (approx) MLT: 3326- 3362°F UEL: NA LEL: NA	None reported	Filter, Acid; AAS; II(3) [§5385]
o-Tolidine $\text{C}_{16}\text{H}_{14}\text{N}_2$ 119-93-7 DD1225000	4,4'-Diamino-3,3'-dimethyl- biphenyl; Diaminoditolyt; 3,3'-Dimethylbenzidine; 3,3'-Dimethyl-4,4'-diphenyl- diamine; 3,3'-Tolidine [$\text{CH}_3(\text{NH}_2)\text{C}_6\text{H}_4\text{C}_6\text{H}_3(\text{NH}_2)\text{CH}_3$]	NIOSH Ca See Appendix A See Appendix C C 0.02 mg/m³ [60-min] [skin] OSHA See Appendix C	Ca [N.D.]	White to reddish crystals or powder. [Note: Darkens on exposure to air. Often used in paste or wet cake form. Used as a basis for many dyes.]	MW: 212.3 BP: 572°F Sol: 0.1% Fl.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 264°F UEL: ? LEL: ?	Strong oxidizers	Filter; water; HPLC/UVD; III [§5013, Dyes]
Toluene $\text{C}_6\text{H}_5\text{CH}_3$ 108-88-3 XS5250000 1294 27	Methyl benzene, Methyl benzol, Phenyl methane, Toluol 1 ppm = 3.83 mg/m³	NIOSH 100 ppm (375 mg/m³) ST 150 ppm (560 mg/m³) OSHA† 200 ppm C 300 ppm 500 ppm (10-min max peak)	500 ppm	Colorless liquid with a sweet, pungent, benzene- like odor.	MW: 92.1 BP: 232°F Sol(74°F): 0.07% Fl.P: 40°F IP: 8.82 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 21 mm FRZ: -139°F UEL: 7.1% LEL: 1.1%	Strong oxidizers	Char; CS; GC/FID; III [§1500, Hydro- carbons]
Toluenediamine $\text{CH}_3\text{C}_6\text{H}_4(\text{NH}_2)_2$ 25376-45-8 95-80-7 (2,4-TDA) XS9445000 XS9625000 (2,4-TDA) 1709 53	Diaminotoluene, Methylphenylene diamine, TDA, Tolylenediamine	NIOSH Ca (all isomers) See Appendix A OSHA none	Ca [N.D.]	Colorless to brown, needle-shaped crystals or powder. [Note: Tends to darken on storage & exposure to air. Properties given are for 2,4-TDA.]	MW: 122.2 BP: 558°F Sol: Soluble Fl.P: 300°F IP: ? Sp.Gr: 1.05 (Liquid at 212°F) Combustible Solid	VP(224°F): 1 mm MLT: 210°F UEL: ? LEL: ?	None reported	Imp; Reagent; HPLC/UVD; III [§5516]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. Daily	NIOSH X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Lung fib; [carc]	Breath:	Resp support	Resp sys [in animals: lung tumors]
[Titanium dioxide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; in animals: liver, kidney damage; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, resp sys, liver, kidneys [in animals: liver, bladder & mammary gland tumors]
[o-Tolidine]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH 500 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; fig. weak, conf, euph, dizz, head; dilated pupils, lac; ner; musc fig, insom; pares; derm; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Toluene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH X: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; derm; ataxia, tacar, nau, vomit, convuls, resp depres; methemo, cyan, head, fig, dizz, bluish skin; liver in; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, blood, CVS, liver, CNS [in animals: liver, skin & mammary gland tumors]
[Toluenediamine]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Toluene-2,4- diisocyanate <chem>CH3C6H3(NCO)2</chem> 584-84-9 CZ6300000	TDI; 2,4-TDI; 2,4-Toluene diisocyanate	NIOSH Ca See Appendix A OSHA† C 0.02 ppm (0.14 mg/m³)	Ca [2.5 ppm]	Colorless to pale- yellow solid or liquid (above 71°F) with a sharp, pungent odor.	MW: 174.2 BP: 484°F Sol: Insoluble FLP: 260°F IP: ?	VP(77°F): 0.05 mm MLT: 71°F UEL: 9.5% LEL: 0.9%	Strong oxidizers, water, acids, bases & amines (may cause foam & spatter), alcohols [Note: Reacts slowly with water to form carbon dioxide and polyureas]	Coated glass wool; Methanol; HPLC/JVD; III [#2535]
2078 57	1 ppm = 7.24 mg/m³				Sp.Gr: 1.22 Class IIIB Combustible Liquid			
o-Toluidine <chem>CH3C6H4NH2</chem> 95-53-4 XU2975000	o-Aminotoluene, 2-Aminotoluene, 1-Methyl-2-aminobenzene, o-Methylaniline, 2-Methylaniline, ortho-Toluidine	NIOSH Ca See Appendix A [skin] OSHA 5 ppm (22 mg/m³) [skin]	Ca [50 ppm]	Colorless to pale- yellow liquid with an aromatic, aniline-like odor.	MW: 107.2 BP: 392°F Sol: 2% FLP: 185°F IP: 7.44 eV	VP: 0.3 mm FRZ: 6°F UEL: ? LEL: ?	Strong oxidizers, nitric acid, bases	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
1708 55	1 ppm = 4.46 mg/m³				Sp.Gr: 1.01 Class IIIA Combustible Liquid			
m-Toluidine <chem>CH3C6H4NH2</chem> 108-44-1 XU2800000	3-Amino-1-methylbenzene, 1-Aminophenylmethane, m-Aminotoluene, 3-Methylaniline, 3-Methylbenzenamine, 3-Toluidine, m-Tolylamine	NIOSH See Appendix D OSHA† none	N.D.	Colorless to light- yellow liquid with an aromatic, amine- like odor. [Note: Used as a basis for many dyes.]	MW: 107.2 BP: 397°F Sol: 2% FLP: 187°F IP: 7.50 eV	VP(106°F): 1 mm FRZ: -23°F UEL: ? LEL: ?	Oxidizers, acids	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
1708 55	1 ppm = 4.46 mg/m³				Sp.Gr: 0.999 Class IIIA Combustible Liquid			
p-Toluidine <chem>CH3C6H4NH2</chem> 106-49-0 XU3150000	4-Aminotoluene, 4-Methylaniline, 4-Methylbenzenamine, 4-Toluidine, Tolylamine	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	White solid with an aromatic odor. [Note: Used as a basis for many dyes.]	MW: 107.2 BP: 393°F Sol: 0.7% FLP: 188°F IP: 7.50 eV	VP(106°F): 1 mm MLT: 111°F UEL: ? LEL: ?	Oxidizers, acids	Si gel; Ethanol; GC/FID; III [#2002, Aromatic Amines]
1708 55	1 ppm = 4.46 mg/m³				Sp.Gr: 1.05 Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH ✖: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrite eyes, skin, nose, throat; choke, paroxysmal cough; chest pain, retster soreness; nau, vomit, abdom pain; bron, bronchospasm, pulm edema, dysp, asthma; conj, lac; derm, skin sens; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys [in animals: pancreas, liver, mammary gland, circulatory sys & skin tumors]
[Toluene-2,4-diisocyanate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH ✖: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrite eyes; anoxia, head, cyan, weak, dizz, drow; micro hema, eye burns; derm; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, blood kidneys, liver, CVS [in animals: liver, bladder & mammary gland tumors]
[o-Toluidine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		TBAL	Inh Abs Ing Con	Irrite eyes, skin; hema, methemo; cyan, nau, vomit, low BP, convuls; anemia, weak	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, blood CVS
[m-Toluidine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH ✖: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrite eyes, skin; derm; hema, methemo; cyan, nau, vomit, low BP, convuls; anemia, weak; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, blood, CVS [in animals: liver tumors]
[p-Toluidine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Tributyl phosphate (CH ₃) ₃ CH ₂ (O) ₃ PO 126-73-8 TC7700000	Butyl phosphate, TBP, Tributyl ester of phosphoric acid, Tri-n-butyl phosphate	NIOSH 0.2 ppm (2.5 mg/m ³) OSHA† 5 mg/m ³	30 ppm	Colorless to pale- yellow, odorless liquid.	MW: 266.3 BP: 552°F (Decomposes) Sol: 0.6% Fl.P(oc): 295°F IP: ?	VP(77°F): 0.004 mm FRZ: -112°F UEL: ? LEL: ?	Alkalis, oxidizers, water, moist air	Filter; Diethyl ether; GC/FPD; III [#S208]
	1 ppm = 11.07 mg/m ³				Sp.Gr: 0.98 Class IIIB Combustible Liquid			
Trichloroacetic acid CCl ₃ COOH 76-03-9 AJ7875000	TCA, Trichloroethanoic acid	NIOSH 1 ppm (7 mg/m ³) OSHA† none	N.D.	Colorless to white, crystalline solid with a sharp, pungent odor.	MW: 163.4 BP: 388°F Sol: Miscible Fl.P: NA IP: ?	VP(124°F): 1mm MLT: 136°F UEL: NA LEL: NA	Moisture, iron, zinc, aluminum, strong oxidizers [Note: Decomposes on heating to form phosgene & hydrogen chloride. Corrosive to metals.]	None available
1839 59(solid) 2564 59(solution)	1 ppm = 6.79 mg/m ³				Sp.Gr: 1.62 Noncombustible Solid			
1,2,4-Trichlorobenzene C ₆ H ₃ Cl ₃ 120-82-1 DC2100000none	unsym-Trichlorobenzene; 1,2,4-Trichlorobenzol	NIOSH C 5 ppm (40 mg/m ³) OSHA†	N.D.	Colorless liquid or crystalline solid (below 63°F) with an aromatic odor. 2.5%	MW: 181.4 BP: 416°F Sol: 0.003% Fl.P: 222°F IP: ?	VP: 1 mm FRZ: 63°F UEL(302°F): 6.6% LEL(302°F):	Acids, acid fumes, oxidizers, steam	Filter/ XAD-2; Hexane; GC/ECD; III [#5517, Poly- chloro- benzenes]
2321 54(liquid)	1 ppm = 7.54 mg/m ³				Sp.Gr: 1.45 Class IIIB Combustible Liquid Combustible Solid			
1,1,2-Trichloroethane CHCl ₂ CH ₂ Cl 79-00-5 KJ3150000	Ethane trichloride, 1,1,2-Trichloroethane, Vinyl trichloride	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 10 ppm (45 mg/m ³) [skin] OSHA 10 ppm (45 mg/m ³) [skin]	Ca [100 ppm]	Colorless liquid with a sweet, chloroform-like odor.	MW: 133.4 BP: 237°F Sol: 0.4% Fl.P: ? IP: 11.00 eV	VP: 19 mm FRZ: -34°F UEL: 15.5% LEL: 6%	Strong oxidizers & caustics; chemically-active metals (such as aluminum, magnesium powders, sodium & potassium)	Char; XAD; CS; C/FID; III [#1003, Halo- genated Hydro- carbons]
2831 74	1 ppm = 5.55 mg/m ³				Sp.Gr: 1.44 Combustible Liquid, forms dense soot.			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	2 ppm: SA	Ing	head, nau	Skin	Soap wash prompt	
Wash skin:	When contam	5 ppm: SA/CF	Con		Breath:	Resp support	
Remove:	When wet or contam	10 ppm: SCBAF/SAF			Swallow:	Medical attention	
Change:	N.R.	30 ppm: SAF/PD, PP				immed	
		§ SCBAF PD, PP/SAF, PD, PP, ASCBA					
		Escape: GMFOVH/E/SCBAE					
[Tributyl phosphate]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	throat, resp sys; cough,	Skin:	Water flush immed	GI tract
Wash skin:	When contam		Con	dysp, delayed pulm edema;	Breath:	Resp support	
Remove:	When wet or contam			eye, skin burns; derm;	Swallow:	Medical attention	
Change:	Daily			saliv, vomit, diarr		immed	
Provide:	Eyewash, Quick drench						
[Trichloroacetic acid]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	in animals; liver, kidney	Skin:	Soap wash	liver, repro sys
Wash skin:	When contam		Ing	damage; possible terato	Breath:	Resp support	
Remove:	When wet or contam		Con	effects	Swallow:	Medical attention	
Change:	N.R.					immed	
[1,2,4-Trichlorobenzene]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose; CNS	Eye:	Irr immed	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact	¼ SCBAF PD, PP/SAF, PD, PP, ASCBA	Abs	depres, liver, kidney	Skin:	Soap wash prompt	liver, kidneys
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	damage, derm; [carc]	Breath:	Resp support	[in animals:
Remove:	When wet or contam		Con		Swallow:	Medical attention	liver cancer]
Change:	N.R.					immed	
Provide:	Eyewash, Quick drench						
[1,1,2-Trichloroethane]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Trichloroethylene <chem>ClCH=CCl2</chem> 79-01-6 KX4550000	Ethylene trichloride, TCE, Trichloroethene, Trilene	NIOSH Ca See Appendix A See Appendix C OSHA† 100 ppm C 200 ppm 300 ppm (5-min max peak in any 2 hrs)	Ca [1000 ppm]	Colorless liquid (unless dyed blue) with a chloroform- like odor.	MW 131.4 BP: 189°F Sol(77°F): 0.0001% Fl.P: ? IP: 9.45 eV	VP: 58 mm FRZ: -99°F UEL(77°F): 10.5% LEL(77°F): 8%	Strong caustics & alkalis; chemically- active metals (such as barium, lithium, sodium, magnesium, titanium & beryllium)	Char; CS; GC/FID; III [#1022]
1710 74	1 ppm = 5.46 mg/m ³				Sp.Gr: 1.46 Combustible Liquid, but burns with difficulty.			
Trichloronaphthalene <chem>C10H5Cl3</chem> 1321-65-9 QK4025000	Halowax® Nibren wax, Seekay wax	NIOSH/OSHA 5 mg/m ³ [skin]	Unknown	Colorless to pale- yellow solid with an aromatic odor.	MW: 231.5 BP: 579-669°F Sol: Insoluble Fl.P(oc): 392°F IP: ?	VP: <1 mm MLT: 199°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; none; GC/FID; II(2) [#S128]
					Sp.Gr: 1.58 Combustible Solid			
1,2,3-Trichloropropane <chem>CH3ClCHClCH2Cl</chem> 96-18-4 TZ9275000	Allyl trichloride, Glycerol trichlorohydrin, Glyceryl trichlorohydrin, Trichlorohydrin	NIOSH Ca See Appendix A 10 ppm (60 mg/m ³) [skin] OSHA† 50 ppm (300 mg/m ³)	Ca [100 ppm]	Colorless liquid with a chloroform- like odor.	MW: 147.4 BP: 314°F Sol: 0.1% Fl.P: 160°F IP: ?	VP: 3 mm FRZ: 6°F UEL(302°F): 12.8% LEL(248°F): 3.2%	Chemically-active metals, strong caustics & oxidizers	Char; CS; GC/FID; III [#1003, Haloge- nated Hydro- carbons]
	1 ppm = 6.13 mg/m ³				Sp.Gr: 1.39 Class IIIA Combustible Liquid			
1,1,2-Trichloro-1,2,2- trifluoroethane <chem>CCl2FCClF2</chem> 76-13-1 KJ4000000	Chlorofluorocarbon-113, CFC-113, Freon® 113, Genetron® 113, Halocarbon 113, Refrigerant 113, TTE	NIOSH 1000 ppm (7600 mg/m ³) ST 1250 ppm (9500 mg/m ³) OSHA† 1000 ppm (7600 mg/m ³)	2000 ppm	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentra- tions. [Note: A gas above 118°F.]	MW: 187.4 BP: 118°F Sol(77°F): 0.02% Fl.P: ? IP: 11.99 eV	VP: 285 mm FRZ: -31°F UEL: ? LEL: ?	Chemically-active metals such as calcium, powdered aluminum, zinc, magnesium & beryllium [Note: Decomposes if in contact with alloys containing >2% magnesium.]	Char; CS; GC/FID; III [#1020]
	1 ppm = 7.79 mg/m ³				Sp.Gr(77°F): 1.56 Noncombustible Liquid at ordinary temperatures, but the gas will ignite and burn weakly at 1256°F.			

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Triethylamine (C ₂ H ₅) ₃ N 121-44-8 YEO175000	TEA	NIOSH See Appendix D OSHA† 25 ppm (100 mg/m ³)	200 ppm	Colorless liquid with a strong, ammonia-like odor.	MW: 101.2 BP: 193°F Sol: 2% Fl.P.: 20°F IP: 7.50 eV	VP: 54 mm FRZ: -175°F UEL: 8.0% LEL: 1.2%	Strong oxidizers, strong acids, chlorine, hypochlorite, halogenated compounds	Bub. NaOH; GC/FID; II(3) [#152]
1296 68	1 ppm = 4.21 mg/m ³				Sp. Gr: 0.73 Class 1B Flammable Liquid			
Trifluorobromomethane CBrF ₃ 75-63-8 PA5425000	Bromotrifluoromethane, Fluorocarbon 1301, Freon® 13B1, Halocarbon 13B1, Halon® 1301, Monobromotrifluoromethane, Refrigerant 13B1, Trifluoromonobromomethane	NIOSH/OSHA 1000 ppm (5100 mg/m ³)	40,000 ppm	Colorless, odorless gas. [Note: Shipped as a liquefied compressed gas.]	MW: 148.9 BP: -72°F Sol: 0.03% Fl.P.: NA IP: 11.78 eV	VP: >1 atm FRZ: -267°F UEL: NA LEL: NA	Chemically-active metals (such as calcium, powdered aluminum, zinc & magnesium)	Char(2); CH, Cl; GC/FID; III [#1017]
1009 12	1 ppm = 6.19 mg/m ³				RGasD: 5.14 Nonflammable Gas			
Trimellitic anhydride C ₆ H ₂ O ₅ 552-30-7 DC2050000	1,2,4-Benzeneetricarboxylic anhydride; 4-Carboxyphthalic anhydride; TMA; TMAN; Trimellitic acid anhydride [Note: TMA is also a synonym for Trimethylamine.]	NIOSH 0.005 ppm (0.04 mg/m ³) Should be handled in the workplace as an extremely toxic substance. OSHA† none	N.D.	Colorless solid.	MW: 192.1 BP: ? Sol: ? Fl.P.: NA IP: ?	VP: 0.000004 mm MLT: 322°F UEL: NA LEL: NA	None reported	Filter; Methanol; GC/FID; III [FACAM #322]
	1 ppm = 7.99 mg/m ³				Sp. Gr: ? Combustible Solid			
Trimethylamine (CH ₃) ₃ N 75-50-3 PA0350000	N,N-Dimethylmethanamine; TMA [Note: May be used in an aqueous solution (typically 25%, 30%, or 40% TMA.)]	NIOSH 10 ppm (24 mg/m ³) ST 15 ppm (36 mg/m ³) OSHA† none	N.D.	Colorless gas with a fishy, amine odor. [Note: A liquid below 37°F. Shipped as a liquefied compressed gas.]	MW: 59.1 BP: 37°F Sol(88°F): 48% Fl.P.: NA (Gas) 20°F (Liq) IP: 7.82 eV	VP(70°F): 1454 mm FRZ: -173°F UEL: 11.8% LEL: 2.0%	Strong oxidizers (including bromine), ethylene oxide, nitrosating agents (e.g., sodium nitrite), mercury, strong acids [Note: Corrosive to many metals (e.g., zinc, brass, aluminum, copper).]	None available
1083 19 (anhydrous) 1297 29 (aqueous)	1 ppm = 2.46 mg/m ³				RGasD: 2.09 Flammable Gas Class 1A Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	OSHA 200 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; in animals: myocardial, kidney, liver damage	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS, liver, kidneys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Eyewash (>1%), Quick drench (>1%)					
[Triethylamine]						
Skin:	Frostbite	NIOSH/OSHA 10,000 ppm: SA 25,000 ppm: SA:CF 40,000 ppm: SAT:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Li-head; card arrhy; liq: frostbite	Eye: Skin: Breath: Frostbite Resp support	CNS, heart
Eyes:	Frostbite					
Wash skin:	N.R.					
Remove:	N.R.					
Change:	N.R.					
Provide:	Frostbite					
[Trifluorobromomethane]						
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin, nose, resp sys; pulm edema, resp sens; rhinitis, asthma, cough, wheez, dysp, mal, fever, muscle aches, sneez	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact					
Wash skin:	When contam					
Remove:	When wet or contam					
Change:	Daily					
[Trimellitic anhydride]						
Skin:	Prevent skin contact (liq/soln)/ Frostbite	TBAL	Inh Ing (soln) Con	Irrit eyes, skin, nose, throat, resp sys; cough, dysp, delayed pulm edema; blurred vision, corn nec; skin burns; liq: frostbite	Eye: Skin: Breath: Swallow: Irr immed (liq/soln)/ Frostbite Water flush immed (liq/soln)/Frostbite Resp support Medical attention immed (soln)	Eyes, skin, resp sys
Eyes:	Prevent eye contact (liq/soln)/Frostbite					
Wash skin:	When contam (soln)					
Remove:	When wet (flamm)					
Change:	N.R.					
Provide:	Eyewash (liq/soln), Quick drench (liq/soln), Frostbite					
[Trimethylamine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1,2,3-Trimethylbenzene $C_6H_3(CH_3)_3$ 526-73-8 DC3300000	Hemellitrol [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]	NIOSH 25 ppm (125 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a distinctive, aromatic odor.	MW: 120.2 BP: 349°F Sol: Low FLP: ? IP: 8.48 eV	VP(62°F): 1 mm FRZ: -14°F UEL: 6.6% LEL: 0.6%	Oxidizers, nitric acid	None available
2325 26	1 ppm = 5.00 mg/m ³				Sp.Gr: 0.89 Flammable Liquid			
1,2,4-Trimethylbenzene $C_6H_3(CH_3)_3$ 95-63-6 DC3325000	Assymetrical trimethyl- benzene, psi-Cumene, Pseudocumene [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.]	NIOSH 25 ppm (125 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a distinctive, aromatic odor.	MW: 120.2 BP: 337°F Sol: 0.006% FLP: 112°F IP: 8.27 eV	VP(56°F): 1 mm FRZ: -77°F UEL: 6.4% LEL: 0.9%	Oxidizers, nitric acid	None available
2325 26	1 ppm = 5.00 mg/m ³				Sp.Gr: 0.88 Class II Flammable Liquid			
1,3,5-Trimethylbenzene $C_6H_3(CH_3)_3$ 108-67-8 OX6825000	Mesitylene, Symmetrical trimethyl- benzene, sym-Trimethylbenzene	NIOSH 25 ppm (125 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a distinctive, aromatic odor.	MW: 120.2 BP: 329°F Sol: 0.002% FLP: 122°F IP: 8.39 eV	VP: 2 mm FRZ: -49°F UEL: ? LEL: ?	Oxidizers, nitric acid	None available
2325 26	1 ppm = 5.00 mg/m ³				Sp.Gr: 0.86 Class II Flammable Liquid			
Trimethyl phosphite $(CH_3O)_3P$ 121-45-9 TH1400000	Methyl phosphite, Trimethoxyphosphine	NIOSH 2 ppm (10 mg/m ³) OSHA† none	N.D.	Colorless liquid with a distinctive, pungent odor.	MW: 124.1 BP: 232°F Sol: Reacts FLP: 82°F IP: ?	VP(77°F): 24 mm FRZ: -108°F UEL: ? LEL: ?	Magnesium perchlorate, None water [Note: Reacts (hydrolyzes) with water.]	None available
2329 26	1 ppm = 5.16 mg/m ³				Sp.Gr: 1.05 Class IC Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Ing Con	Irr ite eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, conf; chemical pneu (aspiriliq)	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[1,2,3-Trimethylbenzene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Ing Con	Irr ite eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, conf; chemical pneu (aspiriliq)	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[1,2,4-Trimethylbenzene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Ing Con	Irr ite eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, conf; chemical pneu (aspiriliq)	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[1,3,5-Trimethylbenzene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Quick drench	TBAL	Inh Ing Con	Irr ite eyes, skin, upper resp sys; derm; in animals: terato effects	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, repro sys
[Trimethyl phosphite]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOTID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2,4,6-Trinitrotoluene $\text{CH}_3\text{C}_6\text{H}_2(\text{NO}_2)_3$ 118-96-7 XU0175000	1-Methyl-2,4,6- trinitrobenzene; TNT; Trinitrotoluene; sym-Trinitrotoluene; Trinitrotol:ol	NIOSH 0.5 mg/m ³ [skin] OSHA† 1.5 mg/m ³ [skin]	500 mg/m ³	Colorless to pale- yellow, odorless solid or crushed flakes.	MW: 227.1 BP: 464°F (Explodes) Sol(77°F): 0.01% Fl.P: ? (Explodes) IP: 10.59 eV Sp.Gr: 1.65 Combustible Solid (Class A Explosive)	VP: 0.0002 mm MLT: 176°F UEL: ? LEL: ?	Strong oxidizers, ammonia, strong alkalis, combustible materials, heat [Note: Rapid heating will result in detonation.]	TenaxGC; Acetone; GC/TEA; OSHA [#44]
1356 33 (wet)								
Trionthocresyl phosphate $(\text{CH}_3\text{C}_6\text{H}_4\text{O})_3\text{PO}$ 78-30-8 TD0350000	TCP TOCP Tri-o-cresyl ester of phosphoric acid; Tri-o-cresyl phosphate	NIOSH 0.1 mg/m ³ [skin] OSHA† 0.1 mg/m ³	40 mg/m ³	Colorless to pale- yellow, odorless liquid or solid (below 52°F).	MW: 368.4 BP: 770°F (Decomposes) Sol: Slight Fl.P: 437°F IP: ? Sp.Gr: 1.20 Class IIIB Combustible Liquid	VP(77°F): 0.00002 mm FRZ: 52°F UEL: ? LEL: ?	Oxidizers	Filter; Diethyl ether; GC/FPD, III [#S209]
2574 55	1 ppm = 15.31 mg/m ³							
Triphenylamine $(\text{C}_6\text{H}_5)_3\text{N}$ 603-34-9 YK2680000	N,N-Diphenylaniline; N,N-Diphenylbenzenamine	NIOSH 5 mg/m ³ OSHA† none	N.D.	Colorless solid.	MW: 245.3 BP: 689°F Sol: Insoluble Fl.P: ? IP: 7.60 eV Sp.Gr: 0.77	VP: ? MLT: 261°F UEL: ? LEL: ?	None reported	None available
Triphenyl phosphate $(\text{C}_6\text{H}_5)_3\text{P}$ 115-86-6 TC8400000	Triphenyl phosphate, tri-o-cresyl ester of phosphoric acid	NIOSH/OSHA 3 mg/m ³	1000 mg/m ³	Colorless, crystalline powder with a phenol-like odor.	MW: 326.3 BP: 776°F Sol(129°F): 0.002% Fl.P: 428°F IP: ? Sp.Gr: 1.29 Combustible Solid	VP(380°F): 1mm MLT: 120°F UEL: ? LEL: ?	None reported	Filter; Diethyl ether; GC/FPD, III [#S210]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit skin, muc memb; liver	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 mg/m ³ : SA*	Abs	damage, jaun; cyan; sneez;	Skin:	blood, liver, CVS,
Wash skin:	When contam/Daily	12.5 mg/m ³ : SA:CF*	Ing	cough, sore throat; peri	Breath:	CNS, kidneys
Remove:	When wet or contam	25 mg/m ³ : SCBAF/SAF	Con	neur, musc pain; kidney	Swallow:	
Change:	Daily	500 mg/m ³ : SAF:PD,PP		damage; cataract; sens		
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		denn; leucyt; anemia;		
		Escape: GMFOVHIE/SCBAE		card irreg		
[2,4,6-Trinitrotoluene]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	GI dist; peri neur;	Eye:	PNS, CNS
Eyes:	N.R.	0.5 mg/m ³ : DM	Abs	cramps in calves, pares in	Skin:	
Wash skin:	When contam	1 mg/m ³ : DMXSQ/SA	Ing	feet or hands; weak feet,	Breath:	
Remove:	When wet or contam	2.5 mg/m ³ : SA:CF/PAPRDM	Con	wrist drop, para	Swallow:	
Change:	N.R.	5 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF				
		40 mg/m ³ : SA:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Triorthocresyl phosphate]						
Skin:	Prevent skin contact	TBAL	Inh	In animals: irrit skin	Eye:	Skin
Eyes:	Prevent eye contact		Ing		Skin:	
Wash skin:	Daily		Con		Breath:	
Remove:	N.R.				Swallow:	
Change:	Daily					
[Triphenylamine]						
Skin:	N.R.	NIOSH/OSHA	Inh	Minor changes in blood	Breath:	Blood, PNS
Eyes:	N.R.	15 mg/m ³ : D	Ing	enzymes;	Swallow:	
Wash skin:	N.R.	30 mg/m ³ : HIE/DXSQ/SA		in animals: musc weak,		
Remove:	N.R.	75 mg/m ³ : SA:CF/PAPRDM		para		
Change:	N.R.	150 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF				
		1000 mg/m ³ : SA:PD,PP				
		§: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Triphenyl phosphate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Tungsten W 7440-33-7 YO7175000	Tungsten metal, Wolfram	NIOSH* 5 mg/m ³ ST 10 mg/m ³ [* Note: The REL also applies to other insoluble tungsten compounds (as W).] OSHA† none	N.D.	Hard, brittle, steel-gray to tin-white solid.	MW: 183.9 BP: 10,701°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 19.3 Combustible in the form of finely divided powder; may ignite spontaneously.	VP: 0 mm (approx) MLT: 6170°F UEL: NA LEL: NA	Bromine trifluoride, chlorine trifluoride, fluorine, iodine pentafluoride	Filter; Acid; AA; III [#7074]
Tungsten (soluble compounds, as W)	Synonyms vary depending upon the specific soluble tungsten compound.	NIOSH 1 mg/m ³ ST 3 mg/m ³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific soluble tungsten compound.	Properties vary depending upon the specific soluble tungsten compound.		Varies	Filter; Acid; AA; III [#7074]
Tungsten carbide (cemented) WC/Co/Ni/Ti 1: 11107-01-0 2: 12718-69-3 3: 37329-49-0 1: Y07350000 2: Y07525000 3: Y07700000	Cemented tungsten carbide, Cemented WC, Hard metal [Note: The tungsten carbide (WC) content is generally 85-95% & the cobalt content is generally 5-15%.] [1: 85% WC, 15% Co 2: 92% WC, 8% Co 3: 78% WC, 14% Co, 8% Ti]	NIOSH See Appendix C OSHA† See Appendix C	N.D.	A mixture of tungsten carbide, cobalt, and sometimes other metals & metal oxides or carbides.	Properties vary depending upon the specific mixture.		Tungsten carbide: Fluorine, chlorine trifluoride, oxides of nitrogen, lead dioxide	Filter; Acid; AA; III [#7027, Cobalt]
Turpentine C ₁₀ H ₁₆ (approx) 8006-64-2 Y08400000 1299 27	Gum spirits, Gum turpentine, Spirits of turpentine, Steam distilled turpentine, Sulfate wood turpentine, Turps, Wood turpentine 1 ppm 5.65 mg/m ³ (approx)	NIOSH/OSHA 100 ppm (560 mg/m ³)	800 ppm	Colorless liquid with a characteristic odor.	MW: 136 (approx) BP: 309-338°F Sol: Insoluble Fl.P, 95°F IP: ? Sp.Gr: 0.86 Class IC Flammable Liquid	VP: 4 mm FRZ: -58 to -78°F UEL: ? LEL: 0.8%	Strong oxidizers, chlorine, chromic anhydride, stannic chloride, chromyl chloride	Char; CS; GC/FID; III [#1551]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH 50 mg/m ³ : HIE/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIE/SCBAE	Inh ing Con	Irrit eyes, skin, resp sys; diffuse pulm fib; loss of appetite, nau, cough; blood changes	Eye: Skin: Breath: Swallow:	Irritated Soap wash Fresh air Medical attention Irritated	Eyes, skin, resp sys, blood
[Tungsten]							
Recommendations vary depending upon the specific compound.		NIOSH 10 mg/m ³ : HIE/SA 25 mg/m ³ : SA:CF 50 mg/m ³ : HIE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIE/SCBAE	Inh ing Con	Irrit eyes, skin, resp sys; in animals: CNS disturbances; diarr; resp failure; behavior, body weight, blood changes	Eye: Skin: Breath: Swallow:	Irritated Water wash Resp support Medical attention Irritated	Eyes, skin, resp sys, CNS, GI tract
[Tungsten (soluble compounds, as W)]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily (NI) Remove: When wet or contam Change: Daily		NIOSH 0.25 mg Co/m ³ : DM* 0.5 mg Co/m ³ : DMXSO*/DMFu*/SA* 1.25 mg Co/m ³ : SA:CF*/PAPRDM*/ PAPRDMFu* 2.5 mg Co/m ³ : HIE/SCBAF/SAF 20 mg Co/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIE/SCBAE	Inh ing Con	Irrit eyes, skin, resp sys; possible skin sens to cobalt, nickel; diffuse pulm fib; loss of appetite, nau, cough; blood changes	Eye: Skin: Breath: Swallow:	Irritated Soap wash Fresh air Medical attention Irritated	Eyes, skin, resp sys, blood
[Tungsten carbide (cemented)]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flam) Change: N.R.		NIOSH/OSHA 800 ppm: SA:CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs ing Con	Irrit eyes, skin, nose, throat; head, verti, convuls; skin sens; hema, album; kidney damage; abdom pain, nau, vomit, diarr; chemical pneu (aspir liq)	Eye: Skin: Breath: Swallow:	Irritated Soap wash prompt Resp support Medical attention Irritated	Eyes, skin, resp sys, CNS, kidneys
[Turpentine]							

Chemical name, structural formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
1-Undecanethiol <chem>CH3(CH2)10SH</chem> 5332-52-5	Undecylmercaptan	NIOSH C 0.5 ppm (3.9 mg/m ³) [15-min] OSHA none	N.D.	Liquid.	MW: 188.4 BP: 495°F Sol: Insoluble FLP: ? IP: ?	VP: ? FRZ: 27°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
1 ppm = 7.83 mg/m ³					Sp.Gr: 0.84 Combustible Liquid			
Uranium (insoluble compounds, as U) U (Metal) 7440-61-1 (Metal) YR3490000 (Metal) 2979 65 (Metal, pyrophoric)	Uranium metal; Uranium I Synonyms of other insoluble uranium compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A 0.2 mg/m ³ ST 0.6 mg/m ³ OSHA† 0.25 mg/m ³	Ca [10 mg/m ³ (as U)]	Metal. Silver-white, malleable, ductile, lustrous solid. [Note: Weakly radioactive.]	MW: 238.0 BP: 6895°F Sol: Insoluble FLP: NA IP: NA	VP: 0 mm (approx) MLT: 2097°F UEL: NA LEL: NA MEC: 60 g/m ³	Carbon dioxide, carbon tetrachloride, nitric acid, fluorine [Note: Complete coverage of uranium metal scrap with oil is essential for prevention of fire.]	None available
					Sp.Gr: 19.05 (Metal) Metal: Combustible Solid, especially turnings and powder.			
Uranium (soluble compounds, as U)	Synonyms vary depending upon the specific soluble uranium compound.	NIOSH Ca See Appendix A 0.05 mg/m ³ OSHA 0.05 mg/m ³	Ca [10 mg/m ³ (as U)]	Appearance and odor vary depending upon the specific soluble uranium compound.	Properties vary depending upon the specific soluble uranium compound.		Uranyl nitrate: combustibles Uranium hexafluoride: water	None available
n-Valeraldehyde <chem>CH3(CH2)4CHO</chem> 110-52-3 YV3600000	Amyl aldehyde, Pentanal, Valeral, Valeraldehyde, Valeric aldehyde	NIOSH 50 ppm (175 mg/m ³) See Appendix C (Aldehydes) OSHA† none	N.D.	Colorless liquid with a strong, acid, pungent odor.	MW: 86.2 BP: 217°F Sol: Slight FLP: 54°F IP: 9.82 eV	VP: 26 mm FRZ: -133°F UEL: ? LEL: ?	None reported	XAD-2; Toluene; GC/FID; ■ [02536]
2058 26					Sp.Gr: 0.81 Class IB Flammable Liquid			
1 ppm = 3.56 mg/m ³								

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irritates eyes, skin, resp sys; conf, dizz, head, drow, nausea, vomit, weak, convuls	Eye: Skin: Breath: Swallow:	Irritated Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[1-Undecanethiol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Derm, kidney damage; blood changes; in animals: lung, lymph node damage Potential for cancer is a result of alpha- emitting properties & radioactive decay products (e.g., radon).	Eye: Skin: Breath: Swallow:	Irritated Soap wash prompt Resp support Medical attention immed	Skin, kidneys, bone marrow, lymphatic sys [lung cancer]
[Uranium (insoluble compounds, as U)]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash (UF ₆), Quick drench	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape(Halides): GMFAGHE/SCBAE Escape(Non-halides): HIEF/SCBAE	Inh Ing Con	Lac, conj; short breath, cough, chest rales; nausea, vomiting, skin burns; RBC, casts in urine; albumin; high BUN; [cancer] Potential for cancer is a result of alpha- emitting properties & radioactive decay products (e.g., radon).	Eye: Skin: Breath: Swallow:	Irritated Water flush immed Resp support Medical attention immed	Resp sys, blood, liver, kidneys, lymphatics sys, skin, bone marrow [lung cancer]
[Uranium (soluble, compounds as U)]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	TBAL	Inh Ing Con	Irritates eyes, skin, nose, throat	Eye: Skin: Breath: Swallow:	Irritated Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[n-Valeraldehyde]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Vanadium dust V_2O_5 1314-62-1 YW2450000	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide Other synonyms vary depending upon the specific vanadium compound.	NIOSH* C 0.05 mg V/m ³ [15-min] [*Note: The REL applies to all vanadium compounds except Vanadium metal & Vanadium carbide (see Ferro-vanadium dust).] OSHA† C 0.5 mg V_2O_5 /m ³ (resp)	35 mg/m ³ (as V)	Yellow-orange powder or dark gray, odorless flakes dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.8% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1274°F UEL: NA LEL: NA	Lithium, chlorine trifluoride	Filter; THF; XRD; III [#7504]
2852 53					Sp.Gr: 3.36 Noncombustible Solid, but may increase intensity of fire when in contact with combustible materials			
Vanadium fume V_2O_5 1314-62-1 YW2450000	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide Other synonyms vary depending upon the specific vanadium compound.	NIOSH* C 0.05 mg V/m ³ [15-min] OSHA† C 0.1 mg V_2O_5 /m ³	35 mg/m ³ (as V)	Finely divided particulate dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.8% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 1274°F UEL: NA LEL: NA	Lithium, chlorine trifluoride	Filter; THF; XRD; III [#7504]
2862 53					Sp.Gr: 3.36 Noncombustible Solid			
Vegetable oil mist 68956-68-3 YX1850000	Vegetable mist	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	An oil extracted from the seeds, fruit, or nuts of vegetables or other plant matter.	MW: varies BP: ? Sol: Insoluble Fl.P: 323-640°F IP: ?	VP: ? FMZ: ? UEL: ? LEL: ?	None reported	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
Vinyl acetate $CH_2=CHOOCCH_3$ 108-05-4 AK0875000	1-Acetoxyethylene, Ethenylacetate, Ethenylethanoate, VAC, Vinyl acetate monomer, Vinyl ethanoate	NIOSH C 4 ppm (15 mg/m ³) [15-min] OSHA† none	N.D.	Colorless liquid with a pleasant, fruity odor. [Note: Raw material for many poly- vinyl resins.]	MW: 86.1 BP: 102°F Sol: 2% Fl.P: 18°F IP: 3.19 eV	VP: 83 mm FRZ: -136°F UEL: 13.4% LEL: 2.6%	Acids, bases, silica gel, alumina, oxidizers, azo compounds, ozone [Note: Usually con- tains a stabilizer (e.g., hydroquinone or diphenylamine) to prevent polymeriza- tion.]	Chrom; none; GC/FID; III [P&CAM #278]
1301 26	1 ppm = 3.58 mg/m ³				Sp.Gr: 0.93 Class IB Flammable Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH (as V) 0.5 mg/m ³ : H:EF/SA* 1.25 mg/m ³ : SA:CF/PAPR:H:EF* 2.5 mg/m ³ : H:EF/PAPRTH:EF/ SCBAF/SAF 35 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: H:EF/SCBAE	Inh Ing Con	Irr: eyes, skin, throat; green tongue, metallic taste, eczema, cough; fine rales, wheez, bron, dysp	Eye: Skin: Breath: Swallow: Irr: immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Vanadium dust]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH (as V) 0.5 mg/m ³ : H:EF/SA* 1.25 mg/m ³ : SA:CF/PAPR:H:EF* 2.5 mg/m ³ : H:EF/PAPRTH:EF/ SCBAF/SAF 35 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: H:EF/SCBAE	Inh Con	Irr: eyes, throat, green tongue, metallic taste, cough, fine rales, wheez, bron, dysp, eczema	Breath: Resp support	Eyes, skin, resp sys
[Vanadium fume]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irr: eyes, skin, resp sys; lac	Eye: Breath: Irr: immed Fresh air	Eyes, skin, resp sys
[Vegetable oil mist]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH 40 ppm: CCROV:SA* 100 ppm: SA:CF/PAPROV* 200 ppm: CCROV/GMFOV/PAPRTOV/ SCBAF/SAF 4000 ppm: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irr: eyes, skin, nose, throat; hoarseness, cough; loss of smell; eye burns, skin blisters	Eye: Skin: Breath: Swallow: Irr: immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Vinyl acetate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Vinyl bromide <chem>CH2=CHBr</chem> 593-60-2 KU8400000	Bromoethene, Bromoethylene	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Colorless gas or liquid (below 60°F) with a pleasant odor. [Note: Shipped as a liquefied compressed gas with 0.1% phenol added to prevent polymerization.]	MW: 107.0 BP: 60°F Sol: Insoluble Fl.P: NA (Gas) IP: 9.80 eV RGasD: 3.79 Sp.Gr: 1.49 (Liquid at 60°F) Flammable Gas Class IA Flammable Liquid	VP: 1.4 atm FRZ: -219°F UEL: 15% LEL: 9%	Strong oxidizers [Note: May polymerize in sunlight.]	Char; Ethanol; GC/FID; III [#1009]
1085 60	1 ppm = 4.45 mg/m³							
Vinyl chloride <chem>CH2=CHCl</chem> 75-01-4 KU9625000	Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM)	NIOSH Ca See Appendix A [Use 1910.1017] OSHA[1910.1017] 1 ppm C 5 ppm [15-min]	Ca [N.D.]	Colorless gas or liquid (below 7°F) with a pleasant odor at high concen- trations. [Note: Shipped as a liquefied compressed gas.]	MW: 62.5 BP: 7°F Sol(77°F): 0.1% Fl.P: NA (Gas) IP: 9.99 eV RGasD: 2.21 Flammable Gas	VP: 3.3 atm FRZ: -256°F UEL: 33.0% LEL: 3.6%	Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibi- tors such as phenol. Attacks iron & steel in presence of moisture.]	Char(2); CS; GC/FID; III [#1007]
1086 17	1 ppm = 2.60 mg/m³							
Vinyl cyclohexene dioxide <chem>C6H10O2</chem> 106-87-6 RN8640000	1-Epoxyethyl-3,4-epoxy- cyclohexane; 4-Vinylcyclohexene diepoxide; 4-Vinyl-1-cyclohexene dioxide	NIOSH Ca Appendix A 10 ppm (60 mg/m³) [skin] OSHA† none	Ca [N.D.]	Colorless liquid.	MW: 140.2 BP: 441°F Sol: High Fl.P(oc): 230°F IP: ? Sp.Gr: 1.10 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: -164°F UEL: ? LEL: ?	Alcohols, amines, water [Note: Slowly hydrolyzes in water.]	None available
1086 17	1 ppm = 5.83 mg/m³							
Vinyl fluoride <chem>CH2=CHF</chem> 75-02-5 YZ7351000	Fluoroethene, Fluoroethylene, Monofluoroethylene, Vinyl fluoride monomer	NIOSH 1 ppm C 5 ppm [use 1910.1017] OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Shipped as a liquefied compressed gas.]	MW: 46.1 BP: -98°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.37 eV RGasD: 1.60 Flammable Gas	VP: 25.2 atm FRZ: -257°F UEL: 21.7% LEL: 2.6%	None reported [Note: Inhibited with 0.2% terpenes to prevent polymeriza- tion.]	None available
1860 17	1 ppm = 1.91 mg/m³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin:	Prevent skin contact (liq)	NIOSH	Inh	Irritation, skin; dizz,	Eye:	Eyes, skin, CNS,
Eyes:	Prevent eye contact (liq)	8: SCBAF:PD,PP/SAF:PD,PP:ASCBA	ing	conf, inco, narco, nau,	Skin:	liver
Wash skin:	When contam (liq)	Escape: GMFOV/SCBAE	(liq)	vomit; liq: frostbite;	Breath:	[in animals: liver
Remove:	When wet (flam)		Con	[carc]	Swallow:	& lymph node
Change:	N.R.		(liq)			tumors]
[Vinyl bromide]						
Skin:	Frostbite	NIOSH	Inh	Weak; abdom pain, GI	Eye:	Liver, CNS,
Eyes:	Frostbite	8: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	bleeding; enlarged liver;	Skin:	blood, resp sys,
Wash skin:	N.R.	Escape: GMFS/SCBAE	(liq)	pallor or cyan of	Breath:	lymphatic sys
Remove:	When wet (flam)			extremities; liq: frostbite;		[liver cancer]
Change:	N.R.			[carc]		
Provide:	Frostbite					
[Vinyl chloride]						
Skin:	Prevent skin contact	NIOSH	Inh	In animals: irritation,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	8: SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	skin, resp sys; testicular	Skin:	blood, thymus,
Wash skin:	When contam	Escape: GMFOV/SCBAE	ing	atrophy; leupen; nec thymus;	Breath:	repro sys
Remove:	When wet or contam		Con	skin sens; [carc]	Swallow:	[in animals: skin
Change:	N.R.					tumors]
Provide:	Eyewash, Quick drench					
[Vinyl cyclohexane dioxide]						
Skin:	Frostbite	NIOSH	Inh	Head, dizz, conf, inco,	Eye:	CNS
Eyes:	Frostbite	10 ppm: CCROV/SA	Con	narco, nau, vomit;	Skin:	
Wash skin:	N.R.	25 ppm: SA:CF/PAPROV	(liq)	liq: frostbite	Breath:	
Remove:	When wet (flam)	50 ppm: CCRFOV/GMFOV/PAPRTOV/				
Change:	N.R.	SCBAF/SAF				
Provide:	Frostbite	200 ppm: SAF:PD,PP				
		8: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Vinyl fluoride]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL, Fl.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Vinylidene chloride $\text{CH}_2=\text{CCl}_2$ 75-35-4 KV9275000	1,1-DCE; 1,1-Dichloroethene; 1,1-Dichloroethylene; VDC; Vinylidene chloride monomer; Vinylidene dichloride	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.	MW: 96.9 BP: 89°F Sol: 0.04% Fl.P.: -2°F IP: 10.00 eV	VP: 500 mm FRZ: -189°F UEL: 15.5% LEL: 6.5%	Aluminum, sunlight, air, copper, heat [Note: Polymerization may occur if exposed to oxidizers, chlorosulfonic acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.]	Char; CS; GC/FID; III [#1015]
1303 26	1 ppm = 4.03 mg/m ³				Sp.Gr: 1.21 Class (A) Flammable Liquid			
Vinylidene fluoride $\text{CH}_2=\text{CF}_2$ 75-38-7 KW0560000	Difluoro-1,1-ethylene; 1,1-Difluoroethene; 1,1-Difluoroethylene; Halocarbon 1132A; VDF; Vinylidene difluoride	NIOSH 1 ppm C 5 ppm [use 1910.1017] OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Shipped as a liquefied compressed gas.]	MW: 64.0 BP: -122°F Sol: Insoluble Fl.P.: NA (Gas) IP: 10.29 eV	VP: 35.2 atm FRZ: -227°F UEL: 21.3% LEL: 5.5%	Oxidizers, aluminum chloride [Note: Violent reaction with hydrogen chloride when heated under pressure.]	None available
1959 22	1 ppm = 2.66 mg/m ³				RGasD: 2.21 Flammable Gas			
Vinyl toluene $\text{CH}_2=\text{CHC}_6\text{H}_5$ 25013-15-4 WL5075000	Ethenylmethylbenzene, Methylstyrene, Tolyethylene	NIOSH/OSHA 100 ppm (480 mg/m ³)	400 ppm	Colorless liquid with a strong, disagreeable odor.	MW: 118.2 BP: 339°F Sol: 0.009% Fl.P.: 127°F IP: 8.20 eV	VP: 1 mm FRZ: -106°F UEL: 11.0% LEL: 0.8%	Oxidizers, peroxides, strong acids, iron or aluminum salts [Note: Usually inhibited with tert-butyl catechol to prevent polymerization.]	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]
2618 27	1 ppm = 4.91 mg/m ³				Sp.Gr: 0.89 Class II Combustible Liquid			
VM & P Naphtha 8032-32-4 OI6180000	Ligroin, Painters naphtha, Petroleum ether, Petroleum spirit, Refined solvent naphtha, Varnish makers' & painters' naphtha	NIOSH 350 mg/m ³ C 1800 mg/m ³ [15-min] OSHA† none	N.D.	Clear to yellowish liquid with a pleasant, aromatic odor.	MW: 87-114 (approx) BP: 203-320°F Sol: Insoluble Fl.P.: 20-55°F IP: ?	VP: 2-20 mm FRZ: 7 UEL: 6.0% LEL: 1.2%	None reported [Note: VM&P Naphtha is a refined petroleum solvent (predominantly C ₆ -C ₁₀ , which is typically 55% paraffins, 30% mono- cycloparaffins, 2% dicyclo- paraffins & 12% alkylbenzenes.)	Char; CS; GC/FID; III [#1550, Naphthas]
1271 26	1 ppm = 3.61-4.74 mg/m ³ (approx)				Sp.Gr(60°F): 0.73-0.76 Class (B) Flammable Liquid			

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, throat; dizz, head, nau; dysp; liver, kidney dysfunc; pneuitis;[carc]	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: liver & kidney tumors]
[Vinylidene chloride]					
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH 10 ppm: CCROV/SA 25 ppm: SA:CF/PAPROV 50 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Dizz, head, nau; liq: frostbite	Eye: Skin: Breath: Frostbite Frostbite Resp support	CNS
[Vinylidene fluoride]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH/OSHA 400 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys; drow; in animals: narco	Eye: Skin: Breath: Swallow: Irr immed Soap flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Vinyl toluene]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH 3500 mg/m ³ : CCROV/SA 8750 mg/m ³ : SA:CF/PAPROV 17,500 mg/m ³ : CCRFOV/GMFOV/ PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys; derm, CNS depres; chemical pneu (aspir liq)	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[VM & P naphtha]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLV unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Warfarin $C_{19}H_{16}O_4$ 81-81-2 GN4550000	3-(α -Acetonyl)-benzyl- 4-hydroxycoumarin, 4-Hydroxy-3-(3-oxo-1-phenyl butyl)-2H-1-benzopyran- 2-one, WARF	NIOSH/OSHA 0.1 mg/m ³	100 mg/m ³	Colorless, odorless, crystalline powder. [rodenticide]	MW: 308.3 BP: Decomposes Sol: 0.002% FLP: ? IP: ? Sp Gr: ? Combustible Solid	VP(71°F): 0.09 mm MLT: 322°F UEL: ? LEL: ?	Strong oxidizers	Filter; Methanol; HPLC/UVD; III [#5002]
Welding fumes ZC2550000	Synonyms vary depending upon the specific component of the welding fumes.	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Fumes generated by the process of joining or cutting pieces of metal by heat, pressure, or both.	Properties vary depending upon the specific component of the welding fumes.		Varies	Filter; none; XRF; III [#7200]
Wood dust ZC9850000	Hard wood dust, Soft wood dust, Western red cedar dust	NIOSH Ca See Appendix A 1 mg/m ³ OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	Ca [N.D.]	Dust from various types of wood.	MW: varies BP: NA Sol: ? FLP: NA IP: NA Sp Gr: ? Combustible Solid	VP: 0 mm (approx) MLT: NA UEL: NA LEL: NA	None reported	Filter; none; Grav; III [#0500, Nucleic Dust (total)]
o-Xylene $C_8H_{10}(CH_3)_2$ 95-47-6 ZE2450000 1307 27	1,2-Dimethylbenzene; ortho-Xylene; o-Xylol 1 ppm = 4.41 mg/m ³	NIOSH 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA† 100 ppm (435 mg/m ³)	900 ppm	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 292°F Sol: 0.02% FLP: 90°F IP: 8.56 eV Sp Gr: 0.88 Class IC Flammable Liquid	VP: 7 mm FRZ: -13°F UEL: 6.7% LEL: 0.9%	Strong oxidizers, strong acids	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)	
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam Daily	NIOSH/OSHA 0.5 mg/m ³ : DM 1 mg/m ³ : DMXSO/SA 2.5 mg/m ³ : SA/CF/PAPRDM 5 mg/m ³ : HIEF/SAT/CF/PAPRTHIE/ SCBAF/SAF 100 mg/m ³ : SA/PD/PP S: SCBAF/PD/PP/SAF/PD/PP/ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Hema, back pain; hematoma arms, legs; epis, bleeding lips, muc memb hemorr; abdom pain, vomit, fecal blood; petechial rash; abnor hematologic indices	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Blood, CVS
[Warfarin]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH S: SCBAF/PD/PP/SAF/PD/PP/ASCBA Escape: GMFOVHIE/SCBAE	Inh Con	Symptoms vary depending upon the specific component of the welding fumes; metal fume fever; flu-like symptoms, dysp, cough, musc pain, fever, chills; interstitial pneu; [carc]	Eye: Skin: Breath:	Irr immed Soap wash Resp support	Eyes, skin, resp sys, CNS [lung cancer]
[Welding fumes]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH S: SCBAF/PD/PP/SAF/PD/PP/ASCBA Escape: HIEF/SCBAE	Inh Con	Irr ite eyes; epis; derm; resp hypersensitivity; granulomatous pneumitis; asthma; cough, wheez, sinusitis; prolonged colds; [carc]	Eye: Skin: Breath:	Irr immed Soap wash Fresh air	Eyes, skin, resp sys [nasal cancer]
[Wood dust]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH/OSHA 900 ppm: CCROV*/PAPROV*/SA*/SCBAF S: SCBAF/PD/PP/SAF/PD/PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irr ite eyes, skin, nose, throat; dizz, excitement, drow, inco, staggering gait; corn vacuolization; unor, nau, vomit, abdom pain; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys
[o-Xylene]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
m-Xylene $C_8H_{10}(CH_3)_2$ 108-38-3 ZE2275000	1,3-Dimethylbenzene; meta-Xylene; m-Xylol	NIOSH 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA† 100 ppm (435 mg/m ³)	900 ppm	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 282°F Sol: Slight Fl.P: 82°F IP: 8.56 eV	VP: 9 mm FRZ: -54°F UEL: 7.0% LEL: 1.1%	Strong oxidizers, strong acids	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]
1307 27	1 ppm = 4.41 mg/m ³				Sp.Gr: 0.86 Class IC Flammable Liquid			
p-Xylene $C_8H_{10}(CH_3)_2$ 106-42-3 ZE2625000	1,4-Dimethylbenzene; para-Xylene; p-Xylol	NIOSH 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA† 100 ppm (435 mg/m ³)	900 ppm	Colorless liquid with an aromatic odor. [Note: A solid below 56°F.]	MW: 106.2 BP: 281°F Sol: 0.02% Fl.P: 81°F IP: 8.44 eV	VP: 9 mm FRZ: 56°F UEL: 7.0% LEL: 1.1%	Strong oxidizers, strong acids	Char; CS; GC/FID; III [#1501, Aromatic Hydro- carbons]
1307 27	1 ppm = 4.41 mg/m ³				Sp.Gr: 0.86 Class IC Flammable Liquid			
m-Xylene, α, α'-diamine $C_8H_8(CH_2NH_2)_2$ 1477-55-0 PF8970000	1,3-bis(Aminomethyl)benzene; 1,3-Benzenedimethanamine; MXDA; m-Phenylenebis(methylamine); m-Xylylenediamine	NIOSH C 0.1 mg/m ³ [skin] OSHA† none	N.D.	Colorless liquid.	MW: 136.2 BP: 477°F Sol: Miscible Fl.P: 243°F IP: ?	VP(77°F): 0.03 mm FRZ: 58°F UEL: ? LEL: ?	None reported	None available
	1 ppm = 5.66 mg/m ³				Sp.Gr: 1.032 Class II/8 Combustible Liquid			
Xylidine $(CH_3)_2C_6H_3NH_2$ 1300-73-8 ZE8575000	Aminodimethylbenzene, Aminoxylene, Dimethylaminobenzene, Dimethylaniline, Xylidine isomers (e.g., 2,4-Dimethylaniline) [Note: Dimethylaniline is also used as a synonym for N,N-Dimethylaniline.]	NIOSH 2 ppm (10 mg/m ³) [skin] OSHA† 5 ppm (25 mg/m ³) [skin]	50 ppm	Pale-yellow to brown liquid with a weak, aromatic, amine-like odor.	MW: 121.2 BP: 415-439°F Sol: Slight Fl.P: 206°F (2,3-) IP: 7.65 eV (2,4-) 7.30 eV (2,6-)	VP: <1 mm FRZ: -33°F UEL: ? LEL: 1.0% (2,3-)	Strong oxidizers, hypochlorite salts	Si gel; Ethanol; GC/FID; III [#2002]
171155	1 ppm = 5.04 mg/m ³				Sp.Gr: 0.98 Class IIIB Combustible Liquid (2,3-)			

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Yttrium Y 7440-65-5 ZG2980000	Yttrium metal	NIOSH/OSHA* 1 mg/m ³ [Note: The REL and PEL also apply to other yttrium compounds (as Y).]	500 mg/m ³ (as Y)	Dark-gray to black, odorless solid.	MW: 88.9 BP: 5301°F Sol: Soluble in hot H ₂ O Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 2732°F UEL: NA LEL: NA	Oxidizers	Filter; Acid; ICP; III [#7300, Elements]
					Sp.Gr: 4.47 Noncombustible Solid in bulk form.			
Zinc chloride fume ZnCl ₂ 7646-85-7 ZH1400000	Zinc dichloride fume	NIOSH 1 mg/m ³ ST 2 mg/m ³ OSHA† 1 mg/m ³	50 mg/m ³	White particulate dispersed in air.	MW: 136.3 BP: 1350°F Sol(70°F): 435% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 554°F UEL: NA LEL: NA	Potassium	Filter; Water; AAS; OSHA [#D121]
					Sp.Gr: 2.91 Noncombustible Solid			
Zinc oxide ZnO 1314-13-2 ZH4810000 1516 47	Zinc peroxide	NIOSH 5 mg/m ³ (fume/dust) ST 10 mg/m ³ (fume) C 15 mg/m ³ (dust) OSHA† 5 mg/m ³ (fume) 15 mg/m ³ (total dust) 5 mg/m ³ (resp dust)	500 mg/m ³	White, odorless solid.	MW: 81.4 BP: ? Sol(64°F): 0.0004% Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 3587°F UEL: NA LEL: NA	Chlorinated rubber (at 419°F), water [Note: Slowly decomposed by water.]	Filter; none; XRF; III [#7502] Filter; none; Grav; III [#D600]
Zinc stearate Zn(C ₁₈ H ₃₅ O ₂) ₂ 557-05-1 ZH5200000	Dibasic zinc stearate, Zinc distearate, Zinc salt of stearic acid	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Soft, white powder with a slight, characteristic odor.	MW: 632.4 BP: ? Sol: Insoluble Fl.P(oc): 530°F iP: NA	VP: 0 mm (approx) MLT: 266°F UEL: ? LEL: ? MEC: 20 g/m ³	Oxidizers, dilute acids [Note: Hydrophobic (i.e., repels water).]	Filter; none; Grav; III [Nuisance Dust: #0500 (total), #0600 (resp)]
					Sp.Gr: 1.10 Combustible Solid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: N.R.	N.R.	NIOSH/OSHA	Inh	Irrit eyes;	Eye:	Eyes, resp sys,
Eyes: N.R.	N.R.	5 mg/m ³ : DM	Ing	in animals: pulm irrit;	Skin:	liver
Wash skin: N.R.	N.R.	10 mg/m ³ : DMXSQ/SA	Con	eye inj; possible liver damage	Breath:	
Remove: N.R.	N.R.	25 mg/m ³ : SA:CF/PAPRDM			Swallow:	
Change: N.R.	N.R.	50 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF				
		500 mg/m ³ : SA:PD,PP				
		S: SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: HIEF/SCBAE				
[Yttrium]						
Skin: N.R.	N.R.	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Breath:	Eyes, skin, resp sys,
Eyes: N.R.	N.R.	10 mg/m ³ : DMFu*/SA*	Con	throat; conj; cough,	Resp support	CVS
Wash skin: N.R.	N.R.	25 mg/m ³ : SA:CF*/PAPRDMFu*		copious sputum; dysp,		
Remove: N.R.	N.R.	50 mg/m ³ : HIEF/PAPRTHIE*/SCBAF/SAF		chest pain, pulm edema,		
Change: N.R.	N.R.	S: SCBAF:PD,PP/SAF:PD,PP:ASCBA		broncopneu; pulm fib, cor		
		Escape: HIEF/SCBAE		pulmonale; fever; cyan;		
				tachypnea; skin burns		
[Zinc chloride fume]						
Skin: N.R.	N.R.	NIOSH/OSHA	Inh	Metal fume fever: chills,	Breath:	Resp sys
Eyes: N.R.	N.R.	50 mg/m ³ : DMFu/SA		muscle ache, nau, fever,	Resp support	
Wash skin: N.R.	N.R.	125 mg/m ³ : SA:CF/PAPRDMFu		dry throat, cough, weak,		
Remove: N.R.	N.R.	250 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF		lass; metallic taste;		
Change: N.R.	N.R.	500 mg/m ³ : SA:PD,PP		head; blurred vision;		
		S: SCBAF:PD,PP/SAF:PD,PP:ASCBA		low back pain; vomit; ftg;		
		Escape: HIEF/SCBAE		mal; tight chest, dysp,		
				rales, decr pulm func		
[Zinc oxide]						
Skin: N.R.	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Eyes, skin, resp sys
Eyes: N.R.	N.R.		Ing	resp sys; cough	Skin:	
Wash skin: N.R.	N.R.		Con		Breath:	
Remove: N.R.	N.R.				Swallow:	
Change: N.R.	N.R.					
[Zinc stearate]						

Chemical name, structure/ormula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties		Incompatibilities and reactivities	Measurement method (See Table 1)
					MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Zirconium compounds (as Zr)	Zirconium metal. Zirconium Synonyms of other zirconium compounds vary depending upon the specific compound.	NIOSH* 5 mg/m ³ ST 10 mg/m ³ [Note: The REL applies to all zirconium compounds (as Zr) except Zirconium tetrachloride.]	50 mg/m ³ (as Zr)	Metal: Soft, malleable, ductile, solid or gray to gold, amorphous powder.	MW: 91.2 BP: 6471°F Sol: Insoluble Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 3375°F UEL: NA LEL: NA	Potassium nitrate, oxidizers [Note: Fine powder may be stored completely immersed in water.]	Filter; Acid; ICP; III [#7300, Elements]
Zr (Metal)								
7440-67-7 (Metal); ZH70700000 (Metal); 1358 32 (powder, wet) 1932 32 (scrap) 2008 37 (powder, dry)								
		OSHA† 5 mg/m ³			Sp Gr: 6.51 (Metal) Metal: Combustible, but solid form is difficult to ignite; however, powder form may ignite SPONTANEOUSLY and can continue burning under water.			

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 25 mg/m ³ : DM 50 mg/m ³ : DMXSQ/PAPRDM/HIEF/SA/ SCBAF § SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: HIEF/SCBAE	Inh Con	Skin, lung granulomas; in animals: irrit skin, muc memb; X-ray evidence of retention in lungs	Eye: Skin: Breath: Swallow: Irrimed Soap wash Resp support; Medical attention immed	Skin, resp sys
[Zirconium compounds (as Zr)]					

APPENDIX A — NIOSH POTENTIAL OCCUPATIONAL CARCINOGENS

NIOSH has identified numerous substances that should be treated as potential occupational carcinogens even though OSHA may not have identified them as such. In determining their carcinogenicity, NIOSH uses the OSHA classification outlined in 29 CFR 1990.103, which states in part:

Potential occupational carcinogen means any substance, or combination or mixture of substances, which causes an increased incidence of benign and/or malignant neoplasms, or a substantial decrease in the latency period between exposure and onset of neoplasms in humans or in one or more experimental mammalian species as the result of any oral, respiratory or dermal exposure, or any other exposure which results in the induction of tumors at a site other than the site of administration. This definition also includes any substance which is metabolized into one or more potential occupational carcinogens by mammals.

NIOSH has not identified thresholds for carcinogens that will protect 100% of the population. NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concentration. To ensure maximum protection from carcinogens through the use of respiratory protection, only the most reliable and protective respirators are recommended. These include (1) a self-contained breathing apparatus (SCBA) that has a full facepiece and is operated in a positive-pressure mode, or (2) a supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary SCBA operated in a pressure-demand or other positive-pressure mode.

APPENDIX B — THIRTEEN OSHA-REGULATED CARCINOGENS

Without establishing PELs, OSHA promulgated standards in 1974 to regulate the industrial use of 13 chemicals identified as potential occupational carcinogens (2-acetylaminofluorene, 4-aminodiphenyl, benzidine, bis-chloromethyl ether, 3,3'-dichlorobenzidine, 4-dimethylaminoazobenzene, ethyleneimine, methyl chloromethyl ether, alpha-naphthylamine, beta-naphthylamine, 4-nitrobiphenyl, N-nitrosodimethylamine, and beta-propiolactone). Exposures of workers to these 13 chemicals are to be controlled through the required use of engineering controls, work practices, and personal protective equipment, including respirators. See 29 CFR 1910.1003-1910.1016 for specific details of these requirements.

Respirator selections in the *Pocket Guide* are based on NIOSH policy, which considers the 13 chemicals to be potential occupational carcinogens.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS

Aldehydes (Low-Molecular-Weight)

Exposure to acetaldehyde has produced nasal tumors in rats and laryngeal tumors in hamsters, and exposure to malonaldehyde has produced thyroid gland and pancreatic islet cell tumors in rats. NIOSH therefore recommends that acetaldehyde and malonaldehyde be considered potential occupational carcinogens in conformance with the OSHA carcinogen policy. Testing has not been completed to determine the carcinogenicity of acrolein, butyraldehyde (CAS#: 123-72-8), crotonaldehyde, glutaraldehyde, glyoxal (CAS#: 107-22-2), paraformaldehyde (CAS#: 30525-89-4), propionaldehyde (CAS#: 624-67-9), propionaldehyde (CAS#: 123-38-6), and n-valeraldehyde, nine related low-molecular-weight-aldehydes. However, the limited studies to date indicate that these substances have chemical reactivity and mutagenicity similar to acetaldehyde and malonaldehyde. Therefore, NIOSH recommends that careful consideration should be given to reducing exposures to these nine related aldehydes. Further information can be found in the "NIOSH Current Intelligence Bulletin 55: Carcinogenicity of Acetaldehyde and Malonaldehyde, and Mutagenicity of Related Low-Molecular-Weight Aldehydes" [DHHS (NIOSH) Publication No. 91-112.]

Asbestos

NIOSH considers asbestos (i.e., actinolite, amosite, anthophyllite, chrysotile, crocidolite, and tremolite) to be a potential occupational carcinogen and recommends that exposures be reduced to the lowest possible concentration. For asbestos fibers >5 micrometers in length, NIOSH recommends a REL of 100,000 fibers per cubic meter of air (100,000 fibers/m³), which is equal to 0.1 fiber per cubic centimeter of air (0.1 fiber/cm³), as determined by a 400-liter air sample collected over 100 minutes and NIOSH Analytical Method #7400.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

As found in 29 CFR 1910.1001, the OSHA PEL for asbestos fibers (i.e., actinolite asbestos, amosite, anthophyllite asbestos, chrysotile, crocidolite, and tremolite asbestos) is an 8-hour TWA airborne concentration of 0.1 fiber (longer than 5 micrometers and having a length-to-diameter ratio of at least 3 to 1) per cubic centimeter of air (0.1 fiber/cm³), as determined by the membrane filter method at approximately 400X magnification with phase contrast illumination. No worker should be exposed in excess of 1 fiber/cm³ (excursion limit) as averaged over a sampling period of 30 minutes.

As found in 29 CFR 1910.1101, the OSHA PEL for asbestos is an 8-hour TWA airborne concentration of 2 fibers (longer than 5 micrometers and having a length-to-diameter ratio of at least 3 to 1) per cubic centimeter of air (2 fibers/cm³) as determined by the membrane filter method at 400-450X magnification (4-millimeter objective) with phase contrast illumination. This standard applies in lieu of the revised standards governing occupational exposure to asbestos (as defined in 1910.1001) and the non-fibrous forms of tremolite, anthophyllite, and actinolite during the period and to the extent that the revised standards have been partially stayed.

Benzidine-, o-Tolidine, and o-Dianisidine-based Dyes

In December 1980, OSHA and NIOSH jointly published the Health Hazard Alert: Benzidine-, o-Tolidine, and o-Dianisidine-based Dyes. In this Alert, OSHA and NIOSH concluded that benzidine and benzidine-based dyes were potential occupational carcinogens and recommended that worker exposure be reduced to the lowest feasible level. OSHA and NIOSH further concluded that o-tolidine and o-dianisidine (and dyes based on them) may present a cancer risk to workers and should be handled with caution and exposure minimized.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Carbon Black

NIOSH considers "Carbon Black" to be the material consisting of more than 80% elemental carbon in the form of near-spherical colloidal particles and coalesced particle aggregates of colloidal size that is obtained by the partial combustion or thermal decomposition of hydrocarbons. The NIOSH REL (10-hour TWA) for carbon black is 3.5 mg/m³. Polycyclic aromatic hydrocarbons (PAHs), particulate polycyclic organic material (PPOM), and polynuclear aromatic hydrocarbons (PNAs) are terms frequently used to describe various petroleum-based substances that NIOSH considers to be potential occupational carcinogens. Since some of these aromatic hydrocarbons may be formed during the manufacture of carbon black (and become adsorbed on the carbon black), the NIOSH REL (10-hour TWA) for carbon black in the presence of PAHs is also 0.1 mg PAHs/m³ (measured as the cyclohexane-extractable fraction). The OSHA PEL (8-hour TWA) for carbon black is 3.5 mg/m³.

Chloroethanes

NIOSH considers ethylene dichloride; hexachloroethane; 1,1,2,2-tetrachloroethane; and 1,1,2-trichloroethane; to be potential occupational carcinogens. Additionally, NIOSH recommends that the other five chloroethane compounds: 1,1-dichloroethane; ethyl chloride; methyl chloroform; pentachloroethane; and 1,1,1,2-tetrachloroethane be treated in the workplace with caution because of their structural similarity to the four chloroethanes shown to be carcinogenic in animals.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Chromic Acid and Chromates (as CrO_3), Chromium(II) and Chromium(III) Compounds (as Cr), and Chromium Metal (as Cr)

The NIOSH REL (10-hour TWA) is $0.001 \text{ mg Cr(VI)}/\text{m}^3$ for all hexavalent chromium [Cr(VI)] compounds. NIOSH considers all Cr(VI) compounds (including chromic acid, tert-butyl chromate, zinc chromate, and chromyl chloride) to be potential occupational carcinogens. The NIOSH REL (8-hour TWA) is $0.5 \text{ mg Cr}/\text{m}^3$ for chromium metal and chromium(II) and chromium(III) compounds.

The OSHA PEL is $0.1 \text{ mg CrO}_3/\text{m}^3$ (ceiling) for chromic acid and chromates (including tert-butyl chromate with a "skin" designation and zinc chromate); $0.5 \text{ mg Cr}/\text{m}^3$ (8-hour TWA) for chromium(II) and chromium(III) compounds; and $1 \text{ mg Cr}/\text{m}^3$ (8-hour TWA) for chromium metal and insoluble salts.

Coal Tar Pitch Volatiles

NIOSH considers coal tar products (i.e., coal tar, coal tar pitch, or creosote) to be potential occupational carcinogens; the NIOSH REL (10-hour TWA) for coal tar products is $0.1 \text{ mg}/\text{m}^3$ (cyclohexane-extractable fraction).

The OSHA PEL (8-hour TWA) for coal tar pitch volatiles is $0.2 \text{ mg}/\text{m}^3$ (benzene-soluble fraction). OSHA defines "coal tar pitch volatiles" in 29 CFR 1910.1002 as the fused polycyclic hydrocarbons that volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter and includes substances such as anthracene, benzo(a)pyrene (BaP), phenanthrene, acridine, chrysene, pyrene, etc.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Coke Oven Emissions

The production of coke by the carbonization of bituminous coal leads to the release of chemically-complex emissions from coke ovens that include both gases and particulate matter of varying chemical composition. The emissions include coal tar pitch volatiles (e.g., particulate polycyclic organic matter [PPOM], polycyclic aromatic hydrocarbons [PAHs], and polynuclear aromatic hydrocarbons [PNAs]), aromatic compounds (e.g., benzene and β -naphthylamine), trace metals (e.g., arsenic, beryllium, cadmium, chromium, lead, and nickel), and gases (e.g., nitric oxides and sulfur dioxide).

Cotton Dust (raw)

NIOSH recommends reducing exposures to cotton dust to the lowest feasible concentration to reduce the prevalence and severity of byssinosis; the REL is $<0.200 \text{ mg/m}^3$ (as lint-free cotton dust).

As found in OSHA Table Z-1 (29 CFR 1910.1000), the PEL for cotton dust (raw) is 1 mg/m^3 for the cotton waste processing operations of waste recycling (sorting, blending, cleaning, and willowing) and garnetting. PELs for other sectors (as found in 29 CFR 1910.1043) are 0.200 mg/m^3 for yarn manufacturing and cotton washing operations, 0.500 mg/m^3 for textile mill waste house operations or for dust from "lower grade washed cotton" used during yarn manufacturing, and 0.750 mg/m^3 for textile slashing and weaving operations. The OSHA standard in 29 CFR 1910.1043 does not apply to cotton harvesting, ginning, or the handling and processing of woven or knitted materials and washed cotton. All PELs for cotton dust are mean concentrations of lint-free, respirable cotton dust collected by the vertical elutriator or an equivalent method and averaged over an 8-hour period.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Lead

NIOSH considers "Lead" to mean metallic lead, lead oxides, and lead salts (including organic salts such as lead soaps but excluding lead arsenate). The NIOSH REL for lead (10-hour TWA) is 0.100 mg/m³; air concentrations should be maintained so that worker blood lead remains less than 0.060 mg Pb/100 g of whole blood.

OSHA considers "Lead" to mean metallic lead, all inorganic lead compounds (lead oxides and lead salts), and a class of organic compounds called soaps; all other lead compounds are excluded from this definition. The OSHA PEL (8-hour TWA) is 0.050 mg/m³; other OSHA requirements can be found in 29 CFR 1910.1025. The OSHA PEL (8-hour TWA) for lead in "non-ferrous foundries with less than 20 employees" is 0.075 mg/m³.

Mineral Dusts

These OSHA PELs for "mineral dusts" listed below are from Table Z-3 of 29 CFR 1910.1000. The OSHA PEL (8-hour TWA) for crystalline silica (as respirable quartz) is either 250 mppcf divided by the value "%SiO₂ + 5" or 10 mg/m³ divided by the value "%SiO₂ + 2". The OSHA PEL (8-hour TWA) for crystalline silica (as total quartz) is 30 mg/m³ divided by the value "%SiO₂ + 2". The OSHA PELs (8-hour TWAs) for cristobite and tridymite are ½ the values calculated above using the count or mass formulae for quartz.

The OSHA PEL (8-hour TWA) for amorphous silica (including diatomaceous earth) is either 80 mg/m³ divided by the value "%SiO₂", or 20 mppcf.

The OSHA PELs (8-hour TWAs) for mica, soapstone, and talc (not containing asbestos) are 20 mppcf. The OSHA PEL (8-hour TWA) for Portland cement is 50 mppcf. The OSHA PEL (8-hour TWA) for

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

graphite (natural) is 15 mppcf.

The OSHA PEL (8-hour TWA) for coal dust (as the respirable fraction) containing less than 5% SiO_2 is 2.4 mg/m³ divided by the value "% SiO_2 + 2". The OSHA PEL (8-hour TWA) for coal dust (as the respirable fraction) containing greater than 5% SiO_2 is 10 mg/m³ divided by the value "% SiO_2 + 2".

NIAX® Catalyst ESN

In May 1978, OSHA and NIOSH jointly published the Current Intelligence Bulletin (CIB) 26: NIAX® Catalyst ESN. In this CIB, OSHA and NIOSH recommended that occupational exposure to NIAX® Catalyst ESN, its components, dimethylaminopropionitrile and bis(2-(dimethylamino)ethyl)ether, as well as formulations containing either component, be minimized. Exposures should be limited to as few workers as possible, while minimizing workplace exposure concentrations with effective work practices and engineering controls. Exposed workers should be carefully monitored for potential disorders of the nervous and genitourinary system. Although substitution is a possible control measure, alternatives to NIAX® Catalyst ESN or its components should be carefully evaluated with regard to possible adverse health effects.

Trichloroethylene

NIOSH considers trichloroethylene (TCE) to be a potential occupational carcinogen and recommends a REL of 2 ppm (as a 60-minute ceiling) during the usage of TCE as an anesthetic agent and 25 ppm (as a 10-hour TWA) during all other exposures.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Tungsten Carbide (Cemented)

"Cemented tungsten carbide" or "hard metal" refers to a mixture of tungsten carbide, cobalt, and sometimes metal oxides or carbides and other metals (including nickel). When the cobalt (Co) content exceeds 2%, its contribution to the potential hazard is judged to exceed that of tungsten carbide. Therefore, the NIOSH REL (10-hour TWA) for cemented tungsten carbide containing >2% Co is 0.05 mg Co/m³; the applicable OSHA PEL is 0.1 mg Co/m³ (8-hour TWA). Nickel (Ni) may sometimes be used as a binder rather than cobalt. NIOSH considers cemented tungsten carbide containing nickel to be a potential occupational carcinogen and recommends a REL 0.015 mg Ni/m³ (10-hour TWA). The OSHA PEL for Insoluble Nickel (i.e., a 1 mg Ni/m³ 8-hour TWA) applies to mixtures of tungsten carbide and nickel.

APPENDIX D — SUBSTANCES WITH NO ESTABLISHED RELs

After reviewing available published literature, NIOSH provided comments to OSHA on August 1, 1988, regarding the "Proposed Rule on Air Contaminants" (29 CFR 1910, Docket No. H-020). In these comments, NIOSH questioned whether the PELs proposed (and listed below) for the following substances included in the *Pocket Guide* were adequate to protect workers from recognized health hazards: acetylene tetrabromide [TWA 1 ppm], chlorobenzene [TWA 75 ppm], coal dust (<5% SiO₂) [2 mg/m³ (as the respirable dust fraction)], coal dust (≥ 5% SiO₂) [0.1 mg/m³ (as the respirable quartz fraction)], ethyl bromide [TWA 200 ppm; STEL 250 ppm], ethylene glycol [Ceiling 50 ppm], ethyl ether [TWA 400 ppm; STEL 500 ppm], fenthion [TWA 0.2 mg/m³ (skin)], furfural [TWA 2 ppm (skin)], 2-isopropoxyethanol [TWA 25 ppm], isopropyl acetate [TWA 250 ppm; STEL 310 ppm], isopropylamine [TWA 5 ppm; STEL 10 ppm], manganese tetroxide (as Mn) [TWA 1 mg/m³], molybdenum (soluble compounds as Mo) [TWA 5 mg/m³], nitromethane [TWA 100 ppm], m-toluidine [TWA 2 ppm (skin)], and triethylamine [TWA 10 ppm; STEL 15 ppm].

At that time, NIOSH also conducted a limited evaluation of the literature and concluded that the documentation cited by OSHA was inadequate to support the proposed PEL (as an 8-hour TWA) of 10 mg/m³ for α-alumina, benomyl, emery, glycerine (mist), graphite (synthetic), magnesium oxide fume, molybdenum (insoluble compounds as Mo), particulates not otherwise regulated, picloram, and rouge.

APPENDIX E—RESPIRATOR RECOMMENDATIONS FOR SELECTED CHEMICALS

Mercury compounds [except (organo) alkyls]

Mercury vapor:

NIOSH

0.5 mg/m³: CCRS¹/SA

1.25 mg/m³: SA:CF/PAPRS¹(canister)

2.5 mg/m³: CCRFS¹/GMFS¹/SAT:CF/

PAPRTS(canister)/

SCBAF/SAF

10 mg/m³: SA:PD,PP

§: SCBAF:PD,PP/SAF:PD,PP:ASCBA

Escape: GMFS/SCBAE

Other non (organo) alkyl mercury compounds:

NIOSH/OSHA

1 mg/m³: CCRS¹/SA

2.5 mg/m³: SA:CF/PAPRS¹(canister)

5 mg/m³: CCRFS¹/GMFS¹/SAT:CF/

PAPRTS(canister)/

SCBAF/SAF

10 mg/m³: SA:PD,PP

§: SCBAF:PD,PP/SAF:PD,PP:ASCBA

Escape: GMFS/SCBAE

APPENDIX F—MISCELLANEOUS NOTES

Benzene: The final OSHA Benzene standard in 1910.1028 applies to all occupational exposures to benzene except some subsegments of industry where exposures are consistently under the action level (i.e., distribution and sales of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures); for the excepted subsegments, the benzene limits in Table Z-2 apply (i.e., an 8-hour TWA of 10 ppm, an acceptable ceiling of 25 ppm, and 50 ppm for a maximum duration of 10 minutes as an acceptable maximum peak above the acceptable ceiling).

APPENDIX G—VACATED 1989 OSHA PELs

Acetaldehyde:	TWA 100 ppm (180 mg/m ³) ST 150 ppm (270 mg/m ³)	Allyl propyl disulfide:	TWA 2 ppm (12 mg/m ³) ST 3 ppm (18 mg/m ³)
Acetic anhydride:	C 5 ppm (20 mg/m ³)	α-Alumina:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Acetone:	TWA 750 ppm (1800 mg/m ³) ST 1000 ppm (2400 mg/m ³)	Aluminum (pyro powders & welding fumes, as Al):	TWA 5 mg/m ³
Acetonitrile:	TWA 40 ppm (70 mg/m ³) ST 60 ppm (105 mg/m ³)	Aluminum (soluble salts & alkyls, as Al):	TWA 2 mg/m ³
Acetylsalicylic acid:	TWA 5 mg/m ³	Amitrole:	TWA 0.2 mg/m ³
Acrolein:	TWA 0.1 ppm (0.25 mg/m ³) ST 0.3 ppm (0.8 mg/m ³)	Ammonia:	ST 35 ppm (27 mg/m ³)
Acrylamide:	TWA 0.03 mg/m ³ [skin]	Ammonium chloride fume:	TWA 10 mg/m ³ ST 20 mg/m ³
Acrylic acid:	TWA 10 ppm (30 mg/m ³) [skin]	Ammonium sulfamate:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Allyl alcohol:	TWA 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³) [skin]	Aniline (and homologs):	TWA 2 ppm (8 mg/m ³) [skin]
Allyl chloride:	TWA 1 ppm (3 mg/m ³) ST 2 ppm (6 mg/m ³)	Atrazine:	TWA 5 mg/m ³
Allyl glycidyl ether:	TWA 5 ppm (22 mg/m ³) ST 10 ppm (44 mg/m ³)	Barium sulfate:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Benomyl:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	2-Butanone:	TWA 200 ppm (590 mg/m ³) ST 300 ppm (885 mg/m ³)
Benzenethiol:	TWA 0.5 ppm (2 mg/m ³)	2-Butoxyethanol:	TWA 25 ppm (120 mg/m ³) [skin]
Bismuth telluride (doped with selenium sulfide, as Bi ₂ Te ₃):	TWA 5 mg/m ³	n-Butyl acetate:	TWA 150 ppm (710 mg/m ³) ST 200 ppm (950 mg/m ³)
Borates, tetra, sodium salts (Anhydrous):	TWA 10 mg/m ³	Butyl acrylate:	TWA 10 ppm (55 mg/m ³)
Borates, tetra, sodium salts (Decahydrate):	TWA 10 mg/m ³	n-Butyl alcohol:	C 50 ppm (150 mg/m ³) [skin]
Borates, tetra, sodium salts (Pentahydrate):	TWA 10 mg/m ³	sec-Butyl alcohol:	TWA 100 ppm (305 mg/m ³)
Boron oxide:	TWA 10 mg/m ³	tert-Butyl alcohol:	TWA 100 ppm (300 mg/m ³) ST 150 ppm (450 mg/m ³)
Boron tribromide:	C 1 ppm (10 mg/m ³)	n-Butyl glycidyl ether:	TWA 25 ppm (135 mg/m ³)
Bromacil:	TWA 1 ppm (10 mg/m ³)	n-Butyl lactate:	TWA 5 ppm (25 mg/m ³)
Bromine:	TWA C. 1 ppm (0.7 mg/m ³) ST 0.3 ppm (2 mg/m ³)	n-Butyl mercaptan:	TWA 0.5 ppm (1.5 mg/m ³)
Bromine pentafluoride:	TWA 0.1 ppm (0.7 mg/m ³)	o-sec-Butylphenol:	TWA 5 ppm (30 mg/m ³) [skin]
n-Butane:	TWA 800 ppm (1900 mg/m ³)	p-tert-Butyltoluene:	TWA 10 ppm (60 mg/m ³) ST 20 ppm (120 mg/m ³)
		Calcium cyanamide:	TWA 0.5 mg/m ³

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Caprolactam:	Dust: TWA 1 mg/m ³ ST 3 mg/m ³ Vapor: TWA 5 ppm (20 mg/m ³) ST 10 ppm (40 mg/m ³)	Cesium hydroxide:	TWA 2 mg/m ³
Captan:	TWA 0.1 mg/m ³	Chlorinated camphene:	TWA 0.5 mg/m ³ ST 1 mg/m ³ [skin]
Carbofuran:	TWA 5 mg/m ³	Chlorine:	TWA 0.5 ppm (1.5 mg/m ³) ST 1 ppm (3 mg/m ³)
Carbon dioxide:	TWA 0.1 mg/m ³	Chlorine dioxide:	TWA 0.1 ppm (0.3 mg/m ³) ST 0.3 ppm (0.9 mg/m ³)
Carbon disulfide:	TWA 10,000 ppm (18,000 mg/m ³) ST 30,000 ppm (54,000 mg/m ³)	Chloroacetyl chloride:	TWA 0.05 ppm (0.2 mg/m ³)
Carbon monoxide:	TWA 4 ppm (12 mg/m ³) ST 12 ppm (36 mg/m ³) [skin]	o-Chlorobenzylidene malononitrile:	C 0.05 ppm (0.4 mg/m ³) [skin]
Carbon tetrabromide:	TWA 35 ppm (40 mg/m ³) C 200 ppm (229 mg/m ³)	Chlorodifluoromethane:	TWA 1000 ppm (3500 mg/m ³)
Carbon tetrachloride:	TWA 0.1 ppm (1.4 mg/m ³) ST 0.3 ppm (4 mg/m ³)	Chloroform:	TWA 2 ppm (9.78 mg/m ³)
Carbonyl fluoride:	TWA 2 ppm (12.6 mg/m ³)	1-Chloro-1-nitropropane:	TWA 2 ppm (10 mg/m ³)
Catechol:	TWA 2 ppm (5 mg/m ³) ST 5 ppm (15 mg/m ³)	Chloropentafluoroethane:	TWA 1000 ppm (6320 mg/m ³)
	TWA 5 ppm (20 mg/m ³) [skin]	β-Chloroprene:	TWA 10 ppm (35 mg/m ³) [skin]
		o-Chlorostyrene:	TWA 50 ppm (285 mg/m ³) ST 75 ppm (428 mg/m ³)
		o-Chlorotoluene:	TWA 50 ppm (250 mg/m ³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Chlorpyrifos:	TWA 0.2 mg/m ³ [skin]	Cyhexatin:	TWA 5 mg/m ³
Coal dust:	TWA 2 mg/m ³ (<5% SiO ₂) (resp dust) TWA 0.1 mg/m ³ (≥5% SiO ₂) (resp quartz)	Decaborane:	TWA 0.3 mg/m ³ (0.05 ppm) ST 0.9 mg/m ³ (0.15 ppm) [skin]
Cobalt metal dust & fume, as Co:	TWA 0.05 mg/m ³	Diazinon®:	TWA 0.1 mg/m ³ [skin]
Cobalt carbonyl (as Co):	TWA 0.1 mg/m ³	2-N-Dibutylaminoethanol:	TWA 2 ppm (14 mg/m ³)
Cobalt hydrocarbonyl (as Co):	TWA 0.1 mg/m ³	Dibutyl phosphate:	TWA 1 ppm (5 mg/m ³) ST 2 ppm (10 mg/m ³)
Crag® herbicide:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Dichloroacetylene:	C 0.1 ppm (0.4 mg/m ³)
Cruformate:	TWA 5 mg/m ³	p-Dichlorobenzene:	TWA 75 ppm (450 mg/m ³) ST 110 ppm (675 mg/m ³)
Cyanamide:	TWA 2 mg/m ³	1,3-Dichloro-5,5-dimethylhydantoin:	TWA 0.2 mg/m ³ ST 0.4 mg/m ³
Cyanogen:	TWA 10 ppm (20 mg/m ³)	Dichloroethyl ether:	TWA 5 ppm (30 mg/m ³) ST 10 ppm (60 mg/m ³) [skin]
Cyanogen chloride:	C 0.3 ppm (0.6 mg/m ³)	Dichloromonofluoromethane:	TWA 10 ppm (40 mg/m ³)
Cyclohexanol:	TWA 50 ppm (200 mg/m ³) [skin]	1,1-Dichloro-1-nitroethane:	TWA 2 ppm (10 mg/m ³)
Cyclohexanone:	TWA 25 ppm (100 mg/m ³) [skin]	1,3-Dichloropropene:	TWA 1 ppm (5 mg/m ³) [skin]
Cyclohexylamine:	TWA 10 ppm (40 mg/m ³)		
Cyclonite:	TWA 1.5 mg/m ³ [skin]		
Cyclopentane:	TWA 600 ppm (1720 mg/m ³)		

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

2,2-Dichloropropionic acid:	TWA 1 ppm (6 mg/m ³)	Dimethyl sulfate:	TWA 0.1 ppm (0.5 mg/m ³) [skin]
Dicrotophos:	TWA 0.25 mg/m ³ [skin]	Dinitolmide:	TWA 5 mg/m ³
Dicyclopentadiene:	TWA 5 ppm (30 mg/m ³)	Di-sec octyl phthalate:	TWA 5 mg/m ³ ST 10 mg/m ³
Dicyclopentadienyl iron:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Dioxane:	TWA 25 ppm (90 mg/m ³) [skin]
Diethanolamine:	TWA 3 ppm (15 mg/m ³)	Dioxathion:	TWA 0.2 mg/m ³ [skin]
Diethylamine:	TWA 10 ppm (30 mg/m ³) ST 25 ppm (75 mg/m ³)	Diphenylamine:	TWA 10 mg/m ³
Diethylenetriamine:	TWA 1 ppm (4 mg/m ³)	Dipropylene glycol methyl ether:	TWA 100 ppm (600 mg/m ³) ST 150 ppm (900 mg/m ³) [skin]
Diethyl ketone:	TWA 200 ppm (705 mg/m ³)	Dipropyl ketone:	TWA 50 ppm (235 mg/m ³)
Diethyl phthalate:	TWA 5 mg/m ³	Diquat (Diquat dibromide):	TWA 0.5 mg/m ³
Diglycidyl ether:	TWA 0.1 ppm (0.5 mg/m ³)	Disulfiram:	TWA 2 mg/m ³
Diisobutyl ketone:	TWA 25 ppm (150 mg/m ³)	Disulfoton:	TWA 0.1 mg/m ³ [skin]
N,N-Dimethylaniline:	TWA 5 ppm (25 mg/m ³) ST 10 ppm (50 mg/m ³) [skin]	2,6-Di-tert-butyl-p-cresol:	TWA 10 mg/m ³
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate:	TWA 3 mg/m ³ [skin]	Diuron:	TWA 10 mg/m ³
		Divinyl benzene:	TWA 10 ppm (50 mg/m ³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Emery:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Ethyl ether:	TWA 400 ppm (1200 mg/m ³) ST 500 ppm (1500 mg/m ³)
Endosulfan:	TWA 0.1 mg/m ³ [skin]	Ethylidene norbornene:	C 5 ppm (25 mg/m ³)
Epichlorohydrin:	TWA 2 ppm (8 mg/m ³) [skin]	Ethyl mercaptan:	TWA 0.5 ppm (1 mg/m ³)
Ethanolamine:	TWA 3 ppm (8 mg/m ³) ST 6 ppm (15 mg/m ³)	N-Ethylmorpholine:	TWA 5 ppm (23 mg/m ³) [skin]
Ethion:	0.4 mg/m ³ [skin]	Ethyl silicate:	TWA 10 ppm (85 mg/m ³)
Ethyl acrylate:	TWA 5 ppm (20 mg/m ³) ST 25 ppm (100 mg/m ³) [skin]	Fenamiphos:	TWA 0.1 mg/m ³ [skin]
Ethyl benzene:	TWA 100 ppm (435 mg/m ³) ST 125 ppm (545 mg/m ³)	Fensulfothion:	TWA 0.1 mg/m ³
Ethyl bromide:	TWA 200 ppm (890 mg/m ³) ST 250 ppm (1110 mg/m ³)	Fenthion:	TWA 0.2 mg/m ³ [skin]
Ethylene chlorohydrin:	C 1 ppm (3 mg/m ³) [skin]	Ferbam:	TWA 10 mg/m ³
Ethylene dichloride:	TWA 1 ppm (4 mg/m ³) ST 2 ppm (8 mg/m ³)	Ferrovanadium dust:	TWA 1 mg/m ³ ST 3 mg/m ³
Ethylene glycol:	C 50 ppm (125 mg/m ³)	Fluorotrichloromethane:	C 1000 ppm (5600 mg/m ³)
Ethylene glycol dinitrate:	ST 0.1 mg/m ³ [skin]	Fonofos:	TWA 0.1 mg/m ³ [skin]
		Formamide:	TWA 20 ppm (30 mg/m ³) ST 30 ppm (45 mg/m ³)
		Furfural:	TWA 2 ppm (8 mg/m ³) [skin]

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Furfuryl alcohol:	TWA 10 ppm (40 mg/m ³) ST 15 ppm (60 mg/m ³) [skin]	n-Hexane:	TWA 50 ppm (180 mg/m ³)
Gasoline:	TWA 300 ppm (900 mg/m ³) ST 500 ppm (1500 mg/m ³)	Hexane isomers (except n-Hexane):	TWA 500 ppm (1800 mg/m ³) ST 1000 ppm (3600 mg/m ³)
Germanium tetrahydride:	TWA 0.2 ppm (0.6 mg/m ³)	2-Hexanone:	TWA 5 ppm (20 mg/m ³)
Glutaraldehyde:	C 0.2 ppm (0.8 mg/m ³)	Hexone:	TWA 50 ppm (205 mg/m ³) ST 75 ppm (300 mg/m ³)
Glycerin (mist):	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Hexylene glycol:	C 25 ppm (125 mg/m ³)
Glycidol:	TWA 25 ppm (75 mg/m ³)	Hydrazine:	TWA 0.1 ppm (0.1 mg/m ³) [skin]
Graphite (natural):	TWA 2.5 mg/m ³ (resp)	Hydrogenated terphenyls:	TWA 0.5 ppm (5 mg/m ³)
Graphite (synthetic):	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Hydrogen bromide:	C 3 ppm (10 mg/m ³)
n-Heptane:	TWA 400 ppm (1600 mg/m ³) ST 500 ppm (2000 mg/m ³)	Hydrogen cyanide:	ST 4.7 ppm (5 mg/m ³) [skin]
Hexachlorobutadiene:	TWA 0.02 ppm (0.24 mg/m ³)	Hydrogen fluoride (as F):	TWA 3 ppm ST 6 ppm
Hexachlorocyclopentadiene:	TWA 0.01 ppm (0.1 mg/m ³)	Hydrogen sulfide:	TWA 10 ppm (14 mg/m ³) ST 15 ppm (21 mg/m ³)
Hexafluoroacetone:	TWA 0.1 ppm (0.7 mg/m ³) [skin]	2-Hydroxypropyl acrylate:	TWA 0.5 ppm (3 mg/m ³) [skin]
		Indene:	TWA 10 ppm (45 mg/m ³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

362	Indium:	TWA 0.1 mg/m ³	Isopropyl alcohol:	TWA 400 ppm (980 mg/m ³) ST 500 ppm (1225 mg/m ³)
	Iodoform:	TWA 0.6 ppm (10 mg/m ³)	Isopropylamine:	TWA 5 ppm (12 mg/m ³) ST 10 ppm (24 mg/m ³)
	Iron pentacarbonyl (as Fe):	TWA 0.1 ppm (0.8 mg/m ³) ST 0.2 ppm (1.6 mg/m ³)	N-Isopropylaniline:	TWA 2 ppm (10 mg/m ³) [skin]
	Iron salts (soluble, as Fe):	TWA 1 mg/m ³	Isopropyl glycidyl ether:	TWA 50 ppm (240 mg/m ³) ST 75 ppm (360 mg/m ³)
	Isoamyl alcohol (primary & secondary):	TWA 100 ppm (360 mg/m ³) ST 125 ppm (450 mg/m ³)	Kaolin:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
	Isobutane:	TWA 800 ppm (1900 mg/m ³)	Ketene:	TWA 0.5 ppm (0.9 mg/m ³) ST 1.5 ppm (3 mg/m ³)
	Isobutyl alcohol:	TWA 50 ppm (150 mg/m ³)	Magnesium oxide fume:	TWA 10 mg/m ³
	Isooctyl alcohol:	TWA 50 ppm (270 mg/m ³) [skin]	Malathion:	TWA 10 mg/m ³ [skin]
	Isophorone:	TWA 4 ppm (23 mg/m ³)	Manganese compounds and fume (as Mn):	Compounds: C 5 mg/m ³ Fume: TWA 1 mg/m ³ ST 3 mg/m ³
	Isophorone diisocyanate:	TWA 0.005 ppm ST 0.02 ppm [skin]	Manganese cyclopentadienyl tricarbonyl (as Mn):	TWA 0.1 mg/m ³ [skin]
	2-Isopropoxyethanol:	TWA 25 ppm (105 mg/m ³)		
	Isopropyl acetate:	TWA 250 ppm (950 mg/m ³) ST 310 ppm (1185 mg/m ³)		

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Manganese tetroxide (as Mn):	TWA 1 mg/m ³	Methylacrylonitrile:	TWA 1 ppm (3 mg/m ³) [skin]
Mercury compounds, as Hg [except (organo) alkyls]:	Hg Vapor: TWA 0.05 mg/m ³ [skin] Non-alkyl compounds: C 0.1 mg/m ³ [skin]	Methyl alcohol:	TWA 200 ppm (260 mg/m ³) ST 250 ppm (325 mg/m ³) [skin]
Mercury (organo) alkyl compounds (as Hg):	TWA 0.01 mg/m ³ ST 0.03 mg/m ³ [skin]	Methyl bromide:	TWA 5 ppm (20 mg/m ³) [skin]
Mesityl oxide:	TWA 15 ppm (60 mg/m ³) ST 25 ppm (100 mg/m ³)	Methyl chloride:	TWA 50 ppm (105 mg/m ³) ST 100 ppm (210 mg/m ³)
Methacrylic acid:	TWA 20 ppm (70 mg/m ³) [skin]	Methyl chloroform:	TWA 350 ppm (1900 mg/m ³) ST 450 ppm (2450 mg/m ³)
Methomyl:	TWA 2.5 mg/m ³	Methyl-2-cyanoacrylate:	TWA 2 ppm (8 mg/m ³) ST 4 ppm (16 mg/m ³)
Methoxychlor:	TWA 10 mg/m ³	Methylcyclohexane:	TWA 400 ppm (1600 mg/m ³)
4-Methoxyphenol:	TWA 5 mg/m ³	Methylcyclohexanol:	TWA 50 ppm (235 mg/m ³)
Methyl acetate:	TWA 200 ppm (610 mg/m ³) ST 250 ppm (760 mg/m ³)	o-Methylcyclohexanone:	TWA 50 ppm (230 mg/m ³) ST 75 ppm (345 mg/m ³) [skin]
Methyl acetylene-propadiene mixture	TWA 1000 ppm (1800 mg/m ³) ST 1250 ppm (2250 mg/m ³)	Methyl cyclopentadienyl manganese tricarbonyl (as Mn):	TWA 0.2 mg/m ³ [skin]
		Methyl demeton:	TWA 0.5 mg/m ³ [skin]

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

364	4,4'-Methylenebis(2-chloroaniline):	TWA 0.02 ppm (0.22 mg/m ³) [skin]	Mica:	TWA 3 mg/m ³ (resp)
	Methylene bis(4-cyclohexylisocyanate):	C 0.01 ppm (0.11 mg/m ³) [skin]	Molybdenum (insoluble compounds, as Mo):	TWA 10 mg/m ³
	Methyl ethyl ketone peroxide:	C 0.7 ppm (5 mg/m ³)	Monocrotophos:	TWA 0.25 mg/m ³
	Methyl formate:	TWA 100 ppm (250 mg/m ³) ST 150 ppm (375 mg/m ³)	Monomethyl aniline:	TWA 0.5 ppm (2 mg/m ³) [skin]
	Methyl iodide:	TWA 2 ppm (10 mg/m ³) [skin]	Morpholine:	TWA 20 ppm (70 mg/m ³) ST 30 ppm (105 mg/m ³) [skin]
	Methyl isoamyl ketone:	TWA 50 ppm (240 mg/m ³)	Naphthalene:	TWA 10 ppm (50 mg/m ³) ST 15 ppm (75 mg/m ³)
	Methyl isobutyl carbinol:	TWA 25 ppm (100 mg/m ³) ST 40 ppm (165 mg/m ³) [skin]	Nickel metal & other compounds (as Ni):	Metal & insoluble compounds: TWA 1 mg/m ³ Soluble compounds: TWA 0.1 mg/m ³
	Methyl isopropyl ketone:	TWA 200 ppm (705 mg/m ³)	Nitric acid:	TWA 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³)
	Methyl mercaptan:	TWA 0.5 ppm (1 mg/m ³)	p-Nitroaniline:	TWA 3 mg/m ³ [skin]
	Methyl parathion:	TWA 0.2 mg/m ³ [skin]	Nitrogen dioxide:	ST 1 ppm (1.8 mg/m ³)
	Methyl silicate:	TWA 1 ppm (6 mg/m ³)	Nitroglycerine:	ST 0.1 mg/m ³ [skin]
	α-Methyl styrene:	TWA 50 ppm (240 mg/m ³) ST 100 ppm (485 mg/m ³)	2-Nitropropane:	TWA 10 ppm (35 mg/m ³)
	Metribuzin:	TWA 5 mg/m ³		

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Nitrotoluene (o-, m-, p-isomers):	TWA 2 ppm (11 mg/m ³) [skin]	Pentaerythritol:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
Nonane:	TWA 200 ppm (1050 mg/m ³)	n-Pentane:	TWA 600 ppm (1800 mg/m ³) ST 750 ppm (2250 mg/m ³)
Octachloronaphthalene:	TWA 0.1 mg/m ³ ST 0.3 mg/m ³ [skin]	2-Pentanone:	TWA 200 ppm (700 mg/m ³) ST 250 ppm (875 mg/m ³)
Octane:	TWA 300 ppm (1450 mg/m ³) ST 375 ppm (1800 mg/m ³)	Perchloryl fluoride:	TWA 3 ppm (14 mg/m ³) ST 6 ppm (28 mg/m ³)
Osmium tetroxide (as Os):	TWA 0.002 mg/m ³ (0.0002 ppm) ST 0.006 mg/m ³ (0.0006 ppm)	Petroleum distillates (naphtha):	TWA 400 ppm (1600 mg/m ³)
Oxalic acid:	TWA 1 mg/m ³ ST 2 mg/m ³	Phenothiazine:	TWA 5 mg/m ³ [skin]
Oxygen difluoride:	C 0.05 ppm (0.1 mg/m ³)	Phenyl glycidyl ether:	TWA 1 ppm (6 mg/m ³)
Ozone:	TWA 0.1 ppm (0.2 mg/m ³) ST 0.3 ppm (0.6 mg/m ³)	Phenylhydrazine:	TWA 5 ppm (20 mg/m ³) ST 10 ppm (45 mg/m ³) [skin]
Paraffin wax fume:	TWA 2 mg/m ³	Phenylphosphine:	C 0.05 ppm (0.25 mg/m ³)
Paraquat:	TWA 0.1 mg/m ³ (resp) [skin]	Phorate:	TWA 0.05 mg/m ³ ST 0.2 mg/m ³ [skin]
Pentaborane:	TWA 0.005 ppm (0.01 mg/m ³) ST 0.015 ppm (0.03 mg/m ³)	Phosdrin:	TWA 0.01 ppm (0.1 mg/m ³) ST 0.03 ppm (0.3 mg/m ³) [skin]

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Phosphine:	TWA 0.3 ppm (0.4 mg/m ³) ST 1 ppm (1 mg/m ³)	Propargyl alcohol:	TWA 1 ppm (2 mg/m ³) [skin]
Phosphoric acid:	TWA 1 mg/m ³ ST 3 mg/m ³	Propionic acid:	TWA 10 ppm (30 mg/m ³)
Phosphorus oxychloride:	TWA 0.1 ppm (0.6 mg/m ³)	Propoxur:	TWA 0.5 mg/m ³
Phosphorus pentasulfide:	TWA 1 mg/m ³ ST 3 mg/m ³	n-Propyl acetate:	TWA 200 ppm (840 mg/m ³) ST 250 ppm (1050 mg/m ³)
Phosphorus trichloride:	TWA 0.2 ppm (1.5 mg/m ³) ST 0.5 ppm (3 mg/m ³)	n-Propyl alcohol:	TWA 200 ppm (500 mg/m ³) ST 250 ppm (625 mg/m ³)
Phthalic anhydride:	TWA 6 mg/m ³ (1 ppm)	Propylene dichloride:	TWA 75 ppm (350 mg/m ³) ST 110 ppm (510 mg/m ³)
m-Phthalodinitrile:	TWA 5 mg/m ³ TWA 10 mg/m ³ (total)	Propylene glycol dinitrate:	TWA 0.05 ppm (0.3 mg/m ³)
Picloram:	TWA 5 mg/m ³ (resp)	Propylene glycol monomethyl ether:	TWA 100 ppm (360 mg/m ³) ST 150 ppm (540 mg/m ³)
Piperazine dihydrochloride:	TWA 5 mg/m ³	Propylene oxide:	TWA 20 ppm (50 mg/m ³)
Platinum metal (as Pt):	TWA 1 mg/m ³	n-Propyl nitrate:	TWA 25 ppm (105 mg/m ³) ST 40 ppm (170 mg/m ³)
Portland cement:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Resorcinol:	TWA 10 ppm (45 mg/m ³) ST 20 ppm (90 mg/m ³)
Potassium hydroxide:	TWA 2 mg/m ³	Ronnel:	TWA 10 mg/m ³

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Rosin core solder, pyrolysis products (as formaldehyde):	TWA 0.1 mg/m ³	Sodium azide:	C 0.1 ppm (as HN ₃) [skin] C 0.3 mg/m ³ (as NaN ₃) [skin]
Rouge:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Sodium bisulfite:	TWA 5 mg/m ³
Silica, amorphous:	TWA 6 mg/m ³	Sodium fluoroacetate:	TWA 0.05 mg/m ³ ST 0.15 mg/m ³ [skin]
Silica, crystalline (as respirable dust):	TWA 0.05 mg/m ³ (cristobalite) TWA 0.05 mg/m ³ (tridymite) TWA 0.1 mg/m ³ (quartz) TWA 0.1 mg/m ³ (tripoli) TWA 0.1 mg/m ³ (fused)	Sodium hydroxide:	C 2 mg/m ³
Silicon:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Sodium metabisulfite:	TWA 5 mg/m ³
Silicon carbide:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Stoddard solvent:	TWA 525 mg/m ³ (100 ppm)
Silicon tetrahydride:	TWA 5 ppm (7 mg/m ³)	Styrene:	TWA 50 ppm (215 mg/m ³) ST 100 ppm (425 mg/m ³)
Soapstone:	TWA 6 mg/m ³ (total) TWA 3 mg/m ³ (resp)	Subtilisins:	ST 0.00006 mg/m ³ [60-minute]
		Sulfur dioxide:	TWA 2 ppm (5 mg/m ³) ST 5 ppm (13 mg/m ³)
		Sulfur monochloride:	C 1 ppm (6 mg/m ³)
		Sulfur pentafluoride:	C 0.01 ppm (0.1 mg/m ³)
		Sulfur tetrafluoride:	C 0.1 ppm (0.4 mg/m ³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Sulfuryl fluoride:	TWA 5 ppm (20 mg/m ³) ST 10 ppm (40 mg/m ³)	Tin(II) oxide (as Sn):	TWA 2 mg/m ³
Sulprofos:	TWA 1 mg/m ³	Tin(IV) oxide (as Sn):	TWA 2 mg/m ³
Talc:	TWA 2 mg/m ³ (resp)	Titanium dioxide:	TWA 10 mg/m ³
Temephos:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	Toluene:	TWA 100 ppm (375 mg/m ³) ST 150 ppm (560 mg/m ³)
Terphenyl (o-, m-, p-isomers):	C 5 mg/m ³ (0.5 ppm)	Toluene-2,4-diisocyanate:	TWA 0.005 ppm (0.04 mg/m ³) ST 0.02 ppm (0.15 mg/m ³)
1,1,2,2-Tetrachloroethane:	TWA 1 ppm (7 mg/m ³) [skin]	m-Toluidine:	TWA 2 ppm (9 mg/m ³) [skin]
Tetrachloroethylene:	TWA 25 ppm (170 mg/m ³)	p-Toluidine:	TWA 2 ppm (9 mg/m ³) [skin]
Tetrahydrofuran:	TWA 200 ppm (590 mg/m ³) ST 250 ppm (735 mg/m ³)	Tributyl phosphate:	TWA 0.2 ppm (2.5 mg/m ³)
Tetrasodium pyrophosphate:	TWA 5 mg/m ³	Trichloroacetic acid:	TWA 1 ppm (7 mg/m ³)
4,4'-Thiobis(6-tert-butyl-m-cresol):	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)	1,2,4-Trichlorobenzene:	C 5 ppm (40 mg/m ³)
Thioglycolic acid:	TWA 1 ppm (4 mg/m ³) [skin]	Trichloroethylene:	TWA 50 ppm (270 mg/m ³) ST 200 ppm (1080 mg/m ³)
Thionyl chloride:	C 1 ppm (5 mg/m ³)	1,2,3-Trichloropropane:	TWA 10 ppm (60 mg/m ³)
Tin (organic compounds, as Sn):	TWA 0.1 mg/m ³ [skin]	1,1,2-Trichloro-1,2,2-trifluoroethane:	TWA 1000 ppm (7600 mg/m ³) ST 1250 ppm (9500 mg/m ³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Triethylamine:	TWA 10 ppm (40 mg/m ³) ST 15 ppm (60 mg/m ³)	Tungsten carbide (cemented):	TWA 5 mg/m ³ (as W) ST 10 mg/m ³ (as W)
Trimellitic anhydride:	TWA 0.005 ppm (0.04 mg/m ³)		TWA 0.05 mg/m ³ (as Co) TWA 1 mg/m ³ (as Ni)
Trimethylamine:	TWA 10 ppm (24 mg/m ³) ST 15 ppm (36 mg/m ³)	Uranium (insoluble compounds, as U):	TWA 0.2 mg/m ³ ST 0.6 mg/m ³
1,2,3-Trimethylbenzene:	TWA 25 ppm (125 mg/m ³)	n-Valeraldehyde:	TWA 50 ppm (175 mg/m ³)
1,2,4-Trimethylbenzene:	TWA 25 ppm (125 mg/m ³)	Vanadium dust:	TWA 0.05 mg V ₂ O ₅ /m ³ (resp)
1,3,5-Trimethylbenzene:	TWA 25 ppm (125 mg/m ³)	Vanadium fume:	C 0.05 mg V ₂ O ₅ /m ³
Trimethyl phosphite:	TWA 2 ppm (10 mg/m ³)	Vinyl acetate:	TWA 10 ppm (30 mg/m ³) ST 20 ppm (60 mg/m ³)
2,4,6-Trinitrotoluene:	TWA 0.5 mg/m ³ [skin]	Vinyl bromide:	TWA 5 ppm (20 mg/m ³)
Triorthocresyl phosphate:	TWA 0.1 mg/m ³ [skin]	Vinyl cyclohexene dioxide:	TWA 10 ppm (60 mg/m ³) [skin]
Triphenylamine:	TWA 5 mg/m ³	Vinylidene chloride:	TWA 1 ppm (4 mg/m ³)
Tungsten (insoluble compounds, as W):	TWA 5 mg/m ³ ST 10 mg/m ³	VM & P Naphtha:	TWA 1350 mg/m ³ (300 ppm) ST 1800 mg/m ³ (400 ppm)
Tungsten (soluble compounds, as W):	TWA 1 mg/m ³ ST 3 mg/m ³	Welding fumes:	TWA 5 mg/m ³

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

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Wood dust (all wood dusts except Western red cedar):	TWA 5 mg/m ³ ST 10 mg/m ³	Zinc oxide:	TWA 5 mg/m ³ (fume) ST 10 mg/m ³ (fume)
Wood dust (Western red cedar):	TWA 2.5 mg/m ³		TWA 10 mg/m ³ (total dust) TWA 5 mg/m ³ (resp dust)
Xylene (o-, m-, p-isomers):	TWA 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³)	Zinc stearate:	TWA 10 mg/m ³ (total) TWA 5 mg/m ³ (resp)
m-Xylene α,α'-diamine:	C 0.1 mg/m ³ [skin]	Zirconium compounds (as Zr):	TWA 5 mg/m ³ ST 10 mg/m ³
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