

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

CDC
CENTERS FOR DISEASE CONTROL
AND PREVENTION

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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≡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 ABxxxxxx. 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

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	
Ambersorb	Ambersorb® 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/UV	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		

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.		
PROVIDE		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.
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.		
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	OTHER CODES	
		Liq.....	Liquid
		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
ζ	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)		CCROV (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s)
CCRFOV (APF = 50)	Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s)	CCROVAG (APF = 10)	Any chemical cartridge respirator with organic vapor and acid gas 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	CCROVDM (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust and mist filter
CCRFOVHiE (APF = 50) ...	Any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter	CCROVDMFu (APF = 10) .	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter
CCRFs (APF = 50)	Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern	CCROVHiE (APF = 10)	Any chemical cartridge respirator with organic vapor cartridge(s) in combination with a high-efficiency particulate 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	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)		GMFOV (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
DMF (APF = 10)	Any dust and mist respirator with a full facepiece	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
DMFu (APF = 10)	Any dust, mist, and fume respirator	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
DMXSQ (APF = 10)	Any dust and mist 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
DXSQ (APF = 10)	Any dust respirator except single-use and quarter-mask respirators		(Continued)
GMFAG (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister		
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)			
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	HiEF (APF = 50)	Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter
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	PAPRAG (APF = 25)	Any powered, air-purifying respirator with acid gas cartridge(s)
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	PAPRAGHiE (APF = 25) ...	Any powered, air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter
HiE (APF = 10)	Any air-purifying respirator with a high-efficiency particulate filter	PAPRD (APF = 25)	Any powered, air-purifying respirator with a dust 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)		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
PAPROVAG (APF = 25)	Any powered, air-purifying respirator with organic vapor and acid gas cartridge(s)	PAPRTS (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern
PAPROVDM (APF = 25) ...	Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust and mist filter	SA (APF = 10)	Any supplied-air respirator
PAPROVDMFu (APF = 25)	Any powered, air-purifying respirator with organic vapor cartridge(s) in combination with a dust, mist, and fume filter	SA:CF (APF = 25)	Any supplied-air respirator operated in a continuous-flow mode
PAPRS (APF = 25)	Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern	SAF (APF = 50)	Any supplied-air respirator with a full facepiece
PAPRTHiE (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter	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
PAPRTOV (APF = 50)	Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s)		(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	Euphonia
conc	Concentration	fail	Failure
conf	Confusion	fasc	Fasciculation
conj	Conjunctivitis		

(Continued)

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
hemog	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	musc	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
nec	Necrosis	retster	Retrosternal (occurring behind the sternum)
neph	Nephritis	rhin	Rhinorrhea (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)
peri orb	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
pneutis	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:			soon as possible.
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	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:	
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	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 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)			
Soap wash	If this chemical contacts the skin, wash the contaminated skin with soap and water.		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 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 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 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	If this chemical contacts the skin, wash the contaminated skin with water.
Water flush	If this chemical contacts the skin, flush the contaminated skin with water. Where there is evidence of skin irritation, get medical attention.	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 immed .	If this chemical contacts the skin,		(Continued)

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

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		
Acetaldehyde <chem>CH3CHO</chem> 75-07-0 AB1925000	Acetic aldehyde, Ethanal, Ethyl aldehyde	NIOSH Ca See Appendix A See Appendix C (Aldehydes)	Ca [2000 ppm]	Colorless liquid or gas (above 69°F) with a pungent, fruity odor.	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]
1089 26	1 ppm = 1.83 mg/m ³	OSHA† 200 ppm (380 mg/m ³)		Sp Gr 0.79 Class IA Flammable Liquid				
Acetic acid <chem>CH3COOH</chem> 64-19-7 AF1225000	Acetic acid (aqueous), Ethanoic acid, Glacial acetic acid (pure compound), Methanecarboxylic acid [Note: Can be found in concentrations of 5-8% in vinegar.]	NIOSH 10 ppm (25 mg/m ³) ST 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 163°F IP 10.66 eV	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]
2790 60 (10-80% acid) 2789 29 (>80% acid)	1 ppm = 2.50 mg/m ³			Sp Gr 1.05 Class II Combustible Liquid				
Acetic anhydride <chem>(CH3CO)2O</chem> 108-24-7 AK1925000	Acetic acid anhydride, Acetyl oxide, Ethanoic anhydride	NIOSH C 5 ppm (20 mg/m ³) OSHA† 8 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	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]
1715 39	1 ppm = 4.24 mg/m ³			Sp Gr 1.08 Class II Combustible Liquid				
Acetone <chem>(CH3)2CO</chem> 67-64-1 AL3150000	Dimethyl ketone, Ketone, propane, 2-Propanone	NIOSH 250 ppm (590 mg/m ³) OSHA† 1000 ppm (2400 mg/m ³)	2500 ppm [UEL]	Colorless liquid with a fragrant, mint-like odor.	MW 58.1 BP 133°F Sol Miscible Fl.P 0°F IP 9.68 eV	VP 180 mm FRZ -140°F UEL 12.8% LEL 2.5%	Oxidizers, acids	Char, CS, GC/FID, II [#1300, Ketones I]
1090 26	1 ppm = 2.42 mg/m ³			Sp Gr 0.79 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 6)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R. Eyewash, Quick drench	NIOSH v: SCBAF PD,PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat, eye, skin burns, derm; conj, cough, CNS depress; delayed pulm edema; In animals: kidney, repro, terato effects; [canc]	Eye: Skin: Breath: Swallow: In/Immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, kidneys, CNS, repro sys [In animals: nasal cancer]
[Acetaldehyde]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (>10%) Prevent eye contact When contam (>10%) When wet or contam (>10%) N.R. Eyewash (>5%), Quick drench (>50%)	NIOSH/OSHA 80 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Irrit eyes, skin, nose, throat, eye, skin burns; skin sens, dental erosion, black skin, hyperkeratosis, conj, lac, phar edema, chronic bron	Eye: Skin: Breath: Swallow: In/Immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, teeth
[Acetic acid]						
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 125 ppm: SA:CF/PAPROV/ 200 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Conj, lac, corn edema, opac, photo, nasal, phar irrit, cough, dysp, bron, skin burns, vesic, sens derm	Eye: Skin: Breath: Swallow: In/Immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Acetic anhydride]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH 2500 ppm: CCROV/PAPROV/GMFOV/ SA/SCBAF § SCBAF PD,PP/SAF PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; head, dizz, CNS depress; derm	Eye: Skin: Breath: Swallow: In/Immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[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 FLP, IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Acetone cyanohydrin <chem>CH3C(OH)CNCH3</chem> 75-56-8 OD9275000	Cyanohydrin-2-propanone, 2-Cyano-2-propanol, α -Hydroxyisobutyronitrile, 2-Hydroxy-2-methyl- propanitrile, 2-Methylacetone nitrile	NIOSH C 1 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 FLP: 166°F IP: ? Sp. Gr.(77°F): 0.83 Class IIIA Combustible Liquid	VP: 0.8 mm FRZ: -4°F UEL: 12.0% LEL: 2.2%	Sulfuric acid, caustics [Note: Slowly decomposes to acetone & HCN at room temperature; rate is accelerated by an increase in pH, water content, or temperature.]	Pontapak; Ethyl acetate; GC/NPD; II [#2506]
184186	1 ppm = 3.54 mg/m ³							
Acetonitrile <chem>CH3CN</chem> 75-05-8 AL7700000	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 FLP(oc): 42°F IP: 12.20 eV	VP: 73 mm FRZ: -48°F UEL: 18.0% LEL: 3.0%	Strong oxidizers	Char; Benzene; GC/FID; II [#1806]
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-Fluorenylacacetamide	NIOSH Ca See Appendix A OSHA(1910.1014) See Appendix B	Ca [N.D.]	Tan, crystalline powder.	MW: 223.3 BP: ? Sol: Insoluble FLP: ? IP: ? Sp. Gr. ? Combustible Solid	VP: ? MLT: 351°F UEL: ? LEL: ?	None reported	None available
Acetylene <chem>HC≡CH</chem> 74-86-2 AO9600000	Ethine, Ethyne [Note: A compressed gas used in the welding & cutting of metals.]	NIOSH C 2500 ppm (2962 mg/m ³) 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% FLP: NA (Gas) IP: 11.40 eV RGasD: 0.91 Flammable Gas	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 Crt. Doc.
1001 17	1 ppm = 1.08 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 6)
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				
Provide:	Eyewash, Quick drench	5: SCBAF/PD, PP/SAF/PD, PP/ASCBA				
		Escape: GMFOV/SCBAE				
[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	naus, vomit, chest pain,	Skin	liver, kidneys
Wash skin:	When contam	500 ppm: SA/CF/PAPROV/CCRFOV/	Ing	weak, stupor, convuls.	Breath	
Remove:	When wet (flam)	GMFOV/SCBAF/SAF	Con	In animals: liver, kidney	Swallow	
Change:	N.R.	5: SCBAF/PD, PP/SAF/PD, PP/ASCBA		damage		
Provide:	Quick drench	Escape: GMFOV/SCBAE				
[Acetonitrile]						
Skin:	Prevent skin contact	NIOSH	Inh	Reduced function of	Eye	Liver, bladder,
Eyes:	Prevent eye contact	5: SCBAF/PD, PP/SAF/PD, PP/ASCBA	Abs	liver, kidneys, bladder,	Skin	kidneys, lungs,
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Ing	pancreas, [canc]	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 (flam)					
Change:	N.R.					
Provide:	Frostbite					
[Acetylene]						

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 Fl.P, IP, Sp. Gr, Flammability	VP, FRZ UEL, LEL		
Acetylene tetrabromide $\text{CHBr}_2\text{CHBr}_2$ 79-27-6 K18225000	Symmetrical tetrabromo- ethane, TBE Tetrabromooxetylene, 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) Sol 0.07% Fl.P: NA IP: ? Sp Gr: 2.97 Noncombustible Liquid	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, IR [#2003]
2504 58	1 ppm = 14.37 mg/m ³							
Acetylsalicylic acid $\text{CH}_3\text{COOC}_6\text{H}_4\text{COOH}$ 60-78-2 V00700000	Acetol, o-Acetoxybenzoic acid, 2-Acetoxybenzoic acid, Aspirin	NIOSH 5 mg/m ³ OSHA† none	N.D.	Odorless, colorless to white, crystal- line 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 Sp.Gr: 1.35 Combustible Powder; explosion hazard if dispersed in air.	VP: 0 mm (approx) MLT: 27.6°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; IR [#0500, Nude Dust (total)]
Acrolein $\text{CH}_2=\text{CHCHO}$ 107-02-8 AS1050000	Acraldehyde, Acrylaldehyde, Acrylic aldehyde, Allyl aldehyde, Propenal, 2-Propenal	NIOSH 0.1 ppm (0.25 mg/m ³) ST 0.3 ppm (0.6 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 Sp Gr: 0.84 Class IB Flammable Liquid	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, IR [#2501]
1092 30 (inhibited)	1 ppm = 2.33 mg/m ³							
Acrylamide $\text{CH}_2=\text{CHCONH}_2$ 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 [80 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 Combustible Solid (may also be dissolved in flammable liquids).	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								

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 8)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	OSHA 5 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, anor, neu, severe head, abdom pain, jaun, monoc, CNS depress	Eye: Skin: Breath: Swallow: Immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, liver, CNS
[Acetylene tetrabromide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam N.R. Daily Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; incr blood clotting time; nau, vomit; liver, kidney in	Eye: Skin: Breath: Swallow: Immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, blood, liver, kidney
[Acetylenecydic acid]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R. Eyewash, Quick drench	NIOSH/OSHA 2 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, discr pulm func, delayed pulm edema, chronic resp disease	Eye: Skin: Breath: Swallow: Immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, heart
[Acrolein]						
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, ataxia, numb limbs, pares, musc weak, absent deep tendon reflex, hand sweat, rig, leth; reproto effects; [canc]	Eye: Skin: Breath: Swallow: Immed Water flush immed Resp support Medical attention immed	Eyes, skin, CNS, PNS reproto sys [in animals: tumors of the lungs, testes, 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 F.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%), Ethylacetic acid, Glacial acrylic acid (98% in aqueous solution), 2-Propenoic acid	NIOSH 2 ppm (5 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 56°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 F.P.: 121°F IP: ? Sp. Gr: 1.05 Class II Combustible Liquid	VP: 3 mm FRZ: 56°F UEL: 8.02% LEL: 2.4%	Oxidizers, amines, alkalis, ammonium hydroxide, chloro- sulfonic acid, oleum, ethylene diamine, ethylmercaptan, 2-aminoethanol [Note: Corrosive to many metals.]	XAD(2); Methanol/ water; HPLC/LVD; 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% F.P. 30°F IP 109.1 eV Sp Gr 0.81 Class IB Flammable Liquid	VP 83 mm FRZ -116°F UEL 17% LEL 3.0%	Strong oxidizers, acids & alkalis, bromine, amines [Note: Unless inhib- ited (usually with methylhydroquinone), may polymerize sponta- neously or when heated or in presence of strong alkali. Attacks copper.]	Char Acetone/ CS, GC/FID, III [§ 1604]
1093 30 (inhibited)	1 ppm = 2.21 mg/m ³							
Adiponitrile $\text{NC(CH}_2)_4\text{CN}$ 111-68-3 AV2625000	1,4-Dicyanobutane; Hexanedinitrile; Tetramethylene cyanide	NIOSH 4 ppm (18 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: 643°F Sol: 4.6% F.P.(o.c.): 199°F IP: ? Sp. Gr: 0.97 Class IIIA Combustible Liquid	VP: 0.002 mm FRZ: 34°F UEL: 6.0% LEL: 1.7%	Oxidizers (e.g., perchlorates, nitrates), strong acids (e.g., sulfuric acid) [Note: Decomposes above 184°F, forming hydrogen cyanide.]	Char; Toluene; GC/FID; NIOSH NIR/ES Crt. Doc.
2206 66	1 ppm = 4.80 mg/m ³							
Aldrin $\text{C}_{12}\text{H}_{10}\text{Cl}_6$ 309-00-2 I02100000	1,2,3,4,10,10-Hexachloro- 1,4,4a,5,8,8a-hexahydro- endo-1,4-exo-5,8- dimethanonaphthalene; HRDN 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% F.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/Sub, Isocytane GC/ECAD, III [§ 5502]
2761 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 6)	First aid (See Table 6)		Target organs (See Table 6)
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; skin sens; in animals: lung, liver, kidney inj	Eye: Skin: Breath: Swallow:	Immered Water flush immered Resp support Medical attention immered	Eyes, skin, resp sys
[Acrylic acid]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamem) N.R. Eyewash, Quick drench	NIOSH § SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, asphy head, sneez; nau, vomit weak, h-head, skin vesic, scaling derm, [carc]	Eye Skin Breath Swallow	Immered Water wash immered Resp support Medical attention immered	Eyes, skin, CVS, liver, kidneys, CNS [brain tumors, lung & bowel cancer]
[Acrylonitrile]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 40 ppm: SA 100 ppm: SA/CF 200 ppm: SCBAF/SAF 250 ppm: SAF/PD,PP §: SCBAF PD,PP/SAF PD,PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, dizz, weak, gidd, conf, convuls; blurred vision; dysp; abdom pain, nau, vomit	Eye: Skin: Breath: Swallow:	Immered Soap wash immered Resp support Medical attention immered	Eyes, skin, resp sys, CNS, CVS
[Adiponitrile]							
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	Head dizz nau vomit mal myoclonic jerks of limbs clonic tonic convuls coma, hema, azotemia, [carc]	Eye Skin Breath Swallow	Immered Soap wash immered Resp support Medical attention immered	Cancer CNS, liver, kidneys, skin [in animals: tumors of the lungs, liver, thyroid & adrenal glands]
[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, F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Allyl alcohol <chem>CH2=CHCH2OH</chem> 107-18-6 BA5075000	AA, Allylic alcohol, Propenol, 1-Propen-3-ol, 2-Propenol, Vinyl carbinol	NIOSH 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³) [skin] OSHA† 3 ppm (8 mg/m ³)	20 ppm	Colorless liquid with a pungent, mustard-like odor.	MW 58.1 BP 205°F Sol. Miscible F.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-Propenol/ 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 <chem>CH2=CHCH2Cl</chem> 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% F.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 <chem>C4H8O3</chem> 106-92-3 RR0875000	AGE, 1-Allyloxy-2,3-epoxypropene; 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 (48 mg/m ³)	50 ppm	Colorless liquid with a pleasant odor	MW 114.2 BP 309°F Sol 14% F.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 <chem>H3C=CHCH2SCH2CH2CH3</chem> 2179-69-1 JO0350000	4,5-Dithia-1-octene; Onion oil; 2-Propenyl propyl disulfide; Propyl allyl disulfide	NIOSH 3 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 F.P.: ? IP: ?	VP: ? FRZ: 8°F UEL: ? LEL: ?	Oxidizers	None available
	1 ppm = 6.16 mg/m ³				Sp.Gr(68°F): 0.83 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 6)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Eye irrit, tissue damage,	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	20 ppm: SA:CF*/PAPROV*/CCRFOV/	Abs	irrit upper resp sys,	Skin	
Wash skin:	When contam	GMFOV/SCBAF/SAF	Ing	skin, pulm edema	Breath	
Remove:	When wet (flammi)	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con		Swallow	
Change:	N.R.	Escape GMFOV/SCBAE				
Provide:	Quick drench					
[Allyl alcohol]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 ppm: SA, CF*	Abs	muc memb; pulm edema,	Skin	liver, kidneys
Wash skin:	When contam	50 ppm: SCBAF/SAF	Ing	in animals: liver, kidney inj	Breath	
Remove:	When wet (flammi)	250 ppm: SAF PD, PP	Con		Swallow	
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	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	50 ppm: CCROV/PAPROV/GMFOV/	Abs	resp sys, derm, pulm edema,	Skin	blood, repro sys
Wash skin:	When contam	SA/SCBAF	Ing	narco, possible hemato,	Breath	
Remove:	When wet or contam	§ SCBAF PD, PP/SAF PD, PP ASCBA	Con	repro effects	Swallow	
Change:	N.R.	Escape GMFOV/SCBAE				
Provide:	Eyewash					
[Allyl glycidyl ether]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, nose, resp sys; lac	Eye:	Eyes, resp sys
Eyes:	Prevent eye contact		Ing		Skin:	
Wash skin:	N.R.		Con		Breath:	
Remove:	When wet or contam				Swallow:	
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, F.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 technical 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: 101.8 BP: 5398°F Sol: Insoluble FLP: 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 [Hazardous Dust: \$0800 (total), \$0800 (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 FLP: 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; II [7013]
Aluminum (pyro powders and welding flames, 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	Varies	Filter; HNO ₃ ; AAS; II [7013, Aluminum]
Aluminum (soluble salts and alloys, 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	Varies	Filter; HNO ₃ ; AAS; II [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:	Irritated Blot/brush away Fresh air Medical attention immed	Eyes, skin, resp sys
Eyes:	N.R.				Skin:		
Wash skin:	N.R.				Breath:		
Remove:	N.R.				Swallow:		
Change:	N.R.						
[α -Alumina]							
Skin:	N.R.	TBAL	Inh Con	Irrit eyes, skin, resp sys	Eye:	Irritated Fresh air	Eyes, skin, resp sys
Eyes:	N.R.				Breath:		
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:	Irritated Water/flush immed Resp support Medical attention immed	Skin, resp sys
Eyes:	N.R.				Skin:		
Wash skin:	N.R.				Breath:		
Remove:	N.R.				Swallow:		
Change:	N.R.						
[Aluminum (pyro powders and welding fumes, as Al)]							
Skin:	Prevent skin contact	TBAL	Inh ing Con	Irrit skin, resp sys; skin burns	Eye:	Irritated Water/flush immed Resp support Medical attention immed	Skin, resp sys
Eyes:	Prevent eye contact				Skin:		
Wash skin:	When contam				Breath:		
Remove:	When wet or contam				Swallow:		
Change:	Daily						
[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 FLP, 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 FLP: ? 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% FLP: 154°F IP: 8.00 eV Sp Gr: ? Combustible Solid	VP(77°F): 0.8 mm MLT: 137°F UEL: ? LEL: ?	Strong oxidizers	Tenax GC(2); Thermal desorp; GC/FID; ■ [#S158]
2671 55	1 ppm = 3.91 mg/m ³							
Amitrole $C_6H_8N_4$ 61-82-6 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% FLP: 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; Gmvr; ■ [#0500, Nuisance Dust (total)]
Ammonia NH_3 7664-41-7 BO0875000	Anhydrous ammonia, Aqua ammonia, Aqueous ammonia [Note: Often used in an aqueous solution.]	NIOSH 25 ppm (18 mg/m ³) ST 35 ppm (27 mg/m ³) OSHA† 50 ppm (36 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% FLP: NA (Gas) IP: 10.18 eV RQAccD: 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]
1005 15 (anhydrous) 2672 60 (12-44% soln.) 2073 15 (>44% soln.)	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 # SCBAF PD PP/SAF PD,PP ASCBA Escape HIEF/SCBAE	Inh Abs Ing Con	Head, dizz, leth, dysp, ataxia, weak, methemo, urinary burning, acute hemorrhagic cystitis, [canc]	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 § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, dizz, excitement, naus, 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 # SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, skin; dysp, musc spasms, ataxia, anor, swe, 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]
[Antitoxins]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam (soin) When wet or contam (soin) N.R. Eyewash (>10%), Quick drench (>10%)	NIOSH 250 ppm: CCRS*/SA* 300 ppm: SA,CF*/PAPRS*/CCRFs/ GMFS/SCBAF/SAF § SCBAF PD PP/SAF PD,PP ASCBA Escape GMFS/SCBAE	Inh Ing (soin) Con (soin/ liq)	Irrit eyes, nose, throat, dysp, bronspas, chest pain, pulm edema, pink frothy sputum, skin burns, vesic, liq; frostbite	Eye Skin Breath Swallow	Irr immed (soin/liq) Water flush immed (soin/liq) Resp support Medical attention immed (soin)	Eyes, skin, resp sys
[Ammonia]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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		
Ammonium chloride fume NH_4Cl 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% FLP: 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 [MSD186]
Ammonium sulfamate $\text{NH}_4\text{OSO}_2\text{NH}_2$ 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% FLP: 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) [#S348]
n-Amyl acetate $\text{CH}_3\text{COO}(\text{CH}_2)_4\text{CH}_3$ 628-63-7 AJ1925000 1104 26	Amyl acetate ester, Amyl acetate 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% FLP 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, ■ [#1450, Esters I]
sec-Amyl acetate $\text{CH}_3\text{COOCH}(\text{CH}_3)\text{C}_4\text{H}_9$ 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 FLP 89°F IP: ? Sp Gr: 0.87 Class IC Flammable Liquid	VP: 7 mm FRZ: -108°F UEL: 7.6% LEL: 1%	Nitrates, strong oxidizers, alkalis & acids	Char, CS, GC/FID, ■ [#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 6)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Immered	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Con	cough, dysp, pulm sens	Skin:	Soap wash immered	
Wash skin:	When contam				Breath:	Resp support	
Remove:	When wet or contam						
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Ammonium chloride fume]							
Skin:	N.R.	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Immered	Eyes, resp sys
Eyes:	N.R.	50 mg/m ³ DM	Con	cough, dysp	Skin	Soap wash prompt	
Wash skin:	N.R.	100 mg/m ³ DMXSO/SA			Breath	Resp support	
Remove:	N.R.	250 mg/m ³ SA CF/PAPROM			Swallow	Medical attention	
Change:	N.R.	600 mg/m ³ : SAT:CF/PAPRT/HIE/HIEF/ SCBAF/SAF				immered	
		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	Immered	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: GCROV*/GMFOV/PAPROV*/	Ing	possible CNS depres,	Skin	Water flush prompt	CNS
Wash skin:	When contam	SA*/SCBAF	Con	narco	Breath	Resp support	
Remove:	When wet (flam)	§ SCBAF PD,PP/SAF PD,PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape: GMFOV/SCBAE				immered	
[n-Amyl acetate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Immered	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: GCROV*/GMFOV/PAPROV*/	Ing	narco, derm, possible kidney,	Skin	Water flush prompt	kidneys, liver, CNS
Wash skin:	When contam	SA*/SCBAF	Con	liver inj; possible CNS	Breath	Resp support	
Remove:	When wet (flam)	§ SCBAF PD,PP/SAF PD,PP ASCBA		depres	Swallow	Medical attention	
Change:	N.R.	Escape: GMFOV/SCBAE				immered	
[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 FLP, 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† 8 ppm (19 mg/m³) [skin]	Ca [100 ppm]	Colorless to brown, only liquid with an aromatic amine- like odor [Note: A solid below 21°F]	MW 93.1 BP 363°F Sol 4% FLP 158°F IP 7.70 eV	VP 0.6 mm FRZ 21°F UEL 11% LEL 13%	Strong oxidizers, strong acids, toluene diisocyanate, alkalis	Sigal, Ethanol, GC/FID, IR [#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 177°F: 1% FLP (oc) 244°F IP 7.44 eV	VP <0.1 mm FRZ 41°F UEL ? LEL ?	Strong oxidizers	XAD-2, Methanol, HPLC/UV- VIS [#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 FLP ? IP 7.44 eV	VP (77°F): 0.006 mm MLT 135°F UEL ? LEL ?	Strong oxidizers	XAD-2, Methanol, HPLC/UV- VIS [#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* 0.5 mg/m³ [as Sb] [Note: The REL and PEL also apply to other Antimony compounds (as Sb).]	80 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 FLP 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.]	Filter, Acid, AAS, IR(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.R. Quick drench	NIOSH 4 SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, weak, dizzy, cyan, ataxia, dysp on effort, tacer, irrit eyes, methemo; circ; [canc]	Eye Skin Breath: Swallow	Irrigated Soap wash prompt Resp support Medical attention immed	Blood, CVS, eyes, liver, kidneys, resp eye [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 4 SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Head, dizzy, cyan, RBC Heinz bodies, [canc]	Eye Skin Breath: Swallow	Irrigated 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 6 mg/m ³ : DMXSO ² /SA 12.5 mg/m ³ : SA/CF/PAPRDM 25 mg/m ³ : HIEF/PAPRTHIE/SCBAF/SAF 60 mg/m ³ : SA:PD,PP 6 SCBAF PD, PP/SAF PD, PP ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, dizzy, cyan, RBC Heinz bodies, [canc]	Eye Skin Breath: Swallow	Irrigated 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 : DMXSO ² /SA 12.5 mg/m ³ : SA/CF/PAPRDM 25 mg/m ³ : HIEF/SAT CF/PAPRTHIE/ SCBAF/SAF 60 mg/m ³ : SA:PD,PP 6 SCBAF PD, PP/SAF PD, PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irr eyes, skin, nose, throat, mouth, cough, dizzy, head, nau, vomit, diarr, stomach cramps, insom, anor, unable to smell properly	Eye: Skin Breath: Swallow	Irrigated 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, FLP, IP, Sp. Gr, flammability	VP, FRZ, UEL, LEL		
ANTU $C_6H_5NHC(NH_2)_2S$ 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% FLP: NA IP: ?	VP: Low MLT: 388°F UEL: NA LEL: NA	Strong oxidizers, silver nitrate	Filter; Methanol; HPLC/UV/VD; II(5) [#S278]
1651 53					Sp Gr: ? Noncombustible Solid			
Arsenic (inorganic compounds, as As) As (Metal) 7440-38-2 (Metal) CG0525000 (Metal) 1558 53 (Metal)	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 Arsenic.]	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)]	Metal: Silver-gray or tin-white, brittle, odorless solid.	MW: 74.9 BP: Sublimes Sol: Insoluble FLP: NA IP: NA 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.	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; II [#7900]
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; II [#6022, Arsenic, organo-]
Arsine AsH_3 7784-42-1 CG6475000 2188 18	Arsenic hydride, Arsenic trihydride, Arsenurethid hydrogen, Arsinous hydride, Hydrogen arsine	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 FLP: 20% Sol: NA (Gas) IP: 9.89 eV RGasD: 2.89 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; II [#6001]

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	Eye	Resp sys., blood,
Eyes:	N.R.	3 mg/m ³ CCROVDMFu/SA	ing	doses, vomit, dysp., cyan.	Skin	liver
Wash skin:	N.R.	7.5 mg/m ³ SA CF/PAPROVDMFu		coarse pulm. rales, liver	Breath:	
Remove:	N.R.	15 mg/m ³ CCRFOVHIE/GMFOVHIE/		damage	Swallow:	
Change:	Daily	PAPRTOVHIE/SAT CF/				
		SCBAF/SAF				
		100 mg/m ³ SA PD PP				
		6 SCBAF PD PP/SAF PD PP ASCBA				
		Escape GMFOVHIE/SCBAE				
[ANTU]						
Skin:	Prevent skin contact	NIOSH	Inh	Ulceration of nasal septum,	Eye	Liver, kidneys,
Eyes:	Prevent eye contact	6 SCBAF PD PP/SAF PD PP ASCBA	Abs	derm., GI disturbances,	Skin	skin, lungs,
Wash skin:	When contam/Daily	Escape GMFAGHIE/SCBAE	Con	peri neur., resp. irrit,	Breath:	lymphatic sys.
Remove:	When wet or contam			hyperpig. of skin. [carc]	Swallow:	[lung & lymphatic cancer]
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Arsenic (inorganic compounds, as As)]						
Recommendations vary depending upon the specific compound.		TBAL	Inh	In animals: irrit. skin,	Eye:	Skin, resp sys.,
			ing	possible derm.; resp. distress;	Skin:	kidneys, CNS, liver,
			Con	derm.; kidney damage; musc. tremor, seiz.; possible GI tract, terato, repro effects; possible liver damage	Breath:	GI tract, repro sys.
					Swallow:	
[Arsenic (organic compounds, as As)]						
Skin:	Frostbite	NIOSH	Inh	Head, mal. weak, dizz,	Eye:	Blood, kidneys,
Eyes:	Frostbite	6 SCBAF PD PP/SAF PD PP ASCBA	Con	dysp., abdom. back pain,	Skin:	liver
Wash skin:	N.R.	Escape GMFS/SCBAE	(liq)	nausea, vomit, bronze skin,	Breath:	[lung & lymphatic cancer]
Remove:	When wet (flamm.)			hema., jaun. peri neur.		
Change:	N.R.			liq: frostbite. [carc]		
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 (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		
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 FLP: NA IP: NA Sp Gr: ? Noncombustible Solids	VP: 0 mm (approx) MLT: 1112°F (Decomposes) UEL: NA LEL: NA	None reported	Filter; Acetone/ Triacetin, PCM; II [87400, Fibers] [Also 87402 (TEM).]
Asphalt fumes 8082-42-4 C19900000 1999 27 (Asphalt)	Asphalt; Asphaltum, Bitumen (European term), Petroleum asphalt, Petroleum bitumen, Road asphalt, Roofing asphalt	NIOSH Ca C 8 mg/m ³ [15-min] See Appendix A OSHA none	Ca [N.D.]	Fumes generated during the production or application of asphalt (a dark-brown to black cement-like substance manufactured by the vacuum distillation 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; Gray; NIOSH Asphalt Fumes Crt. Doc.
Atrazine C ₄ H ₄ ClN ₃ 1912-24-9 XV5600000 2763 66 (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 8 mg/m ³ OSHA† none	N.D.	Colorless or white, odorless, crystalline powder. [herbicide]	MW: 215.7 BP: Decomposes Sol: 0.003% FLP: NA IP: NA Sp.Gr: 1.18 Noncombustible Solid, but may be mixed with flammable liquids.	VP: 0.0000063 mm MLT: 340°F UEL: NA LEL: NA	Strong acids, strong bases	Filter; none; Gray; II [90600, Nuisance Dust (total)]
Azinphos-methyl C ₈ H ₁₀ O ₃ P ₃ N ₃ 86-50-0 TE1925000 2783 55	0,0-Dimethyl-S-4-oxo-1,2,3-benzotriazin-3(4H)-ylmethyl phosphorodithioate, Guthion® Methyl azinphos [(CH ₃ O) ₂ P(S)SCH ₂ (N ₃ C ₂ H ₃ 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% FLP: NA IP: ? Sp Gr: 1.44 Noncombustible Solid	VP: 8 x 10 ⁻⁶ mm MLT: 183°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 6)
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: H/EF/SCBAE	Inh Ing Con	Asbestosis (chronic exposure): dysp, interstitial fib, restricted pulm function, finger clubbing, irrit eyes, [canc]	Eye: Breath:	Irr:imed Fresh air	Resp sys, eyes [lung cancer]
[Asbestos]							
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: GMFOVHIE/SCBAE	Inh Abs Con	Irrit eyes, resp sys; [canc]	Eye: Breath:	Irr:imed Resp support	Eyes, resp sys [in animals: skin tumors]
[Asphalt fumes]							
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	Irrit eyes, skin; derm, sens skin; dysp, weak, inco, saliv; hypothermia; [vering]	Eye: Skin: Breath: Swallow:	Irr:imed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, liver
[Atrazine]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	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, rin, head, tight chest, wheez, lar spas, saliv, cyan, anor, nau, vomit, diarr, sweat, twitch, pers, convuls, low BP, card irreg	Eye: Skin: Breath: Swallow:	Irr:imed Soap wash Immed Resp support Medical attention Immed	Resp sys, CNS, CVS, blood chol
[Azinphos-methyl]							

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		
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% Fl.P. NA IP ? Sp Gr 3.86 Noncombustible Solid	VP Low MLT 1765°F UEL NA LEL NA	Acids, oxidizers	Filter; Water; AAS; II [#7056, Barium, soluble compds]
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% Fl.P. NA IP ? Sp Gr 3.24 Noncombustible Solid, but will accelerate the burning of combustible materials.	VP Low MLT 1084°F UEL NA LEL NA	Acids, oxidizers, aluminum-magnesium alloys, (barium dioxide + zinc) [Note: Contact with combustible material may cause fire.]	Filter; Water; AAS; II [#7056, Barium, soluble compds]
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) 8 mg/m ³ (resp) OSHA† 15 mg/m ³ (total) 8 mg/m ³ (resp)	N.D.	White or yellowish, odorless powder.	MW: 233.4 BP: 2912°F (Decomposes) Sol(64°F): 0.0002% Fl.P: NA IP: NA Sp.Gr: 4.25-4.6 Noncombustible Solid	VP: 0 mm (approx) MLT: 2878°F UEL: NA LEL: NA	Phosphorus, aluminum [Note: Aluminum in the presence of heat can cause an explosion.]	Filter; none; Grav; II [Hazardous Dust: #0500 (total), #0500 (resp)]
1564 56 (Barium compound, n.o.s.)								
Benomyl C ₁₂ H ₁₄ N ₂ O ₄ 17804-35-2 DD6475000	Methyl 1-(butylcarbamoyl)- 2-benzimidazolecarbamate	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 8 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% Fl.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; II [Hazardous Dust: #0500 (total), #0500 (resp)]
2757 66 (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 6)	First aid (See Table 6)	Target organs (See Table 5)		
[Azinphos-methyl]							
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 : DMXSO/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	Irrit eyes, skin, upper resp sys; skin burns, gastroenteritis; muscle spasm; slow pulse, extrasytokes; hypokalemia	Eye: Skin: Breath: Swallow:	Irrigated Water flush irrigated Resp support Medical attention irrigated	Eyes, skin, resp sys, heart, CNS
[Barium chloride (as Ba)]							
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 : DMXSO/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	Irrit eyes, skin, upper resp sys; skin burns, gastroenteritis; muscle spasm; slow pulse, extrasytokes; hypokalemia	Eye: Skin: Breath: Swallow:	Irrigated Water flush irrigated Resp support Medical attention irrigated	Eyes, skin, resp sys, heart, CNS
[Barium nitrate (as Ba)]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Daily N.R. N.R. Eyewash, Quick drench	TBAL	Inh Con	Irrit eyes, nose, upper resp sys; benign pneumoconiosis (beriosis)	Eye: Skin: Breath: Swallow:	Irrigated Soap wash Resp support Medical attention irrigated	Eyes, resp sys
[Barium sulfate]							
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	Irrit eyes, skin, upper resp sys; skin lesions; possible repro, terato effects	Eye: Skin: Breath: Swallow:	Irrigated Soap wash irrigated Resp support Medical attention irrigated	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 FLP, 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 ppb 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% FLP: 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 106-98-5 DC0525000	Mercaptobenzene, Phenyl mercaptan, Thiophenol	NIOSH Ca 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% FLP: 132°F IP: 8.33 eV	VP(65°F): 1 mm FRZ: 5°F UEL: ? LEL: ?	Strong acids & bases, calcium hypochlorite, alkali metals [Note: Oxidize 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-Diaminobiphenyl [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% FLP: ? 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% FLP: 178°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]
2065/2086/2067 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: 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	Irriteyes, skin, nose, resp sys, gidd head, nau, staggered gait, fig, anor, lass, derm, bone marrow depres, [canc]	Eye: Skin: Breath: Swallow: Immed Soap wash Immed Resp support Medical attention immed	Eyes, skin, resp sys, blood, CNS, bone marrow [Leukemia]
[Benzene]						
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 1 ppm: CCROV/SA 2.5 ppm: SA/CF/PAPROV 5 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irriteyes, skin, resp sys; derm; cyan; cough, wheez; dysp, pulm edema, pneumitis; head, dizz, CNS depres; nau, vomit; kidney, liver, spleen damage	Eye: Skin: Breath: Swallow: Immed Soap wash Immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys, liver, spleen
[Benzenethiol]						
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	Hema, secondary anemia from hemolysis; acute cystitis, acute liver disorders; derm painful, irreg urination, [canc]	Eye: Skin: Breath: Swallow: Immed Soap wash Immed Resp support Medical attention immed	Bladder, skin, kidneys, liver, blood [liver, kidney & bladder cancer]
[Benzidine]						
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 : DMXSO ² /SA* 125 mg/m ³ : SA/CF*/PAPRDM* 250 mg/m ³ : HIEF/PAPRTHIE*/SCBAF/ SAF 1500 mg/m ³ : SAF PD PP § SCBAF PD PP/SAF PD PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irriteyes, skin, muc memb, sens derm	Eye: Skin: Breath: Swallow: Immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Benzoyl peroxide]						

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 F.P., IP, Sp. Gr, Flammability	VP, FRZ UEL, LEL		
Benzyl chloride $C_6H_5CH_2Cl$ 100-44-7 XS8925000	Chloromethylbenzene, α -Chlorotoluene	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% F.P.: 153°F IP: ? Sp. Gr: 1.10 Class IIIA Combustible Liquid	VP: 1 mm FRZ: -38°F UEL: ? LEL: 1.1% [Note: Can polymerize when in contact with all common metals except nickel & lead. Hydrolyzes in H ₂ O to benzyl alcohol.]	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; II [#1003, Halogenated Hydrocarbons]
1738-59	1 ppm = 5.26 mg/m ³							
Beryllium & beryllium compounds (as Be) Be (Metal) 7440-41-7 (Metal) DS1750000 (Metal) 1568-53 (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 F.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; II [#7102]
Bismuth telluride, doped with Selenium sulfide (as Bi, Te, S)	Doped bismuth sesquioxide, Doped bismuth telluride, Doped bismuth tritelluride, Doped tellurobismuthite [Note: Doped with selenium sulfide. Commercial mix may contain 80% Bi, Te, 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 semiconductor.]	Properties are unavailable but should be similar to Bismuth telluride, undoped. Sp. Gr: 7 Noncombustible Solid	Strong oxidizers, moisture	Filter; none; Grav; II [#0600, Hazardous Dust (total)]	
Bismuth telluride, undoped Bi_2Te_3 1304-82-1 EBC110000	Bismuth sesquioxide, 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: 7 Sol: Insoluble F.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; II [Hazardous Dust: #0600 (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: 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 10 ppm CCROVAG/GMFOVAG/ PAPROVAG/SA/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVAG/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, weak, xmy, head, skin eruption, pulm edema	Eye Skin Breath: Swallow	Irrit med Soap wash Resp support Medical attention imed	Eyes, skin, resp sys, CNS
[Benzyl chloride]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily Eyewash	NIOSH § SCBAF PD PP/SAF PD PP ASCBA Escape HIEF/SCBAE	Inh Con	Berylliosis (chronic exposures): anor, low-wght, weak, chest pain, cough, clubbing of fingers, cyan, pulm insufficiency; Irrit eyes; derm; [carc]	Eye Breath:	Irrit med Fresh air	Eyes, skin, resp sys [lung cancer]
[Beryllium & beryllium compounds (as Be)]							
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 Con	Irrit eyes, skin, upper resp sys; garlic breath; In animals: pulm lesions (nonfibrotic)	Eye: Skin: Breath: Swallow:	Irrit med Soap wash Resp support Medical attention imed	Eyes, skin, resp sys
[Bismuth telluride, doped with Selenium sulfide (as Bi ₂ Te ₃)]							
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 Con	Irrit eyes, skin, upper resp sys; garlic breath	Eye: Skin: Breath: Swallow:	Irrit med Soap wash Resp support Medical attention imed	Eyes, skin, resp sys
[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 F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Borates, tetra, sodium salts (Anhydrous) <chem>Na2B4O7</chem> 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% F.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; II [#0500, Nuisance Dust (total)]
Borates, tetra, sodium salts (Decahydrate) <chem>Na2B4O7·10H2O</chem> 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% F.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; II [#0500, Nuisance Dust (total)]
Borates, tetra, sodium salts (Pentahydrate) <chem>Na2B4O7·5H2O</chem> 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: 7 Sol: 4% F.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; II [#0500, Nuisance Dust (total)]
Boron oxide <chem>B2O3</chem> 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% F.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; II [#0500, Nuisance Dust (total)]

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.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.		Ing	resp sys; derm; epie;	Skin:	Soap wash	
Wash skin:	Daily		Con	cough, dysp	Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention	
Change:	Daily					Irritated	
[Borates, tetra sodium salts (Anhydrous)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.		Ing	resp sys; derm; epie;	Skin:	Soap wash	
Wash skin:	Daily		Con	cough, dysp	Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention	
Change:	Daily					Irritated	
[Borates, tetra sodium salts (Decahydrate)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.		Ing	resp sys; derm; epie;	Skin:	Soap wash	
Wash skin:	Daily		Con	cough, dysp	Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention	
Change:	Daily					Irritated	
[Borates, tetra sodium salts (Pentahydrate)]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	Prevent eye contact	50 mg/m ³ DM*	Ing	cough; conj; skin eryt	Skin:	Water flush prompt	
Wash skin:	When contain	100 mg/m ³ DMXSO**/SA*	Con		Breath:	Fresh air	
Remove:	When wet or contain	250 mg/m ³ SA CF*/PAPRDM**			Swallow:	Medical attention	
Change:	N.R.	500 mg/m ³ HIEF/PAPRTHIE*/SCBAF/ SAF				Irritated	
		2000 mg/m ³ : SAF: PD, PP					
		§ SCBAF: PD, PP/SAF: PD, PP: ASCBA					
		Escape: HIEF/SCBAE					
[Boron oxide]							

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLVAs 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		
Boron tribromide BBr_3 10284-33-4 ED7400000	Boron bromide, Trifluoroborane	NIOSH C 1 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 F.P.: NA IP: 9.70 eV	VP(57°F): 40 mm FRZ: -61°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 89	1 ppm = 10.41 mg/m ³				Sp.Gr(55°F): 2.64 Noncombustible Liquid			
Boron trifluoride BF_3 7637-07-2 ED2275000	Boron fluoride, Trifluoroborane	NIOSH/OSHA C 1 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) F.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 $\text{C}_7\text{H}_9\text{BrN}_2\text{O}_2$ 314-40-9 YQ9100000	5-Bromo-3-sec-butyl-6- methyluracil, 6-Bromo-6-methyl-3- (1-methylpropyl)uracil	NIOSH 1 ppm (10 mg/m ³) OSHA† none	N.D.	Odorless, colorless to white, crystalline solid. [Terbicide] [Note: Commercially available as a wettable powder or in liquid formulations.]	MW: 261.2 BP: Sublimes Sol(77°F): 0.08% F.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; M [P0500, N/A Dust (total)]
1 ppm = 10.86 mg/m ³					Sp.Gr: 1.66 Noncombustible Solid, but may be dissolved in flammable liquids.			
Bromine Br_2 7726-95-6 EF9100000	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% F.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 iron, steel, stainless steel & copper.]	Filter; $\text{Na}_2\text{S}_2\text{O}_5$; IC; M [P0011]
1744 59	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 6)	
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, resp sys; skin, eye burns; dysp, pulm edema	Eyes: Skin: Breath: Swallow:	Im/Immed Water flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys
[Boron tribromide]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 10 ppm: SA* 25 ppm: SA:CF*/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, skin, nose resp sys, epis, eye, skin burns, in animals: pneu, kidney damage	Eye Skin Breath	Im/Immed Water flush Immed Resp support	Eyes, skin, resp sys, kidneys
[Boron trifluoride]							
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	Irrit eyes, skin, upper resp sys; in animals: thyroid inj	Eyes: Skin: Breath: Swallow:	Im/Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, thyroid
[Bromacil]							
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 2.5 ppm: SA, CF*/PAPRS ¹ 3 ppm: CCRFS/GMFS/PAPRTS ⁴ / SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Dizz, head, lac, epis, cough, feeling of oppression, pulm edema, pneu, abdom pain, diarr, measle-like eruptions, eye, skin burns	Eye Skin Breath Swallow:	Im/Immed Soap wash Immed Resp support Medical attention Immed	Resp sys, eyes, CNS, skin
[Bromine]							

Chemical name, structure formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLHA 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		
Bromine pentafluoride BrF_5 7789-30-2 EFS360000	Bromine fluoride	NIOSH 0.1 ppm (0.7 mg/m ³) OSHA† none	N.D.	Colorless to pale- yellow, turning liquid with a pungent odor. [Note: A colorless gas above 106°F. Shipped as a compressed gas.]	MW: 174.9 BP: 105°F Sol: Reacts violently FLP: NA IP: 7 Sp.Gr: 2.48 Noncombustible Liquid, but a very powerful oxidizer.	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
1746 44	1 ppm = 7.27 mg/m ³							
Bromoform CHBr_3 75-25-2 P85600000	Methyl tribromide, Tribromomethane	NIOSH/OSHA 0.5 ppm (5 mg/m ³) (skin)	860 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% FLP: NA IP: 10.46 eV Sp.Gr: 2.89 Noncombustible Liquid	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- erates decomposition.]	Cher; CS; GCFID; III [#1003, Halo- genated Hydro- carbons]
2515 58	1 ppm = 10.51 mg/m ³							
1,3-Butadiene $\text{CH}_2=\text{CHCH}=\text{CH}_2$ 106-99-0 E19275000	Bisethylene, Bivinyll, Butadiene, Divinyll, Erythrene, Vinylstyrene	NIOSH Ca See Appendix A OSHA 1000 ppm (2200 mg/m ³)	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 FLP: NA (Gas) -106°F (Liq) IP: 9.07 eV RGasD: 1.88 Sp.Gr: 0.65 (Liquid at 21°F) Flammable Gas Class IA Flammable Liquid	VP: 2.4 atm FRZ: -164°F UEL: 12.0% LEL: 2.0%	Phenol, chlorine dioxide, copper, crotonaldehyde [Note: May contain inhibitors (such as tributylcatechol) to prevent self- polymerization. May form explosive peroxides upon exposure to air.]	Cher(2); CH ₂ Cl ₂ GCFID; III [#1024]
1010 17 (inhibited)	1 ppm = 2.25 mg/m ³							
n-Butane $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ 106-97-8 EJ4200000	normal-Butane, Butylhydride, Diethyl, Isobutylmethane [Note: Also see specific listing for isobutane.]	NIOSH 800 ppm (1800 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 31°F.]	MW: 58.1 BP: 31°F Sol: Slight FLP: NA (Gas) IP: 10.63 eV RGasD: 2.11 Sp.Gr: 0.6 (Liquid at 31°F) Flammable Gas Class IA Flammable Liquid	VP: 2.06 atm FRZ: -31°F UEL: 8.4% LEL: 1.6%	Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, trichloro carbonyl + oxygen]	None available
1011 22	1 ppm = 2.43 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 8)
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, resp sys; com nec; skin burns; cough, dysp, pulm edema; liver, kidney inj	Eye: Skin: Breath: Swallow: Irrigated Water flush Irrigated Resp support Medical attention Irrigated	Eyes, skin, resp sys, liver, kidneys
[Bromine pentafluoride]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 12.5 ppm: SA, CF*/PAPROV* 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 880 ppm: SAF/PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys, CNS depres, liver, kidney damage	Eye: Skin: Breath: Swallow: Irrigated Soap wash prompt Resp support Medical attention Irrigated	Eyes, skin, resp sys, CNS, liver, kidneys
[Bromoform]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamng) N.R. Frostbite	NIOSH § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit eyes, nose, throat, drow, li-head; liq: frostbite, terato, repro effects; [canc]	Eye: Skin: Breath: Frostbite Frostbite Resp support	Eyes, resp sys, CNS, repro sys [hemato cancer]
[1,3-Butadiene]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamng) N.R. Frostbite	TBAL	Inh Con (liq)	Drow, narco, asphy; liq: frostbite	Eye: Skin: Breath: Frostbite Frostbite Resp support	CNS
[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	Ethyl methyl ketone, MEK, Methyl acetone, Methyl ethyl ketone	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	VP: 78 mm FRZ: -123°F UEL(200°F): 11.4% LEL(200°F): 1.4%	Strong oxidizers, amines, ammonia, inorganic acids, caustics, copper, isocyanates, pyridines	Ambersorb; CS; GC/FID; II [#2500]
1193 26 1232 26	1 ppm = 3.00 mg/m ³				Sp Gr: 0.81 Class IB Flammable Liquid			
2-Butoxyethanol <chem>C4H9OCH2CH2OH</chem> 111-76-2 KJ8575000	Butyl Cellosolve®, Butyl oxfol, Dowanol EB, EGBE, Ektasolve EB, Ethylene glycol monobutyl ether, Jeffersol EB	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	VP: 0.8 mm FRZ: -107°F UEL(275°F): 12.7% LEL(200°F): 1.7%	Strong oxidizers, strong caustics	Char: Methanol/ CH ₃ Cl; GC/FID; II [#1403, Alcohols IV]
2369 26	1 ppm = 4.91 mg/m ³				Sp Gr: 0.90 Class IIIA Combustible Liquid			
2-Butoxyethanol acetate <chem>C4H9O(CH2)3OCOCH3</chem> 112-07-2 KJ8825000	2-Butoxyethyl acetate, Butyl Cellosolve® acetate, Butyl glycol acetate, EGBEA, Ektasolve EB® acetate, Ethylene glycol monobutyl ether acetate	NIOSH 5 ppm (33 mg/m ³) OSHA none	N.D.	Colorless liquid with a pleasant, sweet, fruity odor.	MW: 180.2 BP: 378°F Sol: 1.8% Fl.P: 71°F IP: 7	VP: 0.3 mm FRZ: -82°F UEL(276°F): 0.88% LEL(200°F): 0.54%	Oxidizers	Char; CH ₃ Cl/ Methanol; GC/FID; OSHA [#83]
	1 ppm = 6.86 mg/m ³				Sp. Gr: 0.94 Class IB Flammable Liquid			
n-Butyl acetate <chem>CH3COO(CH2)3CH3</chem> 123-86-4 AF 7350000	Butyl acetate, n-Butyl ester of acetic acid, Butyl ethanoate	NIOSH 150 ppm (710 mg/m ³) ST 200 ppm (950 mg/m ³) OSHA† 180 ppm (710 mg/m ³)	1700 ppm [UEL]	Colorless liquid with a fruity odor	MW 116.2 BP: 258°F Sol 1% Fl.P 72°F IP: 10.00 eV	VP: 10 mm FRZ: -107°F UEL: 7.6% LEL: 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char; CS; GC/FID; II [#1450, Esters I]
1123 26	1 ppm = 4.83 mg/m ³				Sp. Gr: 0.88 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 (flam)	NIOSH/OSHA 3000 ppm: SA:CF/PAPROV/ CCRFOV/GMFOV/SCBAF/ SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, head, dizz, vomit, derm	Eye Skin Breath Swallow	Irritated Water wash Fresh air Medical attention immed	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. Quick/drench	NIOSH 50 ppm: CCROV*/SA* 125 ppm: SA:CF/PAPROV* 250 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 700 ppm: SAF:PD,PP § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, hemolysis, hemog, CNS depres, head; vomit	Eye Skin Breath Swallow	Irritated Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, hemato sys, blood, kidneys, liver, lymphoid sys
[2-Butoxyethanol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	NIOSH 50 ppm: CCROV*/SA* 125 ppm: SA:CF/PAPROV* 250 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 700 ppm: SAF:PD,PP § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; hemolysis, hemog; CNS depres, head; vomit	Eye: Skin: Breath: Swallow:	Irritated Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, hemato 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 (flam)	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	Irrit eyes, skin, upper resp sys, head, drow, narco	Eye Skin Breath Swallow	Irritated Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[n-Butyl acetate]							

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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
sec-Butyl acetate <chem>CH3COOCH(CH2CH2CH3)</chem> 105-46-4 AF7380000	sec-Butyl ester of acetic acid, 1-Methylpropyl acetate	NIOSH/OSHA 200 ppm (950 mg/m ³)	1700 ppm [LEL]	Colorless liquid with a pleasant, fruity odor.	MW 116.2 BP 234°F Sol 0.8% FLP 62°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; IR [#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)	1800 ppm [LEL]	Colorless liquid with a fruity odor.	MW 116.2 BP 206°F Sol Insoluble FLP 72°F IP ?	VP 7 FRZ ? UEL ? LEL 1.8%	Nitrates; strong oxidizers, alkalis & acids	Char; CS; GC/FID; IR [#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 (56 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: 9.1% FLP: 163°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, milky alcoholic odor.	MW 74.1 BP 243°F Sol 9% FLP 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; IR [#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 6)
Skin:	Prevent skin contact	NIOSHOSH A	Inh	Irrit eyes, head, drow,	Eye	Irritated	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 (flam)	§ SCBAF PD PP/SAF PD PP ASCBA			Swallow	Medical attention	
Change:	N.R.	Escape GMFOV/SCBAE				immed	
[sec-Butyl acetate]							
Skin:	Prevent skin contact	NIOSHOSH A	Inh	Itch, inflamm eyes, irrit	Eye	Irritated	Resp sys, eyes,
Eyes:	Prevent eye contact	1600 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 (flam)	§ 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:	Irritated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	resp sys; sens derm; dysp	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	Irritated	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	CCRFOV/GMFOV/PAPROV/	Ing	corn inflam, blurred	Breath:	Resp support	
Remove:	When wet (flam)	SCBAF/SAF	Con	vision, lac photo, derm;	Swallow	Medical attention	
Change:	N.R.	§ SCBAF PD PP/SAF PD PP ASCBA		possible auditory nerve		immed	
		Escape GMFOV/SCBAE		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 FLP, IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
sec-Butyl alcohol $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$ 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 15% FLP 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 & permanga- nate acids	Char, 2-Propanol/ CS, GC/FID, II [#1401 Alcohols II]
1120 26	1 ppm = 3.06 mg/m ³				Sp Gr 0.81 Class IC Flammable Liquid			
tert-Butyl alcohol $(\text{CH}_3)_3\text{COH}$ 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)	1800 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 FLP 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, II [#1400 Alcohols I]
1120 26	1 ppm = 3.06 mg/m ³				Sp Gr 0.78 (Solid) Combustible Solid Class IB Flammable Liquid			
n-Butylamine $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ 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 FLP 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]	Sil gel*, Merhanol, GC/FID, II [#S138]
1125 68	1 ppm = 3.04 mg/m ³				Sp Gr 0.74 Class IB Flammable Liquid			
tert-Butyl chromate $[(\text{CH}_3)_3\text{CO}]_2\text{CrO}_4$ 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 [16 mg/m ³ as Cr(VI)]	Liquid [Note: Solidifies at 32-23°F]	MW 230.3 BP ? Sol ? FLP ? IP ?	VP ? FRZ 32-23°F UEL ? LEL ?	Reducing agents, moisture, acids, alcohols, hydrazine, combustible materials	Filter; NaOH/Na ₂ CO ₃ ; IC; II [#7664, 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 6)
Skin:	Prevent skin contact	NIOSH	Inh Ing Con	Irr eyes, skin, nose, throat; narco	Eye Skin Breath Swallow	Irritated Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	1000 ppm: CCROV/SA*					
Wash skin:	When contam	2000 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF					
Remove:	When wet (flam)	§ SCBAF PD PP/SAF PD,PP ASCBA					
Change:	N.R.	Escape GMFOV/SCBAE					
[sec-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh Ing Con	Irr eyes, skin, nose, throat; drow, narco	Eye Skin Breath Swallow	Irritated Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	1600 ppm: SA:CF/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF					
Wash skin:	When contam	§ SCBAF PD PP/SAF PD,PP ASCBA					
Remove:	When wet (flam)	Escape GMFOV/SCBAE					
Change:	N.R.						
[tert-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh Abs Ing Con	Irr eyes, skin, nose, throat, head, skin, flush, burns	Eye Skin Breath Swallow	Irritated Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	50 ppm: CCRS*/SA*					
Wash skin:	When contam	125 ppm: SA:CF*/PAPRS*					
Remove:	When wet (flam)	250 ppm: CCRFS/GMFS/PAPRTS*/ SCBAF/SAF					
Change:	N.R.	300 ppm: SAF PD,PP					
Provide:	Eyewash, Quick drench	§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape GMFS/SCBAE					
[Butylamine]							
Skin:	Prevent skin contact	NIOSH	Inh Abs Ing Con	Irr eyes, skin, resp sys, eye, skin burns, drow, muscle weak; skin ulcers; lung changes; [canc]	Eye Skin Breath Swallow	Irritated Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS [lung cancer]
Eyes:	Prevent eye contact	§ SCBAF PD PP/SAF PD,PP ASCBA					
Wash skin:	When contam/Daily	Escape GMFOVH-E/SCBAE					
Remove:	When wet or contam						
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 (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		
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, ■ [#S81]
	1 ppm = 5.41 mg/m ³				Sp Gr: 0.91 Class II Combustible Liquid			
n-Butyl lactate $CH_3CH_2CH_2COOC_4H_9$ 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 FLP: 180°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.e.)	1 ppm = 6.68 mg/m ³				Sp.Gr: 0.88 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 (36 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; HCVOC; FPD; ■ [#2542]
2347 27	1 ppm = 3.75 mg/m ³				Sp Gr: 0.83 Class IIB Flammable Liquid			
o-sec-Butylphenol $CH_3CH_2CH(CH_3)C_6H_4OH$ 89-72-6 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) 2228 53 (solid)	1 ppm = 6.34 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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 56 ppm: CCROV/SA* 140 ppm: SA,CF/PAPROV* 280 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF,PD,PP/SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, sens. narco, possible hemato effects; CNS depress	Eye: Skin: Breath: Swallow: Immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[n-Butyl glycidyl ether]						
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; drows, head, CNS depress; nau, vomit	Eye: Skin: Breath: Swallow: Immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[n-Butyl lactate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA,CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF 500 ppm: SA,PD,PP* §: SCBAF,PD,PP/SAF,PD,PP,ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin; muc; weak, mil, sweat, nau, vomit, head, conf; in animals: narco, inco, weak, cyan, pulm irrit, liver, kidney damage	Eye: Skin: Breath: Swallow: Immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[n-Butyl mercaptan]						
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; skin burns	Eye: Skin: Breath: Swallow: Immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[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: 146.3 BP: 379°F Sol: Insoluble Fl.P: 155°F IP: 8.28 eV	VP(77°F): 0.7 mm FRZ: -62°F UEL: ? LEL: ?	Oxidizers	Char; CS; GCFID; ■ [#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 106-74-0 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% FLP: 62°F IP: 11.67 eV	VP: 14 mm FRZ: -170°F UEL: ? LEL: 1.89%	Strong oxidizers & reducing agents, strong acids & bases	Char; Benzene; GCFID; ■ [Adapt #1806]
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) EU9800000 (Metal)	Cadmium metal. Cadmium Other synonyms vary depending upon the specific cadmium compound.	NIOSH* Ca See Appendix A OSHA* [1810, 1027] 0.006 mg/m ³	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: 810°F UEL: NA LEL: NA	Strong oxidizers; elemental sulfur, selenium & tellurium	Filter; Acid; AAS; ■ [#7048]
2570 53 (compound)		[*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]			Sp Gr: 8.65 (Metal) Metal: Noncombustible Solid in bulk form, but will burn in powder form.			
Cadmium fume (as Cd) CdO/Cd 1305-19-0 (CdO) EV1930000 (CdO)	CdO Cadmium monoxide, Cadmium oxide fume Cd Cadmium	NIOSH* Ca See Appendix A OSHA* [1810, 1027] 0.006 mg/m ³	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; ■ [#7048]
		[*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]			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	Immerse	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	100 ppm: SA:CF/PAPROV/CCRFOV/	Ing	throat, head, low BP,	Skin	Water flush prompt	CVS, CNS, bone
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con	tacar, abnor CVS stress;	Breath	Resp support	marrow, liver,
Remove:	When wet or contam	§ SCBAF PD PP/SAF PD PP ASCBA		CNS, hemato depres,	Swallow	Medical attention	kidneys
Change:	N.R.	Escape GMFOV/SCBAE		metallic taste; liver, kidney inj		Immed	
[p-Tert-Butyltoluene]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp	Eye:	Immerse	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	80 ppm: CCROV/SA	Ab	sys; head, dizz, weak,	Skin:	Soap wash immer	CNS, CVS
Wash skin:	When contam	200 ppm: SA:CF/PAPROV	Ing	gidd, conf, convuls;	Breath:	Resp support	
Remove:	When wet (flamm)	400 ppm: CCRFOV/GMFOV/PAPRTOV/	Con	dysp; abdom pain, nau,	Swallow:	Medical attention	
Change:	N.R.	SCBAF/SAF		vomit		Immed	
Provide:	Quick drench	1000 ppm: SAF:PD,PP					
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
[n-Butylamine]							
Skin:	N.R.	NIOSH	Inh	Pulm edema, dysp,	Eye	Immerse	Resp sys,
Eyes:	N.R.	§ SCBAF PD PP/SAF PD PP ASCBA	Ing	cough, chest tight, sube	Skin	Soap wash	kidneys,
Wash skin:	Daily	Escape: HIEF/SCBAE		pain, head, chills, musc	Breath	Resp support	prostate, blood
Remove:	N.R.			aches, nau, vomit, diarr,	Swallow	Medical attention	[prostatic &
Change:	Daily			anos, emphy, prot, mild		Immed	lung cancer]
				anemia, [canc]			
[Cadmium dust (as Cd)]							
Skin:	N.R.	NIOSH	Inh	Pulm edema, dysp,	Breath	Resp support	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) $\text{Ca}_3(\text{AsO}_4)_2$ 7776-44-1 CG0830000 1573 53	Calcium salt (2/3) of arsenic acid. Cucumber 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 [6 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; II [87900, Arsenic]
Calcium carbonate CaCO_3 1317-65-3 EV9800000	Calcium salt of carbonic acid [Note: Occurs in nature as limestones, chalk, marble, dolomites, 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: 2.7-2.96 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517° 3443°F (Decomposes) UEL: NA LEL: NA	Acids, aluminum, ammonium salts, mercury & hydrogen, fluorine, magnesium	Filter; Acid; AAS; II [87020, Calcium]
Calcium cyanamide CaCN_2 156-62-7 G36000000 1405 40 (with >0.1% calcium carbide)	Calcium carbide, Cyanamide, Lime nitrogen, 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; II [80600, Nuisance Dust (total)]
Calcium hydroxide $\text{Ca}(\text{OH})_2$ 1306-62-8 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: 1078°F (Decomposes) (Loses H_2O) UEL: NA LEL: NA	Maleic anhydride, phosphorus, nitroethane, nitromethane, nitropropane, nitropropene [Note: Attacks some metals.]	Filter; Acid; AAS; II [87020, 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 8)
Skin:	Prevent skin contact	NIOSH	Inh	Weak, GI dist, per neur,	Eye:	Immed	Eyes, resp sys,
Eyes:	Prevent eye contact	* SCBAF PD PP/SAF PD, PP ASCBA	Abs	skin hyperpig, palmar	Skin:	Soap wash prompt	liver, skin, CNS,
Wash skin:	When contam/Daily	Escape H ₂ EF/SCBAE	ing	planter hyperkeratosis,	Breath:	Resp support	lymphatic sys,
Remove:	When wet or contam		Con	derm. [canc]	Swallow	Medical attention	lymphatic &
Change:	Daily			in animals liver damage		immed	lung cancer)
Provide:	Eyewash, Quick drench						
[Calcium arsenate (as As)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	N.R.		Con	sys; cough	Skin:	Soap wash	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Calcium carbonate]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Irrigated	Eyes, skin, resp sys;
Eyes:	Prevent eye contact		ing	sys; head, vert, rapid	Skin:	Soap flush immed	vasomotor sys
Wash skin:	When contam		Con	breath, low BP, nau,	Breath:	Resp support	
Remove:	When wet or contam			vomit; skin burns, sens;	Swallow:	Medical attention	
Change:	Daily			cough; Antabuse-like		immed	
Provide:	Eyewash, Quick drench			effects			
[Calcium cyanamide]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irrigated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		ing	resp sys; eye, skin burns;	Skin:	Soap flush immed	
Wash skin:	When contam/Daily		Con	skin vesic; cough, bron,	Breath:	Resp support	
Remove:	When wet or contam			pneu	Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash, Quick drench						
[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, F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Calcium oxide CaO 1305-78-8 EW3100000	Burned lime, Burnt lime, Lime, Pebble lime, Quick lime, Unslaked lime	NIOSH 2 mg/m ³ OSHA 5 mg/m ³	28 mg/m ³	White or gray, odorless lumps or granular powder	MW: 56.1 BP: 5162°F Sol: Reacts F.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; II [#7020, Calcium]
1910 60					Sp. Gr.: 3.34 Noncombustible Solid, but will support combustion by liberation of oxygen			
Calcium silicate CaSiO ₃ 1344-85-2 VV9160000	Calcium hydroxide, 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: 7 Sol: 0.01% F.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; II [#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% F.P.: NA IP: NA	VP: 0 mm (approx) MLT: 2840°F (Decomposes) UEL: NA LEL: NA	Dicromethane, aluminum phosphorus, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum & Plaster of Paris.]	Filter; none; Grov; II [Reference Dust: #0500 (total), #0500 (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 F.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; II [#1301 Ketones II]
117 32					Sp. Gr.: 0.99 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	Irrit eyes, skin, upper	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 mg/m ³ DM	Ing	resp tract, ulcer, perf	Skin	
Wash skin:	When contam/Daily	20 mg/m ³ DMXSO/SA	Con	nasal septum,	Breath:	
Remove:	When wet or contam	25 mg/m ³ SA:CF/PAPRHE/HIEF/ SCBAF/SAF		pneu, derm	Swallow	
Change:	Daily	§ SCBAF PD,PP/SAF PD,PP ASCBA				
Provide:	Eyewash, Quick drench	Escape HIEF/SCBAE				
[Calcium oxide]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Con	resp sys	Skin:	
Wash skin:	N.R.				Breath:	
Remove:	N.R.					
Change:	N.R.					
[Calcium silicate]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Con	resp sys; conj; rhinitis,	Skin:	
Wash skin:	N.R.			epi	Breath:	
Remove:	N.R.					
Change:	N.R.					
[Calcium sulfate]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	50 mg/m ³ SACF/PAPROVDM ²	Abs	memb, nau, vomit, diarr,	Skin	CNS
Wash skin:	When contam	100 mg/m ³ CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SCBAF/SAF	Ing	head, dizz, excitement,	Breath	
Remove:	When wet or contam	200 mg/m ³ SAF PD,PP	Con	epilep convuls	Swallow	
Change:	Daily	§ SCBAF PD,PP/SAF PD,PP ASCBA				
		Escape GMFOVHIE/SCBAE				
[Camphor (synthetic)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWAs 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		
Caproactam $C_6H_{11}NO$ 106-60-2 CM3878000	Aminocaproic lactam, ε-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: 518°F Sol: 63% FLP: 282°F IP: 7 Sp.Gr: 1.01 Combustible Solid	VP: 0.00000008 mm MLT: 168°F UEL: 8.0% LEL: 1.4%	Strong oxidizers, (acetic acid + dinitrogen trioxide)	None available
Captafol $C_{10}H_5Cl_2NO_5$ 2425-04-1 GS4900000	Captafol; Difolatanil; N-((1,1,2,2-Tetrachloro- ethylthio)-4-cyclohexane- 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 wettable powder or in liquid form.]	MW: 348.1 BP: Decomposes Sol: 0.0001% FLP: NA IP: NA Sp.Gr: 7 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; ■ [#0500, Nuisance Dust (total)]
Captan $C_8H_5Cl_2NO_5$ 133-06-2 GWS675000 9186 31	Captan; N-Trichloromethylmercapto- 4-cyclohexene-1,2- dicarboximide	NIOSH Ca 8 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% FLP: 7 IP: NA Sp.Gr: 1.74 Combustible Solid; may be dissolved in flammable liquids.	VP: 0 mm (approx) MLT: 382°F (Decomposes) UEL: 7 LEL: 7	Strong alkaline materials (e.g., hydrated lime) [Note: Corrosive to metals.]	Filter; none; Grav; ■ [#0500, Nuisance Dust (total)]
Carbaryl $CH_3NHCOOC_6H_5$ 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% FLP: NA IP: 7 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, Via, ■ [#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 6)	
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Dully	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; epis; derm, skin sens; asthma; irrity, conf, dizz, head; abdom cramps, diar, nau, vomit; liver, kidney inj	Eye: Skin: Breath: Swallow:	Irritated Water wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, CVS, liver, kidneys
[Caproctam]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Dully When wet or contam Dully 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; conf; bron, wheez; diar, vomit; liver, kidney inj; high BP; In animals: terato effects; [canc]	Eye: Skin: Breath: Swallow:	Irritated Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, liver, kidneys, CVS [In animals: tumors at many sites]
[Captal]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent skin contact When contam/Dully When wet or contam Dully 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; diar, vomit; [canc]	Eye: Skin: Breath: Swallow:	Irritated 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 Dully	NIOSH/OSHA 50 mg/m ³ SA* 100 mg/m ³ SA:CP*/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Miosis, blurred vision, tear, rhin, saliv, sweat, abdom cramps, nau, vomit, diar, tremor, cyan, convuls, irrit skin; possible repro effects	Eye: Skin: Breath: Swallow:	Irritated Soap wash Immed 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 (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		
Carbofuran $C_{11}H_{10}NO_2$ 1583-86-2 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: 7 Sol(77°F): 0.07% Fl.P: NA IP: NA Sp.Gr: 1.18 Noncombustible Solid	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 [#6800, Nuisance Dust (total)]
2757 85 Carbon black C 1333-86-4 FF5800000	Acetylene black, Channel black, Furnace black, Lamp black, Thermal black	NIOSH/OSHA 3.5 mg/m³ NIOSH C 0.1 mg PAHs/m³ [Carbon black in presence of polycyclic aromatic hydrocarbons (PAHs)] See Appendix A See Appendix C	1750 mg/m³	Black, odorless solid	MW 12.0 BP Sublimes Sol Insoluble Fl.P NA IP NA Sp Gr 1.8-2.1 Combustible Solid that may contain flammable hydrocarbons.	VP 0 mm (approx) MLT Sublimes UEL NA LEL NA	Strong oxidizers such as chlorates, bromates & nitrates	Filter; none; Grav; III [#5000]
Carbon dioxide CO_2 124-38-9 FF6400000 1013 21 1845 21 (dry ice) 2187 21 (liquid)	Carbonic acid gas, Dry ice [Note: Normal constituent of air (about 300 ppm)] 1 ppm = 1.83 mg/m³	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 a 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 RQSD: 1.53 Nonflammable Gas	VP 86.5 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]
Carbon disulfide CS_2 75-15-0 FF6650000 1131 28	Carbon bisulfide 1 ppm = 3.16 mg/m³	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 Sp Gr 1.26 Class IB Flammable Liquid	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]

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 8)
Skin:	Prevent skin contact	TBAL	Inh	Miosis, blurred vision;	Eye:	CNS, PNS, blood chol
Eyes:	Prevent eye contact		Abs	sweat, saliv, abdom cramps,	Skin:	
Wash skin:	When contam		Ing	diarr, head, nau, vomit,	Breath:	
Remove:	When wet or contam		Con	weak; musc twitch, inco,	Swallow:	
Change:	Daily			convuls		
Provide:	Eyewash, Quick drench					
[Carbofuran]						
Skin:	N.R.	NIOSH/OSHA	Inh	Cough; irrit eyes;	Eye	Resp sys, eyes [lymphatic cancer (in presence of PAHs)]
Eyes:	Prevent eye contact	17.5 mg/m ³ DM	Con	in presence of polycyclic aromatic hydrocarbons [canc]	Breath:	
Wash skin:	Daily	35 mg/m ³ DMXSO/SA				
Remove:	N.R.	87.5 mg/m ³ SA CF/PAPROM				
Change:	N.R.	175 mg/m ³ HIEF/PAPRTHIE/SCBAF/SAF		In presence of polycyclic aromatic hydrocarbons		
		1750 mg/m ³ SA PD,PP		NIOSH		
		§ SCBAF PD,PP/SAF PD,PP ASCBA		§ SCBAF PD,PP/SAF PD,PP ASCBA		
		Escape HIEF/SCBAE		Escape HIEF/SCBAE		
[Carbon black]						
Skin:	Frostbite	NIOSH/OSHA	Inh	Head, dizz, restless,	Eye:	Resp sys, CVS
Eyes:	Frostbite	40,000 ppm: SA/SCBAF	Con	parest, dysp, sweat, mal,	Skin:	
Wash skin:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA	(liq/ sol)	incr heart rate, cand	Breath	
Remove:	N.R.	Escape SCBAE		output, BP; coma asphy;	Frostbite	
Change:	N.R.			convuls, frostbite (liq, dry ice)	Resp support	
Provide:	Frostbite					
[Carbon dioxide]						
Skin:	Prevent skin contact	NIOSH	Inh	Dizz, head, poor sleep,	Eye	CNS, PNS, CVS, eyes, kidneys, liver, skin, repro sys
Eyes:	Prevent eye contact	10 ppm CCROV/SA	Abs	ftg, ner, anor, low-wgt,	Skin	
Wash skin:	When contam	25 ppm SA CF/PAPROV	Ing	psychosis, polymneur,	Breath	
Remove:	When wet (flamm)	50 ppm CCRFOV/GMFOV/PAPRTOV/	Con	Parkinson-like syndrome,	Swallow	
Change:	N.R.	SCBAF/SAF		ocular changes, coronary		
		500 ppm SA PD,PP		heart disease, gastritis,		
		§ SCBAF PD,PP/SAF PD,PP ASCBA		kidney liver inj, eye,		
		Escape GMFOV/SCBAE		skin burns, derm, repro effects		
[Carbon 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, FLP, IP, Sp. Gr., flammability	VP, FRZ, UEL, LEL		
Carbon monoxide CO 630-08-0 FG3500000	Carbon oxide, Flue gas, Monoxide	NIOSH 35 ppm (40 mg/m ³) C 200 ppm (229 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% FLP: NA (Gas) IP: 14.01 eV	VP: >35 atm MLT: -337°F UEL: 74% LEL: 12.5%	Strong oxidizers, bromine trifluoride, chlorine trifluoride, lithium	Bag; none; ECA; ■ [#S340]
1016 18 9202 67 (cryogenic liquid)	1 ppm = 1.16 mg/m ³	OSHA† 50 ppm (55 mg/m ³)			RGasD: 0.97 Flammable Gas			
Carbon tetrabromide CBr ₄ 558-13-4 FG4725000	Carbon bromide, Methane tetrabromide, Tetrabromomethane	NIOSH 0.1 ppm (1.4 mg/m ³) ST 0.3 ppm (4 mg/m ³)	N.D.	Colorless to yellow-brown crystals with a slight odor.	MW: 331.7 BP: 374°F Sol: 0.02% FLP: NA IP: 10.31 eV	VP(206°F): 40 mm MLT: 194°F UEL: NA LEL: NA	Strong oxidizers, hexacyclohexyldisulfide, lithium	None available
2518 53	1 ppm = 13.76 mg/m ³	OSHA† none			Sp.Gr: 3.42 Noncombustible Solid			
Carbon tetrachloride CCl ₄ 56-23-5 FG4900000	Carbon chloride, Carbon tet., Freon® 10, Halon® 104, Tetrachloromethane	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% FLP: NA IP: 11.47 eV	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; ■ [#1003, Halogenated hydrocarbons]
1846 55	1 ppm = 6.39 mg/m ³				Sp.Gr: 1.59 Noncombustible Liquid			
Carbonyl fluoride COF ₂ 353-50-4 FG6125000	Carbon difluoride oxide, Carbon fluoride oxide, Carbon oxyfluoride, Carbonyl difluoride, Fluorocarbonyl fluoride, Fluorophosgene	NIOSH 2 ppm (5 mg/m ³) ST 5 ppm (15 mg/m ³)	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 FLP: NA IP: 13.02 eV	VP: 58.4 atm FRZ: -173°F UEL: NA LEL: NA	Heat, moisture, hexafluoroisopropyl- ideneazirine-lithium [Note: Reacts with water to form hydrogen fluoride & carbon dioxide.]	None available
2417 15	1 ppm = 2.74 mg/m ³	OSHA† none			RGasD: 2.29 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 6)
Skin:	Frostbite	NIOSH	Inh	Head, tachypnea, nau,	Eye:	Frostbite	CVS, lungs,
Eyes:	Frostbite	350 ppm: SA	Con	weak, dizz, conf, hali,	Skin:	Frostbite	blood, CNS
Wash skin:	N.R.	875 ppm: SA, CF	(iq)	cyan, depres S-T segment of	Breath:	Resp support	
Remove:	When wet (flam)	1200 ppm: GMFS/SCBAF/SAF		electrocardiogram, angina,			
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA		syncope			
Provide:	Frostbite	Escape: GMFS/SCBAE					
[Carbon monoxide]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Irritated	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		ing	sys; lac; lung, liver,	Skin:	Soap wash prompt	liver, kidneys
Wash skin:	Daily		Con	kidney inj;	Breath:	Resp support	
Remove:	N.R.			in animals: corn damage	Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash						
[Carbon tetrabromide]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, CNS	Eye	Irritated	CNS, eyes,
Eyes:	Prevent eye contact	¼ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	depres, nau, vomit; liver,	Skin	Soap wash immed	lungs, liver,
Wash skin:	When contam	Escape: GMFOV/SCBAE	ing	kidney inj; drow, dizz,	Breath	Resp support	kidneys, skin
Remove:	When wet or contam		Con	inco; [canc]	Swallow:	Medical attention	[in animals:
Change:	N.R.					immed	liver cancer]
Provide:	Eyewash, Quick drench						
[Carbon tetrachloride]							
Skin:	Frostbite	TBAL	Inh	Irrit eyes, skin, muc	Eye:	Frostbite	Eyes, skin, resp sys,
Eyes:	Frostbite		Con	memb, resp sys; eye, skin	Skin:	Frostbite	bone
Wash skin:	N.R.			burns; lac; cough, pulm	Breath:	Resp support	
Remove:	N.R.			edema, dysp; chronic			
Change:	N.R.			exposure: GI pain, musc			
Provide:	Frostbite			fib, skeletal fluorosis;			
				lip; frostbite			
[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, Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Catechol $C_6H_4(OH)_2$ 120-88-9 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% Fl.P: 261°F IP: ? Sp.Gr: 1.34 Combustible Solid	VP(244°F): 10mm MLT: 221°F UEL: ? LEL: 1.4%	Strong oxidizers, nitric acid	None available
Cellulose $(C_6H_{10}O_5)_n$ 8004-34-6 FJ5691480	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 Fl.P: NA IP: NA Sp.Gr: 1.27-1.81 Combustible Solid	VP: 0 mm (approx) MLT: 500-518°F (Decomposes) UEL: NA LEL: NA	Water, bromine pentaffluoride, sodium nitrate, fluorine, strong oxidizers	Filter; none; Grnr; III [Hazardous Dust: #0500 (total), #0500 (resp)]
Cesium hydroxide CsOH 21381-79-1 FK8600000 2682 60 2881 60(solution)	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: 148.9 BP: ? Sol(59°F): 396% Fl.P: NA IP: NA Sp.Gr: 3.68 Noncombustible Solid	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
Chlordane $C_{12}H_8Cl_4$ 57-74-9 PB9800000 ~2 28	Chlorden; Chlordano; 1,2,4,5,6,7,8- Octachloro-3a,4,7,7a- tetrahydro-4,7- methanonorane	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% Fl.P: NA IP: ? Sp.Gr(77°F): 1.8 Noncombustible Liquid, but may be utilized in flammable solutions	VP: 0.00001 mm FRZ: 217-228°F UEL: NA LEL: NA	Strong oxidizers, alkaline reagents	Filter/ Chrom-102, Toluene, GC/ECD, III [#5510]

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	Eye:	Irritated	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	sys; skin sens, derm;	Skin:	Water wash	CNS, kidneys
Wash skin:	When contam		ing	lac, burns eyes; convuls,	Breath:	Resp support	
Remove:	When wet or contam		Con	incr BP, kidney inj]	Swallow:	Medical attention	
Change:	Daily					Irritated	
Provide:	Eyewash						
[Catechol]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	N.R.		Con	resp memb	Skin:	Soap wash	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Cellulose]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Irritated	Eyes, skin, resp sys
Eyes:	Prevent eye contact		ing	resp tract, eye, skin	Skin:	Water flush	
Wash skin:	When contam		Con	burns	Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention	
Change:	Daily					Irritated	
Provide:	Eyewash, Quick drench						
[Cesium hydroxide]							
Skin:	Prevent skin contact	NIOSH	Inh	Blurred vision, conf,	Eye:	Irritated	CNS, eyes,
Eyes:	Prevent eye contact	■ SCBAF PD PP/SAF PD PP ASCBA	Abs	ataxia, delirium, cough	Skin:	Soap wash	liver,
Wash skin:	When contam	Escape GMFOVH/SCBAE	ing	abdom pain, nau, vomit,	Breath:	Resp support	kidneys
Remove:	When wet or contam		Con	diarr, inty tremor,	Swallow:	Medical attention	[in animals
Change:	Daily			convuls, anuria		Irritated	liver cancer]
Provide:	Eyewash, Quick drench			in animals, lung, liver,			
				kidney damage [canc]			
[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 $C_{10}H_{16}Cl_4$ 8001-35-2 XWS250000	Chlorocamphene Octachlorocamphene, Polychlorocamphene, Taxaphene	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; ■ [§S67]
2761 55					Sp Gr 1.65 Noncombustible Solid, but may be dissolved in flammable liquids.			
Chlorinated diphenyl oxide $C_{17}H_{10}Cl_2O$	Synonyms depend on the degree of chlorination of diphenyl oxide [(C ₆ H ₄) ₂ O] _n , ranging from monochlorodiphenyl oxide [(C ₆ H ₄ Cl)O(C ₆ H ₅)] to dichlorodiphenyl oxide [(C ₆ H ₃ Cl ₂)O(C ₆ H ₅)]	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; Isooctane; GC/ECD; ■ [§S025, Chlorinated diphenyl ether]
	1 ppm = 8.8-21.4 mg/m³							
Chlorine Cl_2 7782-50-5 F02100000	Molecular chlorine	NIOSH C 0.5 ppm (1.46 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 ₈ ; IC; ■ [§B011]
1017 20	1 ppm = 2.95 mg/m³				RGasD: 2.47 Nonflammable Gas, but a strong oxidizer			
Chlorine dioxide ClO_2 10049-04-4 F03000000	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 [WD202]
	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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contaminated When wet or contam Daily Eyewash, Quick drench	NIOSH V: SCBAF-PD, PP/SAF-PD, PP/ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Neu. conf., agitation, tremor, convuls., unconscious, dry, red skin; [canc]	Eye: Skin: Breath: Swallow:	Immerse Soap wash prompt Resp support Medical attention immed	CNS, skin [in animals: Ovarian cancer]
[Chlorinated camphene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contaminated When wet or contam Daily	NIOSH/OSHA 5 mg/m ³ : SA/SCBAF §: SCBAF-PD, PP/SAF-PD, PP/ASCBA Escape: GMFOVAGHE/SCBAE	Inh Ing Con	Acne-form dermatitis, liver damage	Eye: Skin: Breath: Swallow:	Immerse Soap wash prompt Resp support Medical attention immed	Skin, liver
[Chlorinated diphenyl oxide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. 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; lacr., rhin.; cough, choking, substernal pain; nau- sua, vomiting, head, dizziness, syncope; pulm. edema; pneumo., hypox- emia; dermatitis; frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys
[Chlorine]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq) Prevent eye contact (liq) When contaminated (liq) When wet (flamm) N.R. Eyewash (liq), Quick drench (liq)	NIOSH/OSHA 1 ppm: CCRS/SA 2.5 ppm: SA/CF/PAPRS* 5 ppm: CCRFS/GMFS/SCBAF/SAF §: SCBAF-PD, PP/SAF-PD, PP/ASCBA Escape: GMFS/SCBAE	Inh Ing (liq) Con	Irrit. eyes, nose, throat; cough, wheez., bronch., pulm. edema, chronic bron-	Eye: Skin: Breath: Swallow:	Immerse (liq) Soap wash immerse (liq) Resp support Medical attention immed (liq)	Eyes, resp sys
[Chlorine dioxide]							

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 Fl.P, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Chlorine trifluoride CF ₃ 7790-91-2 FD2800000	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: Reacts Fl.P: NA IP: 13.00 eV R/GasD: 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 ClCH ₂ CHO 107-20-0 AB2450000	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	VP: 100 mm FRZ: -3°F (40% soln) UEL: ? LEL: ?	Oxidizers, acids	Si gel, Methanol, GC/ECD, II [#S11]
2232 55	1 ppm = 3.26 mg/m ³				Sp Gr: 1.19 (40% solution) Class IIIA Combustible Liquid			
α-Chloroacetophenone C ₆ H ₅ COCH ₂ Cl 532-27-4 AM6300000	2-Chloroacetophenone, Chloromethyl phenyl ketone, Mace®, Phenacyl chloride, Phenyl chloromethyl ketone, Tear gas	NIOSH/OSHA D 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	VP: 0.006 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				Sp Gr: 1.32 Combustible Solid			
Chloroacetyl chloride ClCH ₂ COCl 78-04-9 AO6475000	Chloroacetic acid chloride, Chloroacetyl 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	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 69	1 ppm = 4.87 mg/m ³				Sp. Gr: 1.42 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 6)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Eyes, skin burns (liq or	Eye:	Skin, eyes, resp sys
Eyes:	Prevent eye contact	2.5 ppm: SA, CF*	Ing	high vap conc); resp irrit;	Skin:	Irritated
Wash skin:	When contam (liq)	5 ppm: SCBAF/SAF	(liq)	in animals: lac, corn	Breath:	Water flush, irritated
Remove:	When wet or contam (liq)	20 ppm: SAF, PD, PP	Con	ulcer, pulm edema	Swallow:	Resp support
Change:	N.R.	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA				Medical attention
Provide:	Eyewash (liq), Quick drench (liq)	Escape: GMFS/SCBAE				Irritated (liq)
[Chlorine trifluoride]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit skin, eyes, muc	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm: CCROV/SA*	Abs	memb; skin burns, eye	Skin:	Irritated
Wash skin:	When contam	25 ppm: SA, CF*/PAPROV*	Ing	damage, pulm edema,	Breath:	Water flush, irritated
Remove:	When wet or contam	48 ppm: CCRFOV/GMFOV/PAPRTOV*/	Con	skin, resp sys sens	Swallow:	Resp support
Change:	N.R.	SCBAF/SAF				Medical attention
Provide:	Eyewash, Quick drench	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA				Irritated
[Chloroacetaldehyde]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	3 mg/m ³ : CCROVDM/SA	Ing	pulm edema	Skin:	Irritated
Wash skin:	When contam	7.5 mg/m ³ : SA, CF*/PAPROVDM*	Con		Breath:	Soap wash, irritated
Remove:	When wet or contam	15 mg/m ³ : CCRFOVH/E/GMFSHIE/			Swallow:	Resp support
Change:	Daily	SCBAF/SAF				Medical attention
Provide:	Eyewash	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA				Irritated
[α-Chloroacetophenone]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	sys; eye, skin burns;	Skin:	Irritated
Wash skin:	When contam		Ing	cough, wheez, dysp; lac	Breath:	Water flush, irritated
Remove:	When wet or contam		Con		Swallow:	Resp support
Change:	N.R.					Medical attention
Provide:	Eyewash, Quick drench					Irritated
[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 FLP, IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
Chlorobenzene C_6H_5Cl 108-90-7 CZ0175000	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% FLP: 82°F IP 9.07 eV	VP 9 mm FRZ -50°F UEL 9.6% LEL 1.3%	Strong oxidizers	Char, CS, GCFID, III [#1003, Halogenated 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 OQ3675000	2-Chlorobenzalmonitrile, CS OCBM	NIOSH C 0.05 ppm (0.4 mg/m ³) [skin] OSHA† 0.05 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 FIP ? IP ?	VP: 0.00003 mm MLT: 203-205°F UEL ? LEL ? MEC: 25 g/m ³	Strong oxidizers	Filter/ Tenax GC, Reagent, HPLC/UVD, III(S) [P&CAM #304]
1 ppm = 7.84 mg/m ³					Sp Gr ? Combustible Solid			
Chlorobromomethane CH_3BrCl 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 FIP 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, GCFID, III [#1003, Halogenated Hydro- carbons]
1887 58	1 ppm = 5.38 mg/m ³				Sp Gr 1.93 Noncombustible Liquid			
Chlorodifluoromethane $CHClF_2$ 75-45-6 PA8380000	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% FIP: NA IP: 12.46 eV	VP: 9.4 atm FRZ: -231°F UEL: NA LEL: NA	Alkali, alkaline earth metals (e.g., powdered aluminum, sodium, potassium, zinc)	None available
18 12	1 ppm = 3.58 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 (flam)	OSHA 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, nose, drow, inco, CNS depres; in animals liver, lung, kidney inj	Eye Skin Breath Swallow	Immmed Soap wash prompt Resp support Medical attention immmed	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/GMFSHIE/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFSHIE/SCBAE	Inh Abs Ing Con	Pain, burn eyes, lac, conj, eryt eyelids, blepharospasm, int throat cough, chest tight; head, eryt, vasc skin	Eye Skin Breath Swallow	Immmed Soap wash immmed Resp support Medical attention immmed	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/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, throat conf, dizz, CNS depres; palm edema	Eye Skin Breath Swallow	Immmed Soap wash prompt Resp support Medical attention immmed	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 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		
Chlorodiphenyl (42% chlorine) $C_{12}H_8Cl_2C_2H_4Cl_2$ (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 FLP: NA IP: ? 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.	VP: 0.001 mm FRZ: -2°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Florisil, Hexane, GC/ECD, # [#5503, PCBs]
2315 31	1 ppm 10.72 mg/m ³ (approx)							
Chlorodiphenyl (54% chlorine) $C_{12}H_6Cl_4C_2H_4Cl_2$ (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 FLP: NA IP: ? 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.	VP: 0.00006 mm FRZ: 50°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Florisil, Hexane, GC/ECD, # [#5503, PCBs]
2315 31	1 ppm 13.55 mg/m ³ (approx)							
Chloroform $CHCl_3$ 67-66-3 F59100000	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% FLP: NA IP: 11.42 eV Sp Gr: 1.48 Noncombustible Liquid	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, # [#1003, Halo- genated Hydro- carbons]
1888 55	1 ppm = 4.96 mg/m ³							
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 FLP: <66°F IP: ? Sp Gr: 1.32 Class IB Flammable Liquid	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							

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, chloracne,	Eye	Skin, eyes,
Eyes:	Prevent eye contact	4 SCBAF PD PP/SAF PD PP ASCBA	Abs	liver damage, repro	Skin	liver, repro sys
Wash skin:	When contam	Escape GMFOVH/SCBAE	Ing	effects; [carc]	Breath	[in animals:
Remove:	When wet or contam		Con		Swallow	tumors of the
Change:	Daily					pituitary gland
Provide:	Eyewash, Quick drench					& liver, leukemia]
[Chlorodiphenyl (42% chlorine)]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, chloracne;	Eye	Skin, eyes,
Eyes:	Prevent eye contact	4 SCBAF PD PP/SAF PD PP ASCBA	Abs	liver damage, repro	Skin	liver, repro sys
Wash skin:	When contam	Escape GMFOVH/SCBAE	Ing	effects; [carc]	Breath	[in animals:
Remove:	When wet or contam		Con		Swallow	tumors of the
Change:	Daily					pituitary gland
Provide:	Eyewash, Quick drench					& liver, leukemia]
[Chlorodiphenyl (54% chlorine)]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, dizz,	Eye	Liver, kidneys,
Eyes:	Prevent eye contact	4 SCBAF PD PP/SAF PD PP ASCBA	Abs	mental outness, nau, conf;	Skin	heart, eyes,
Wash skin:	When contam	Escape GMFOVH/SCBAE	Ing	head, fig, area, enlarged	Breath	skin, CNS
Remove:	When wet or contam		Con	liver; [carc]	Swallow	[in animals:
Change:	N.R.					liver & kidney
Provide:	Eyewash, Quick drench					cancer]
[Chloroform]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	4 SCBAF PD PP/SAF PD PP ASCBA	Abs	membr resp sys; pulm	Skin	[lung cancer]
Wash skin:	When contam/Daily	Escape GMFOVH/SCBAE	Ing	congestion edema, com	Breath	
Remove:	When wet (flamm)		Con	damage nec, decr pulm	Swallow	
Change:	Daily			function, cough, dysp,		
Provide:	Eyewash, Quick drench			wheez, blood stained		
				sputum, bronchial		
				secretions, [carc]		
[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, FLP, 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 FLP(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. Heane, GC/ECD, NI1 [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	Koran® 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% FLP(oc): 144°F IP: 9.90 eV	VP(77°F): 6 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, acids	Chrom-106, Ethyl acetate, GC/FID, H(5) [S211]
1239 57	1 ppm = 5.14 mg/m ³				Sp Gr: 1.21 Class IIIA Combustible Liquid			
Chloropentafluoroethane <chem>CClF2CF3</chem> 78-15-3 KH787800	Fluorocarbon-115, Freon® 115, Genetron® 115, Halocarbon 115, Monochloropentafluoroethane	NIOSH 1000 ppm (8320 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% FLP: NA IP: 12.96 eV	VP(70°F): 7.9 atm FRZ: -223°F UEL: NA LEL: NA	Alkalies, alkaline earth metals (e.g., aluminum powder, sodium, potassium, zinc)	None available
1020 12	1 ppm = 6.42 mg/m ³				RGasD: 5.66 Nonflammable Gas			
Chloropicrin <chem>CCl3NO2</chem> 106-2 KN300000 1056 1056 (mixture) 1057 (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% FLP: 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
1020 12	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 6)	
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet (flamem) Daily Eyewash, Quick drench	NIOSH § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb, pulm edema, pulm congestion, pneu, skin burns, nec, cough wheez, pulm congestion, blood stained sputum, low-wgt bronchial secretions, [carc]	Eye Skin Breath Swallow	Irritated Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys [In animals: skin & lung cancer]
[Chloromethyl methyl ether]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 20 ppm: 3A* 50 ppm: 3A CF*/PAPROV* 100 ppm: CCRFOV/GMFOV/PAPRTOV*/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	In animals: irrit eyes, pulm edema, liver, kidney, heart damage	Eye Skin Breath Swallow	Irritated Soap wash Resp support Medical attention immed	Resp sys, liver, kidneys, CVS, eyes
[1-Chloro-1-nitropropane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	TBAL	Inh Con (liq)	Dysp; dizz, inco, narco; nau, vomit; heart palp, card arrhy, asphy; liq: frostbite, derm	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Skin, CNS, CVS
[Chloropentafluoroethane]							
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 2 ppm: 3A: CF*/PAPROV*/CCRFQV/GMFOV/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; lac; cough, pulm edema, nau, vomit	Eye Skin Breath Swallow	Irritated Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys

[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		
3-Chloroprene <chem>CH2=CClCH=CH2</chem> 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, GCTFD; H [#1002]
1991-30 (inhibited)	1 ppm = 3.68 mg/m ³				Sp Gr: 0.96 Class IB Flammable Liquid			
o-Chlorostyrene <chem>ClC6H4CH=CH2</chem> 2039-87-4 WL4180000	2-Chlorostyrene, ortho-Chlorostyrene, 1-Chloro-2-ethenylbenzene	NIOSH 60 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 = 8.76 mg/m ³				Sp Gr: 1.10 Class II Combustible Liquid			
o-Chlorotoluene <chem>ClC6H4CH3</chem> 95-49-8 X59000000	1-Chloro-2-methylbenzene, 2-Chloro-1-methylbenzene, 2-Chlorotoluene, o-Tolyl chloride	NIOSH 60 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: 86°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 = 8.26 mg/m ³				Sp Gr: 1.06 Class IC Flammable Liquid			
2-Chloro-4-trichloro- methyl pyridine <chem>ClC6H3NCCl3</chem> 1929-82-4 US7626000	2-Chloro-4-(trichloro- methyl)pyridine, Nitrpyrin, N-eurob; 2,2,2,4-Tetrachloro- 2-picolone	NIOSH 10 mg/m ³ (total) ST 20 mg/m ³ (total) 8 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 8 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: 146°F UEL: ? LEL: ?	Aluminum, magnesium [Note: Emits oxides of nitrogen and chloride ion when heated to decomposition.]	None available
					Sp Gr: ? 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 6)
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-ASCB Escape GMFOV/SCBAE	Inh Abs ing Con	Irritates eyes, skin, resp sys, ner. entry, derm, alopecia, repro effects; [carc]	Eye: Skin: Breath: Swallow:	Irritated Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, repro sys [lung & skin cancer]
[6-Chloroprene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh ing Con	In animals: irritates eyes, skin; hema, prot, acidosis; enlarged liver, jaun	Eye: Skin: Breath: Swallow:	Irritated 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 (flam) N.R. Eyewash	TBAL	Inh Abs ing Con	Irritates eyes, skin, muc memb; dirm; drow, inco, anes; cough; liver, kidney inj	Eye: Skin: Breath: Swallow:	Irritated Soap wash 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:	Irritated Soap wash 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 $C_8H_{11}Cl_2NO_3P_8$ 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 0.5 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: 350.8 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; IR [#0500, Nuisance Dust (total)]
2783 55								
Chromic acid and chromates CrO_3 (acid) 1333-82-0 (CrO_3) GB6650000 (CrO_3) 1755 50 (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) 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 83% 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. IR [#7500, 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, IR [#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, IR [#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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	Wheez, laryspasms, saliv; bluish lips, skin; mucos, blurred vision; nau, vomit, abdom cramps, diar	Eye: Skin: Breath: Swallow:	In: immed Soap wash immed Resp support Medical attention immed	Resp sys, CNS, PNS, plasma chol
[Chlorpyrifos]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 4 SCBAF PD PP/SAF PD,PP ASCBA Escape H:EF/SCBAE	Inh Ing Con	Irrit resp sys, nasal septum perf, liver, kidney damage, leucyt, leupen, monocyt, eosin, eye ir, conj, skin ulcer, sens derm, [carc]	Eye: Skin: Breath: Swallow:	In: immed Soap flush immed Resp support Medical attention immed	Blood, resp sys, liver kidneys, eyes, skin [lung cancer]
[Chronic acid and chromates]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 2.5 mg/m ³ DM* 5 mg/m ³ DMXSO*/SA* 12.5 mg/m ³ SA CF*/PAPRDM* 25 mg/m ³ H:EF/PAPRTH:IE*/SCBAF/SAF 250 mg/m ³ SAF PD,PP 6 SCBAF PD,PP/SAF PD,PP ASCBA Escape H:EF/SCBAE	Inh Ing Con	Irrit eyes; sens derm	Eye: Skin: Breath: Swallow:	In: immed Water flush prompt Resp support Medical attention immed	Eyes, skin
[Chromium(VI) compounds (as Cr)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 2.5 mg/m ³ DM* 5 mg/m ³ DMXSO*/SA* 12.5 mg/m ³ SA CF*/PAPRDM* 25 mg/m ³ H:EF/PAPRTH:IE*/SCBAF/SAF 6 SCBAF PD,PP/SAF PD,PP ASCBA Escape H:EF/SCBAE	Inh Ing Con	Irrit eyes; sens derm	Eye: Skin: Breath: Swallow:	In: immed Water flush prompt Resp support Medical attention immed	Eyes, skin
[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 (TWAs 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		
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 Fl.P: NA IP: NA	VP: 0 mm (approx) MLT: 3452°F UEL: NA LEL: NA	Strong oxidizers (such as hydrogen peroxide), alkalis	Filter, Acid, AAS, NI (#7024)
Chromyl chloride Cr(OCl) ₂ 14977-41-8 GB6776000 1758 38	Chlorochromic anhydride, Chromic oxychloride, Chromium chloride oxide, Chromium dichloride dioxide, Chromium dioxide dichloride, Chromium dioxide chloride, Chromium oxychloride, Dichlorodioxochromium 1 ppm = 6.44 mg/m ³	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, acrid odor. [Note: Fumes in moist air.]	MW: 154.9 BP: 243°F Sol: Reacts Fl.P: NA IP: 12.00 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 ₈ H ₈ Cl ₂ NO 2871-90-8 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: 182.1 BP: ? Sol: Insoluble Fl.P: NA IP: ? Sp. Gr: ? Noncombustible Solid, but dust may explode in cloud form.	VP: ? MLT: >408°F UEL: NA LEL: NA	None reported	Filter, none; Grav; NI [Nuisance Dust: #0600 (total), #0600 (resp)]
Coal dust GF6281000 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; NI [#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)	Health hazards				
			Route	Symptoms (See Table 6)	First aid (See Table 6)		Target organs (See Table 8)
Skin:	N.R.	NIOSH	Inh	Irrit eyes, skin; lung	Eye:	Ir rimmed	Eyes, skin, resp sys
Eyes:	N.R.	2.5 mg/m ³ DM*	Inh	Irr (histologic)	Skin:	Soap wash	
Wash skin:	N.R.	5 mg/m ³ DMXSO*/SA*	Inh		Breath:	Resp support	
Remove:	N.R.	12.5 mg/m ³ SA CF*/PAPRDM*	Con		Swallow:	Medical attention	
Change:	N.R.	25 mg/m ³ H ₂ EF/PAPRTH ₂ E*/SCBAF/SAF				irrimed	
		250 mg/m ³ SAF; PD, PP					
		5 SCBAF PD, PP/SAF PD, PP ASCBA					
		Escape: H ₂ EF/SCBAE					
[Chromium metal]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, upper	Eye:	Ir rimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	5 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	Inh		Breath:	Resp support	
Remove:	When wet or contam		Inh		Swallow:	Medical attention	
Change:	N.R.		Con			irrimed	
Provide:	Eyewash, Quick drench						
[Chromyl chloride]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Ir rimmed	Eyes, skin, resp sys
Eyes:	N.R.		Con	throat; cough	Skin:	Soap wash	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Cisplatin]							
Skin:	N.R.	TBAL	Inh	Chronic bron, decr pulm	Breath:	Fresh air	Resp sys
Eyes:	N.R.			func, emphy			
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Coal 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, FLP, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Coal tar pitch volatiles 65996-93-2 GF8655000	Synonyms vary depending upon the specific compound (e.g., pyrene, phenanthrene, acridine, chrysene, anthracene & benzo(a)pyrene). [Note: NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products.]	NIOSH Ca 0.1 mg/m ³ (cyclohexane-extractable fraction) See Appendix A See Appendix C OSHA(1910.1002) 0.2 mg/m ³ (benzene-soluble fraction) See Appendix C	Ca [80 mg/m ³]	Black or dark-brown amorphous residue.	Properties vary depending upon the specific compound. Combustible Solids		Strong oxidizers	Filter, Benzene, Grav, II [#5023]
Cobalt metal dust & fume (as Co) Co 7440-48-4 GF8750000	Cobalt metal dust, Cobalt metal fume	NIOSH 0.05 mg/m ³ OSHA† 0.1 mg/m ³	20 mg/m ³ (as Co)	Odorless, silver-gray to black solid.	MW: 58.9 BP: 5612°F Sol: Insoluble FLP: NA IP: NA Sp. Gr: 8.92 Noncombustible Solid in bulk form, but finely divided dust will burn at high temperatures.	VP: 0 mm (approx) MLT: 2719°F UEL: NA LEL: NA	Strong oxidizers, ammonium nitrate	Filter, Acid, AAS, II [#7027]
Cobalt carbonyl (as Co) C ₅ Co ₂ O ₈ 10210-48-1 GG0300000	di-μ-Carbonylhexacarbonyldicobalt, Cobalt octacarbonyl, Cobalt tetracarbonyl dimer, Dicobalt carbonyl, Dicobalt octacarbonyl, Octacarbonyldicobalt	NIOSH 0.1 mg/m ³ OSHA† none	N.D.	Orange to dark-brown, crystalline solid. [Note: The pure substance is white.]	MW: 341.8 BP: 126°F (Decomposes) Sol: Insoluble FLP: NA IP: 7 Sp. Gr: 1.87 Noncombustible Solid, but flammable carbon monoxide is emitted during decomposition.	VP: 0.7 mm MLT: 124°F UEL: NA LEL: NA	Air [Note: Decomposes on exposure to air or heat; stable in atmosphere of hydrogen & carbon monoxide.]	None available
Cobalt hydrocarbonyl (as Co) HCo(CO) ₄ 16842-03-8 GG0900000	Hydrocobalt tetracarbonyl, Tetracarbonylhydridocobalt, Tetracarbonylhydrocobalt	NIOSH 0.1 mg/m ³ OSHA† none	N.D.	Gas with an offensive odor,	MW: 172.0 BP: 7 Sol: 0.09% FLP: NA (Gas) IP: 7 RGasD: 5.93 Flammable Gas	VP: >1 atm FRZ: -15°F UEL: ? LEL: ?	Air [Note: Unstable gas that decomposes rapidly in air at room temperature to cobalt carbonyl & hydrogen.]	None available
	1 ppm = 7.15 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 6)	
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 GMFQVH/ECBAE	Inh Con	Derm, bron, [canc]	Eye Skin Breath Swallow	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 ^a 0.5 mg/m ³ DMXSD ^{**} /DMFu ^{*/SA} 1.25 mg/m ³ SA CF [†] /PAPRDM ^{**} / PAPRDMFu [*] 2.5 mg/m ³ HEF/SCBAF/SAF 20 mg/m ³ SAF PD PP § SCBAF PD PP/SAF PD PP ASCBA Escape HEF/SCBAE	Inh Ing Con	Cough, dysp, wheez, decr pulm func, low-wgt, derm, diffuse nodular fib; resp hypersensitivity, asthma	Eye Skin Breath Swallow	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	Irrit eyes, skin, muc memb; cough, decr pulm func, wheez, dysp; in animals: liver, kidney inj; pulm edema	Eye: Skin: Breath: Swallow:	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:	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; II [#5023, Coal tar pitch volatiles]
Copper (dusts and mists) Cu 7440-50-8 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; II [#7029]
Copper fume (as Cu) Cu ₂ O/Cu 1317-38-0 (Cu ₂ O) GL7900000 (CuO)	Cu ₂ O: 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; II [#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 slut; 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	NIOSH	Inh	Irritation, resp sys;	Eye:	Immediate	Skin, resp sys,
Eyes:	Prevent eye contact	§ SCBAF/PD,PP/SAF/PD,PP ASCBA	Con	cough, dysp, wheez;	Breath:	Resp support	urinary sys
Wash skin:	Daily	Escape: GMFOVHIE/SCBAE		[care]			[skin, lung,
Remove:	N.R.						kidney & bladder
Change:	Daily						cancer]
[Coke oven emissions]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritation, nose, pharynx,	Eye:	Immediate	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 mg/m ³ DM*	Ing	nasal perf; metallic	Skin	Soap wash prompt	liver, kidneys
Wash skin:	When contam	10 mg/m ³ DMXSD**SA*	Con	taste, derm,	Breath:	Resp support	(Incr risk with
Remove:	When wet or contam	25 mg/m ³ SA CF/PAPRDM*		in animals lung, liver,	Swallow:	Medical attention	Wilson's disease)
Change:	Daily	50 mg/m ³ HIEF/PAPRTHIE/SCBAF/SAF		kidney damage, anemia		Immediate	
		100 mg/m ³ SAF/PD,PP					
		§ SCBAF/PD,PP/SAF/PD,PP ASCBA					
		Escape: HIEF/SCBAE					
[Copper (dusts and mists)]							
Skin:	N.R.	NIOSH/OSHA	Inh	Irritation, upper resp sys,	Breath:	Resp support	Eyes, skin, resp sys
Eyes:	N.R.	1 mg/m ³ DMFu/SA	Con	metal fume fever, chills,			(Incr risk with
Wash skin:	N.R.	2.5 mg/m ³ SA CF/PAPRDMFu		muscle ache, nau fever, dry			Wilson's disease)
Remove:	N.R.	5 mg/m ³ HIEF/SAT CF/PAPRTHIE/		throat, cough weak, lass,			
Change:	N.R.	SCBAF/SAF		metallic or sweet taste,			
		100 mg/m ³ SAF/PD,PP		discoloration skin, hair			
		§ SCBAF/PD,PP/SAF/PD,PP ASCBA					
		Escape: HIEF/SCBAE					
[Copper fume (as Cu)]							
Skin:	N.R.	NIOSH	Inh	Dyspnea; chest tight,	Breath:	Fresh air	CVS, resp sys
Eyes:	N.R.	1 mg/m ³ D		cough, wheez, dysp,			
Wash skin:	N.R.	2 mg/m ³ DXSO/HIE/SA		decr FEV, bron mal,			
Remove:	N.R.	5 mg/m ³ SA CF/PAPRD		fever, chills, upper resp			
Change:	N.R.	10 mg/m ³ HIEF/SAT CF/PAPRTHIE/		symptoms after initial			
		SCBAF/SAF		exposure			
		100 mg/m ³ SA/PD,PP					
		§ SCBAF/PD,PP/SAF/PD,PP ASCBA					
		Escape: HIEF/SCBAE					
[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 (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		
Crag® herbicide $C_6H_4C_3OCH_2CH_2OSO_3Na$ 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)	600 mg/m ³	Colorless to white crystalline, odorless solid [herbicide]	MW 309.1 BP Decomposes Sol(77°F) 26% F.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. II(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 86°F.]	MW 108.2 BP 378°F Sol 2% F.P. 178°F IP 8.93 eV Sp Gr. 1.06 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.29 mm MLT 88°F UEL ? LEL(300°F) 1.4%	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% F.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) 1.1%	Strong oxidizers, acids	Si gel, Acetone, GC/FID, III [#2001]
p-Cresol $CH_3C_6H_4OH$ 106-44-6 GO6476000	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 96°F.]	MW 108.2 BP 396°F Sol 2% F.P. 187°F IP 8.97 eV Sp Gr. 1.04 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.11 mm MLT 96°F UEL ? LEL(302°F) 1.1%	Strong oxidizers, acids	Si gel, Acetone, GC/FID, III [#2001]

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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 50 mg/m ³ DM 100 mg/m ³ DMXSO/SA 250 mg/m ³ SA CF/PAPRODM 500 mg/m ³ HIEF/PAPRTHIE/SAT CF/Y SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin; liver, kidney damage; in animals: CNS effects, convuls	Eye Skin Breath Swallow	Irr: immed Water wash prompt Resp support Medical attention immed	Eyes, skin, CNS, liver, kidneys
[Crag® herbicide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 23 ppm CCROVDM/SA 57.5 ppm SA CF/PAPROVDM 115ppm CCRFOVHIE/GMFOVHIE/ PAPRTHIE/SAT CF/Y SCBAF/SAF 250 ppm SAF PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb; CNS effects: conf, depress, resp fail, dysp, irrag rapid resp, weak pulse, eye, skin burns, derm, lung, liver, kidney, pancreas damage	Eye Skin Breath Swallow	Irr: immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, CVS
[o-Cresol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 23 ppm CCROVDM/SA 57.5 ppm SA CF/PAPROVDM 115ppm CCRFOVHIE/GMFOVHIE/ PAPRTHIE/SAT CF/Y SCBAF/SAF 250 ppm SAF PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb; CNS effects: conf, depress, resp fail, dysp, irrag rapid resp, weak pulse, eye, skin burns, derm, lung, liver, kidney, pancreas damage	Eye Skin Breath Swallow	Irr: immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, CVS
[m-Cresol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 23 ppm CCROVDM/SA 57.5 ppm SA CF/PAPROVDM 115ppm CCRFOVHIE/GMFOVHIE/ PAPRTHIE/SAT CF/Y SCBAF/SAF 250 ppm SAF PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb; CNS effects: conf, depress, resp fail, dysp, irrag rapid resp, weak pulse, eye, skin burns, derm, lung, liver, kidney, pancreas damage	Eye Skin Breath Swallow	Irr: immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, CVS
[p-Cresol]							

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		
Crotonaldehyde $\text{CH}_3\text{CH}=\text{CHCHO}$ 4170-30-3 GP499000	2-Butenal, 3-Methylacrolein, Propylene aldehyde	NIOSH 2 ppm (6 mg/m ³) See Appendix C (Aldehydes) OSHA 2 ppm (6 mg/m ³)	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% F.P. 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 temperatures, such as in fire conditions.]	Bub. Reagent; PLR; III [P&CAM #285]
1143 28 (inhibited)	1 ppm = 2.91 mg/m ³				Sp. Gr. 0.87 Class IB Flammable Liquid			
Crufomate $\text{C}_{11}\text{H}_{19}\text{ClNO}_2\text{P}$ 299-88-6 TB386000	4-(4-Butyl-2-chlorophenyl) methyl methylphosphonidate, Dowco® 132, Rustlen®	NIOSH 8 mg/m ³ ST 20 mg/m ³ OSHA† none	N.D.	White, crystalline solid in pure form. [pesticide] [Note: Commercial product is a yellow oil.]	MW: 281.7 BP: Decomposes Sol: Insoluble F.P.: ? IP: ? Sp. Gr: 1.16 Combustible Solid	VP (243°F): 0.01 mm M.L.T.: 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)]
Cumene $\text{C}_9\text{H}_{10}\text{CH}_2\text{CH}_3$ 98-82-8 GR8575000	Cumol, Isopropyl benzene, 2-Phenyl propane	NIOSH/OSHA 50 ppm (245 mg/m ³) [skin]	800 ppm [LEL]	Colorless liquid with a sharp, penetrating, aromatic odor	MW 120.2 BP 306°F Sol. Insoluble F.P. 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. C.S. GC/FID; III [1501, Aromatic Hydrocarbons]
1918 28	1 ppm = 5.00 mg/m ³				Sp. Gr. 0.86 Class IC Flammable Liquid			
Cyanamide NH_2CN 420-04-2 T-5950000	Amidocyanogen, Carbimide, Carbodimide, Cyanogen nitride, Hydrogen cyanamide [Note: Cyanamide is also a synonym for Calcium cyanamide.]	NIOSH 2 mg/m ³ OSHA† none	N.D.	Crystalline solid.	MW: 42.1 BP: 500°F (Decomposes) Sol (50°F): 78% F.P.: 288°F IP: 10.66 eV Sp. Gr: 1.28 Combustible Solid	VP: ? M.L.T.: 113°F UEL: ? LEL: ?	Above 104°F: Moisture, acids, or alkalis; 1,3-phenylenediamine salts [Note: Polymerization may occur on evaporation of aqueous solutions.]	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 hazards			
			Route	Symptoms (See Table 5)	First aid (See Table 5)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flam) Change: N.R. Provide: Eyewash, Quick drench		NIOSH/OSHA 20 ppm: CCROV/SA* 50 ppm: SA:CF/PAPROV/KCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys, in animals; dysp, pulm edema, irit skin	Eye: Irrigated Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Crotonaldehyde]						
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, skin, resp sys; wheez, dysp; blurred vision, lac; meet; abdom cramps, diarr, nau, anor	Eye: Irrigated Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, blood chol
[Cruformate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flam) Change: N.R.		NIOSH/OSHA 500 ppm: CCROV/SA* 800 ppm: SA:CF/PAPROV/KCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb, derm, head, narco, coma	Eye: Irrigated Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
[Cumene]						
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 Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; micels, aalv, lac, twitch; Antabuse-like effects	Eye: Irrigated Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
[Dynamide]						

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 480-19-5 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: -4°F Sol: 1% FLP: NA (Gas) IP: 13.67 eV RQSD: 1.82 Sp.Gr: 0.96 (Liquid at -4°F) Flammable Gas	VP(70°F): 6.1 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
1028 18	1 ppm = 2.16 mg/m ³							
Cyanogen chloride CClN 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 66°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: 66°F Sol: 7% FLP: NA IP: 12.48 eV RQSD: 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
1689 16 (inhibited)	1 ppm = 2.56 mg/m ³							
Cyclohexane C ₆ H ₁₂ 110-82-7 GU5300000	Benzene, hexahydride, Hexahydrobenzene, Hexamethylene, Hexanaphene	NIOSH/OSHA 300 ppm (1050 mg/m ³) OSHA none	1300 ppm (UEL)	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, GCFID, II [#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) [16-min] OSHA none	N.D.	Colorless liquid with a strong, offensive odor.	MW: 116.2 BP: 318°F Sol: Insoluble FLP: 110°F IP: ? Sp.Gr: 0.96 Class II Combustible Liquid	VP: 10 mm FRZ: -181°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids, alkali metals	None available
3064 29	1 ppm = 4.83 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:	Frostbite Prevent eye contact/ Frostbite	TBAL	Inh Con	Irrit 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
Wash skin: Remove: Change: Provide:	N.R. When wet (flamem) N.R. Frostbite						
[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)	Irrit eyes, upper resp sys; cough, delayed pulm edema; weak, head, gidd, dizz, conf, nau, vomit; irreg heartbeat; irrit skin (liq)	Eye: Skin: Breath: Swallow:	Irritated Water/wash immedi (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 (flamem) 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	Irrit eyes, skin, resp sys; drow, derm, narco, coma	Eye: Skin: Breath: Swallow:	Irritated 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	Irrit eyes, skin, resp sys; head, dizz, weak, nau, vomit, convuls; cough, wheez, laryngitis, dysp	Eye: Skin: Breath: Swallow:	Irritated Soap flush immedi 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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Cyclohexanol $C_6H_{11}OH$ 108-93-0 GV7875000	Anol, Cyclohexyl alcohol, Hexahydrophenol, Hexanol, Hydrin, 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% FLP 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; II [#1402, Alcohols III]
1993 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% FLP 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; II [#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 FLP 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; II [#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, Hexahydrobenzylamine	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 FLP: 88°F IP: 8.37 eV	VP: 11 mm FRZ: 0°F UEL: 8.4% LEL: 1.8%	Oxidizers, organic compounds, acid anhydrides, acid chlorides, acids, lead [Note: Corrosive to copper, aluminum, zinc & galvanized steel.]	Si gel; 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/SHA 400 ppm: CCROV*/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:	Irrimmed 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:	Irrimmed 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 (flammi) N.R.	NIOSH/SHA 2000 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, resp sys, drow	Eye: Skin: Breath: Swallow:	Irrimmed 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 (flammi) N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb, resp sys, eye, skin burns; skin sens; cough, pulm edema, drow, ill-head, dizz; diarr, nau, vomit	Eye: Skin: Breath: Swallow:	Irrimmed 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	Cyclotrimethylenetrinitramine; 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: 7 Sol: Insoluble Fl.P: Explodes IP: 7 Sp.Gr: 1.82 Combustible Solid [EXPLOSIVE]	VP(230°F): 0.0004 mm MLT: 401°F UEL: 7 LEL: 7	Strong oxidizers, combustible materials, heat [Note: Detonates on contact with mercury fulminate.]	Filter; none; Grav; II [#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	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, II [#2523]
Cyclopentane C_5H_{10} 287-92-3 GY2300000	Pentamethylene 1 ppm = 2.92 mg/m ³	NIOSH 800 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: 10.62 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 ($C_8H_{11}NO$) 13121-70-6 WH6750000	TCHH, Tricyclohexylhydroxy- stannane, Tricyclohexylhydroxyltin, Tricyclohexylstannum hydroxide, Tricyclohexyltin hydroxide	NIOSH 8 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: 7	VP: 0 mm (approx) MLT: 383°F UEL: NA LEL: NA	Strong oxidizers, ultraviolet light	Filter/ XAD-2; CH ₃ COOH/ CR/CN; HPLC/ AAS-GF; II [#8504, Organotin]

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)
Skln:	Prevent skln contact	TBAL	Inh	Irrit eyes, skln; head,	Eye:	Eyes, skln, CNS
Eyes:	Prevent eye contact		Abs	irrity, itg, weak, tremor,	Skln:	
Wash skln:	When contam/Daily		Ing	nausea, vomit, incoord,	Breath:	
Remove:	When wet or contam		Con	convuls	Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Cyclonite]						
Skln:	Prevent skln contact	NIOSH/OSHA	Inh	Irrit eyes, nose	Eye	Eyes, resp sys
Eyes:	Prevent eye contact	760 ppm: CCROV/GMFOV/PAPROV/SA/	Abs		Skln	
Wash skln:	When contam	SCBAF	Ing		Breath	
Remove:	When wet (flam)	§ SCBAF PD PP/SAF PD PP ASCBA	Con		Swallow	
Change:	N.R.	Escape: GMFOV/SCBAE				
[Cyclopentadiene]						
Skln:	Prevent skln contact	TBAL	Inh	Irrit eyes, skln, nose,	Eye:	Eyes, skln, resp sys,
Eyes:	Prevent eye contact		Ing	throat; ill-head, dizz,	Skln:	CNS
Wash skln:	Daily		Con	euph, inco, nau, vomit,	Breath:	
Remove:	When wet (flam)			stupor; dry, crackling skln	Swallow:	
Change:	N.R.					
[Cyclopentane]						
Skln:	Prevent skln contact	OSHA	Inh	Irrit eyes, skln, resp	Eye:	Eyes, skln, resp sys,
Eyes:	N.R.	3.2 mg/m ³ : CCROVDM/SA	Abs	sys; head, vert; sore	Skln:	liver, kidneys
Wash skln:	When contam	8 mg/m ³ : SA:CF/PAPROVDM	Ing	throat, cough, abdom pain,	Breath:	
Remove:	When wet or contam	16 mg/m ³ : CCRFOVHIE/GMFOVHIE/	Con	vomit, skln burns, pruritus;	Swallow:	
Change:	Daily	PAPROVHIE/SAT:CF/		in animals: liver, kidney		
		SCBAF/SAF		damage		
		80 mg/m ³ : SAF PD, PP				
		§ SCBAF PD, PP/SAF PD, PP:ASCBA				
		Escape: GMFOVHIE/SCBAE				
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
2,4-D <chem>ClC6H3OCH2COOH</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% FLP: NA IP: ? Sp Gr: 1.57 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(320°F): 0.4 mm MLT: 280°F UEL: NA LEL: NA	Strong oxidizers	Filter; Methanol; HPLC/UVD; NI [#5001]
2765 55								
DDT <chem>(C6H4Cl)2CHCCl3</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 FLP: 162-171°F IP: ? Sp Gr: 0.99 Combustible Solid	VP: 0.0000002 mm MLT: 227°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; Isocutane; GC/ECD; II(3) [#S274]
2761 55								
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]	18 mg/m ³	Colorless to white crystalline solid with an intense, bitter, chocolate- like odor.	MW: 122.2 BP: 415°F Sol: Slight FLP: 176°F IP: 9.86 eV Sp Gr: 0.94 Combustible Solid	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							
1-Decanethiol <chem>CH3(CH2)9SH</chem> 143-10-2	Decylmercaptan, n-Decylmercaptan, 1-Mercaptodecane	NIOSH C 0.8 ppm (3.6 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with a strong odor.	MW: 174.4 BP: 448°F Sol: Insoluble FLP: 206°F IP: ? Sp Gr: 0.84 Class III Combustible Liquid	VP: ? FRZ: -18°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, nitric acid	None available
	1 ppm = 7.25 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 6)	
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 100 mg/m ³ : CCROVDMFu/GMFOVHIE/ PAPROVDMFu/SA/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Weak, stupor, hyporeflexia, musc twitch, convuls, derm, in animals: liver, kidney inj	Eye: Skin Breath: Swallow	Irrimmed Soap wash prompt Resp support Medical attention immed	Skin, CNS, liver, kidneys
[2,4-D]							
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, skin, pares tongue, lips, face, tremor; appt, dizz, conf, mal, head, ftg, convuls, paresis hands, vomit, [cerc]	Eye: Skin Breath: Swallow	Irrimmed Soap wash prompt Resp support Medical attention immed	Eyes, skin, CNS, kidneys, liver, PNS [in animals: liver, lung & lymphatic tumors]
[DOT]							
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 3 mg/m ³ SA 7.5 mg/m ³ SA,CF 15 mg/m ³ SAT,CF/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Dizz, head, nau, h-head, drow, enco, local musc, spasms, tremor, convuls, ftg, in animals: dysp, weak, liver, kidney damage	Eye: Skin Breath: Swallow	Irrimmed Soap wash immed Resp support Medical attention immed	CNS, liver, kidneys
[Decaborane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 6 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; conf, dizz, head, drow, nau, vomit, weak, convuls	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[1-Decanethiol]							

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 Fl.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Demeton <chem>(C_2H_5O)_2PSOC_2H_5SC_2H_5</chem> 8065-48-3 TF3150000	O-O-Diethyl-O-(and S)-2- (ethylthio)ethyl phosphorothioate mixture; Systox® 1 ppm = 10.74 mg/m³	NIOSH/OSHA 0.1 mg/m³ [skin]	10 mg/m³	Amber, oily liquid with a sulfur-like odor [insecticide]	MW: 258.3 BP: Decomposes Sol: 0.01% Fl.P: 113°F IP: ? Sp. Gr: 1.12 Class II Combustible Liquid	VP: 0.0003 mm FRZ: <13°F UEL: ? LEL: ?	Strong oxidizers, alkali, water	Filter/ XAD-2; Toluene; GC/FID; ■ [#5514]
Diacetone alcohol <chem>CH_3COCH_2C(CH_3)_2OH</chem> 123-42-2 SA9100000	Diacetone, 4-Hydroxy-4-methyl-2- pentanone, 2-Methyl-2-pentanol-4-one 1146-26 1 ppm = 4.63 mg/m³	NIOSH/OSHA 50 ppm (240 mg/m³)	1800 ppm [LEL]	Colorless liquid with a faint, minty odor.	MW: 116.2 BP: 334°F Sol: Miscible Fl.P: 125°F IP: ? Sp. Gr: 0.94 Class II Combustible Liquid	VP: 1 mm FRZ: -47°F UEL: 6.9% LEL: 1.6%	Strong oxidizers, strong alkalis	Char, 2-Propanol/ CS, GC/FID, ■ [#1402, Alcohols III]
2,4-Diaminoanisole (and its salts) <chem>(NH_2)_2C_6H_4OCH_3</chem> 815-06-4 BZ8880500	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 as a component of hair & fur dye formu- lations.]	MW: 138.2 BP: ? Sol: ? Fl.P: ? IP: ? Sp. Gr: ? Combustible Solid	VP: ? MLT: 163°F UEL: ? LEL: ?	Strong oxidizers	None available
o-Danisidine <chem>(NH_2)_2C_6H_3(OCH_3)_2</chem> 119-80-4 DD6875000	Danisidine; 3,3'-Danisidine; 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: 453°F IP: ? Sp. Gr: ? Combustible Solid	VP: ? MLT: 271°F UEL: ? LEL: ?	Oxidizers	Filter; water; HPLC/UV/; ■ [#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 6)	First aid (See Table 8)	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/OSHA 1 mg/m ³ SA 2.5 mg/m ³ SA CF 5 mg/m ³ SAT CF/SCBAF/SAF 10 mg/m ³ SA; PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, miosis, ache eyes, rhin, head, chest tight, wheez, lar spasm, saliv, cyan, anor nau, vomit, abdom cramps, diarr, local sweat, musc fasc, weak, para, gidd, conf ataxia, convuls, coma, low BP, card irreg	Eye Skin Breath: Swallow	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS, CNS, blood chol
[Demeton]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 1250 ppm: SA; CF/PAPROV ⁶ 1000 ppm: CCRFOV/GMFOV/PAPRTOV/Con § SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, corn damage, In animals: narco, liver damage	Eye Skin Breath Swallow	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver
[Disulfone: alcohol]							
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: GMFOVHE/SCBAE	Inh Abs Ing Con	In animals: Irrit skin; thyroid, liver changes; terato effects; [canc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, thyroid, liver, repro sys [In animals: thyroid, liver, skin & lymphatic eye tumors]
[2,4-Diaminonitrole (and its salts)]							
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: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit skin; In animals: kidney, liver damage; thyroid, spleen changes; [canc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, kidneys, liver, thyroid, spleen [In animals: bladder, liver, stomach & mammary 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® $C_{12}H_{21}N_3O_3P$ 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 58	1 ppm = 12.66 mg/m³				Sp. Gr: 1.12 Class IIIA Combustible Liquid			
Diazomethane CH_2N_2 334-88-3 PA7000000	Azomethylene, Azomethylene, Diazone	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, II [#2515]
	1 ppm = 1.75 mg/m³				RGasD: 1.48 Flammable Gas (EXPLOSIVE!)			
Diborane B_2H_6 19287-45-7 HG9275000	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(82°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*, H₂O*, PES*, II [#6006]
1911 16	1 ppm = 1.15 mg/m³				RGasD: 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(oc) 170°F IP: ?	VP 0.8 mm FRZ 43°F UEL: ? LEL: ?	Chemically active metals such as aluminum, magnesium & in alloys [Note: Corrosive to metals.]	None available
2872 56	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		Inj	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, rig, 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, pneumo,		
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, h-head, verti,		
Change:	N.R.	15 ppm: SA PD, PP		chills, fever, rig, weak,		
		6 SCBAF PD, PP/SAF PD, PP ASCBA		tremor, musc fasc,		
		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	* SCBAF PD, PP/SAF PD, PP ASCBA	Abs	throat, drow, nau, vomit;	Skin:	CNS, liver, kidneys,
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Inj	pulm edema, liver, kidney	Breath:	spleen, repro sys,
Remove:	When wet or contam		Con	inj; 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, 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		
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-Dibutylethanamine	NIOSH 2 ppm (14 mg/m ³) [skin] OSHA† none	N.D.	Colorless liquid with a faint, amine-like odor.	MW: 173.3 BP: 448°F Sol: 0.4% FLP: 196°F IP: ? Sp. Gr: 0.86 Class IIIA Combustible Liquid	VP: 0.1 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	Sigel; Methanol/ water; GC/FID; ■ [#2007, Amino- ethanol Compounds]
2873 85	1 ppm = 7.20 mg/m ³							
Dibutyl phosphate (C ₈ H ₁₉ O ₄)(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 FLP ? IP ? Sp Gr 1.06 Combustible Liquid	VP 1 mm (approx) FRZ ? UEL ? LEL ?	Strong oxidizers	Filter; CH ₃ CN; GC/FID; ■ [#5017]
Dibutylphthalate C ₈ H ₁₇ (COOC ₂ H ₅) ₂ 84-74-2 T10875000	DBP, Dibutyl 1,2-benzenedicarboxylate 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% FLP 315°F IP ? Sp Gr 1.06 Class IIIB Combustible Liquid	VP: 0.00007 mm FRZ -31°F UEL ? LEL(456°F): 0.5%	Nitrates, strong oxidizers, alkalis & acids, liquid chlorine	Filter; CS; GC/FID; ■ [#5020]
Dichloroacetylene ClC≡CCl 7872-29-4 AP1080000	DCA, Dichloroethyne [Note: DCA is a possible decomposition product of trichloroethylene or trichloroethane.]	NIOSH Ca See Appendix A 0.1 ppm (0.4 mg/m ³) OSHA† none	Ca [N.D.]	Volatile oil with a disagreeable, greenish odor. [Note: A gas above 96°F. DCA is not produced commercially.]	MW: 84.9 BP: 90°F (Explosive) Sol: ? FLP: ? IP: ? Sp. Gr: 1.26 Combustible Liquid	VP: ? FRZ: -68 to -57°F UEL: ? LEL: ?	Oxidizers, heat, shock	None available
	1 ppm = 3.96 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 6)
Skin:	Prevent skin contact	TBAL	Inh	In animals: Irrit eyes, skin, nose, derm; skin, corn 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 sys, head	Eye: Irr. Immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	10 ppm: SA	Ing		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.	5 SCBAF:PD,PP/SAF:PD,PP ASCBA				
Provide:	Quick drench	Escape: GMFOVHE/SCBAE				
[Diethyl phosphite]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, upper resp sys, stomach	Eye: Irr. Immed	Eyes, resp sys, GI tract
Eyes:	Prevent eye contact	50 mg/m ³ : DMF	Ing		Skin: Wash regularly	
Wash skin:	N.R.	125 mg/m ³ : SA, CF/PP/PRDM	Con		Breath: Resp support	
Remove:	N.R.	250 mg/m ³ : HEF/SCBAF/SAF			Swallow: Medical attention immed	
Change:	N.R.	4000 mg/m ³ : SAF:PD,PP				
		5 SCBAF:PD,PP/SAF:PD,PP ASCBA				
		Escape: HEF/SCBAE				
[Diethyl phthalate]						
Skin:	Prevent skin contact	NIOSH	Inh	Head, loss of appetite, nau, vomit, intense jaw pain; cranial nerve palsy; in animals: kidney, liver, brain inj; low-wgt; [canc]	Eye: Irr. Immed	CNS [in animals: kidney tumors]
Eyes:	Prevent eye contact	5 SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs		Skin: Soap flush immed	
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing		Breath: Resp support	
Remove:	When wet (Klemm)		Con		Swallow: Medical attention immed	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Dichlorostyrene]						

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 FLP, 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% FIP 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 (460 mg/m ³)	Ca [160 ppm]	Colorless or white crystalline solid with a mothball- like odor [insecticide]	MW 147.0 BP 345°F Sol 0.008% FIP 150°F IP 8.98 eV	VP 1.3 mm MLT 128°F UEL 7 LEL 2.8%	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>NH2C6H3Cl2C6H3Cl2NH2</chem> 91-94-1 DO0525000	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 768°F Sol (59°F): 0.07% FIP ? IP ?	VP ? MLT 271°F UEL ? LEL ?	None reported	Filter/ Sigel, Reagent, HPLC/UV/D, III [#5509]
Dichlorodifluoromethane <chem>CCl2F2</chem> 75-71-8 PAB200000	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% FIP NA IP 11.75 eV	VP 8.7 atm FRZ -252°F UEL NA LEL NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char(2), CH ₂ Cl, GC/FID, III [#1018]
1028 12	1 ppm = 5.03 mg/m ³				RGeD: 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 6)	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	Irrit eyes, nose; liver, kidney damage, skin blisters	Eye Skin Breath Swallow	Irrigated Soap wash prompt Resp support 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, cirt, in animals: liver, kidney inj, [canc]	Eye Skin Breath Swallow	Irrigated Soap wash Resp support 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, [canc]	Eye Skin Breath Swallow	Irrigated Soap wash immed Resp support 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 (§§)	Dizz, tremor, asphy, uncon, card arrhy, card arrest, lq; frostbite	Eye: Skin: Breath	Frostbite Frostbite 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 <chem>C2H4C2N2O2</chem> 118-52-5 MU0700000	Dactin, DOH, 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 ? Sp Gr 1.5 Combustible Solid	VP ? MLT 270°F UEL ? LEL ?	Water, strong acids, easily oxidized materials such as ammonia salts & sulfides	None available
1,1-Dichloroethane <chem>CH3CH2Cl2</chem> 75-34-3 K0175000 2362 27	Asymmetrical dichloroethane, Ethylene chloride, 1,1-Ethylene 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 Sp Gr 1.18 Class IB Flammable Liquid	VP: 182 mm FRZ: -143°F UEL 11.4% LEL 8.4%	Strong oxidizers, strong caustics	Char, CS, GC/FID; II [#1003, Haloge- nated Hydro- carbons]
1,2-Dichloroethylene <chem>C1CH=CHCl</chem> 540-59-0 KV9360000 1150 29	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. 38-38°F IP 9.65 eV Sp Gr(77°F) 1.27 Class IB Flammable Liquid	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; II [#1003, Haloge- nated Hydro- carbons]
Dichloroethyl ether <chem>(ClCH2CH2)2O</chem> 111-44-4 KN0875000 1915 55	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 (30 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 ? Sp.Gr. 1.22 Class II Combustible Liquid	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; II [#1004]

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	NIOSH/OSHA 2 mg/m ³ SA 5 mg/m ³ SA CF/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFSH/SCBAE	Inh ing Con	Irrit eyes, muc memb, resp sys	Eye Skin Breath Swallow Immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys	
[1,3-Dichloro-5,5-dimethylhydantoin]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1000 ppm SA 2500 ppm SA CF 3000 ppm SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh ing Con	Irrit skin, CNS depres, liver, kidney, lung damage	Eye Skin Breath Swallow Immed Soap wash prompt Resp support Medical attention immed	Skin, liver, kidneys, lungs, CNS	
[1,1-Dichloroethane]							
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/PAPROV/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh ing Con	Irrit eyes, resp sys, CNS depres	Eye Skin Breath Swallow Immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, CNS	
[1,2-Dichloroethylene]							
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 nose, throat, resp sys lac cough nau vomit, in animals, pnuemodema liver damage, [canc]	Eye Skin Breath Swallow Immed Soap wash Resp support Medical attention immed	Eyes, resp sys, liver [In animals: liver tumors]	
[Dichloroethyl ether]							

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		
Dichloromonofluoro- ethane CHCl ₂ F 75-43-4 PA8400000	Dichlorofluoromethane, Fluorodichloromethane, Freon® 21, Genatron® 21, Halon® 112 Refrigerant 21	NIOSH 10 ppm (40 mg/m ³) OSHA† 1000 ppm (4200 mg/m ³)	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) F.P.: NA IP: 12.39 eV RGasD: 3.57 Nonflammable Gas	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, II [#2516]
1029 12	1 ppm = 4.28 mg/m ³							
1,1-Dichloro-1-nitro- ethane CH ₂ CCl ₂ NO ₂ 594-72-9 K11050000	Dichloronitroethane	NIOSH/OSHA 2 ppm (10 mg/m ³) OSHA† C 10 ppm (80 mg/m ³)	25 ppm	Colorless liquid with an unpleasant odor [Irritant]	MW: 143.9 BP: 255°F Sol: 0.3% F.P.: 136°F IP: ?	VP: 15 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers [Note: Corrosive to iron in presence of moisture.]	Char(per), CS, GC/FID, III [#1601]
2650 57	1 ppm = 5.98 mg/m ³				Sp Gr: 1.43 Class II Combustible Liquid			
1,3-Dichloropropene CHCl=CHCH ₂ Cl 542-76-6 UC8310000	3-Chloroallyl chloride; DCP; 1,3-Dichloro-1-propene; 1,3-Dichloropropylene; Telone®	NIOSH Ca 1 ppm (5 mg/m ³) (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% F.P.: 77°F IP: ?	VP: 28 mm FRZ: -118°F UEL: 14.5% LEL: 6.3%	Aluminum, magnesium, halogens, oxidizers [Note: Epichlorohydrin may be added as a stabilizer.]	None available
2647 29	1 ppm = 4.81 mg/m ³				Sp.Gr: 1.21 Class IC Flammable Liquid			
2,2-Dichloropropionic acid CH ₃ CCl ₂ COOH 75-99-0 UF0690000	Dalapon; 2,2-Dichloropropanoic acid; α,α-Dichloropropionic acid	NIOSH 1 ppm (5 mg/m ³) OSHA† none	N.D.	Colorless liquid with an acrid odor. [harbicide] [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: 90% F.P.: NA IP: ? Sp.Gr: 1.40 Noncombustible Liquid	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
1780 80	1 ppm = 5.84 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — minimum 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: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	NIOSH/OSHA 100 ppm: SA 250 ppm: SA/CF 500 ppm: SCBAF/SAF 5000 ppm: SA; PD, PP 6 SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Asphy, card arrhy, card arrest, liq: frostbite	Eye: Skin: Breath	Frostbite Frostbite Resp support	Resp sys, CVS
[Dichloromono fluoromethane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 20 ppm: SA 25 ppm: SA/CF/SCBAF/SAF 6 SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: irrit eyes, skin, liver, heart, kidney damage; pulm edema, hemorrh	Eye: Skin: Breath Swallow	Immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, CVS
[1,1-Dichloro-1-nitroethane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamem) N.R. Eyewash, Quick drench	NIOSH 6: SCBAF; PD, PP/SAF; PD, PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; lac; head, dizz; in animals: liver, kidney damage; [canc]	Eye: Skin: Breath: Swallow:	In Immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: cancer of the bladder, liver, lung & fore stomach]
[1,3-Dichloropropane]							
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, upper resp sys; eye, skin burns; less, loss of appetite, diarr, vomit, slowing of pulse; CNS depress	Eye: Skin: Breath: Swallow:	In Immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, GI tract, CNS
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Dichlorotetrafluoro- ethane CClF ₂ CCIF ₂ 76-14-2 K1101000	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% FLP: NA IP: 12.20 eV RGasD: 5.93 Nonflammable Gas	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 ₂ Cl ₂ , GC/FPD, III [#1018]
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% FLP: >175°F IP: ? Sp. Gr(77°F): 1.42 Class III Combustible Liquid	VP: 0.01 mm FRZ: ? UEL: ? LEL: ?	Strong acids, strong alkalis [Note: Corrosive to iron & mild steel.]	XAD-2; Toluene; GC/FPD, II(5) [P&CAM #295]
Dicrotophos C ₁₀ H ₁₁ NO ₅ 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 FLP: >200°F IP: ? Sp. Gr(59°F): 1.22 Class IIIB Combustible Liquid	VP: 0.0001 mm FRZ: ? UEL: ? LEL: ?	Metals [Note: Corrosive to cast iron, mild steel, brass & stainless steel.]	None available
Dicyclopentadiene C ₁₀ H ₁₂ 77-73-6 PC1950000	Bicyclopentadiene; DCPD; 1,3-Dicyclopentadiene dimer; 3a,4,7,7a-Tetrahydro-4,7- methanoindene [Note: Exists in two stereoisomeric forms.]	NIOSH 5 ppm (50 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% FLP(oc): 90°F IP: ? Sp. Gr: 0.98 (Liquid at 95°F) Class IC Flammable Liquid Combustible Solid	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							

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 6)	First aid (See Table 6)		Target organs (See Table 6)
Skin:	Frostbite	NIOSH/OSHA	Inh	Int resp sys, asphy;	Eye:	Frostbite	Resp sys, CVS
Eyes:	Frostbite	10,000 ppm: SA	Con	card arry, card arrest,	Skin:	Frostbite	
Wash skin:	N.R.	15,000 ppm: SA: CF/SCBAF/SAF	(liq)	liq: frostbite	Breath:	Resp support	
Remove:	N.R.	§ SCBAF PD PP/SAF PD, PP ASCBA					
Change:	N.R.	Escape: GMFOV/SCBAE					
Provide:	Frostbite						
[Dichlorotetrafluoroethane]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Int eyes, skin, moist,	Eye	Immed	Resp sys, CVS,
Eyes:	Prevent eye contact	10 mg/m ³ SA	Abs	ache eyes, rhin, head,	Skin:	Soap wash immed	CNS, eyes, skin,
Wash skin:	When contam	25 mg/m ³ SA: CF	Inh	chest tight, wheez, lar	Breath:	Resp support	blood chol
Remove:	When wet or contam	50 mg/m ³ SA: CF/SCBAF/SAF	Con	spasm, saliv, cyan, anor,	Swallow:	Medical attention	
Change:	N.R.	100 mg/m ³ SA: PD, PP		nau, vomit, diarr, sweat,		Immed	
		§ SCBAF PD PP/SAF PD, PP ASCBA		musc fasc, para, gidd,			
		Escape: GMFOV/SCBAE		ataxia, convuls, low BP,			
				card irreg			
[Dichlorvos]							
Skin:	Prevent skin contact	TBAL	Inh	Head, nau, dizz, anxiety,	Eye:	Irr immed	CNS, blood chol
Eyes:	Prevent eye contact		Abs	restless, musc twitch,	Skin:	Water wash immed	
Wash skin:	When contam		Inh	weak, tremor, inco, vomit,	Breath:	Resp support	
Remove:	When wet or contam		Con	abdom cramps, diar; saliv,	Swallow:	Medical attention	
Change:	Daily			sweat, lac, rhinitis; anor,		Immed	
Provide:	Quick drench			naul			
[Dicrotophos]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Inh	throat; inco, head; sneez,	Skin:	Soap flush immed	CNS, kidneys
Wash skin:	When contam		Con	cough; skin blisters;	Breath:	Resp support	
Remove:	When wet or contam			in animals: kidney, lung	Swallow:	Medical attention	
Change:	Daily			damage		Immed	
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 F.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 F.P.: ? IP: 6.88 eV Sp.Gr: ? Combustible Solid	VP: ? MLT: 343°F UEL: ? LEL: ?	Ammonium perchlorate, tetranitromethane, mercury(II) nitrate	None available
Dieldrin C ₁₂ H ₈ Cl ₆ O 60-57-1 IO1750000 2761 55	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% F.P. NA IP ? Sp Gr 1.75 Noncombustible Solid	VP(77°F): 8 x 10 ⁻³ mm MLT 349°F UEL NA LEL NA	Strong oxidizers, active metals such as sodium, strong acids, phenols	Filter, Isocutane, GC/ECD, II(3) [#S283]
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	Varies
Diethanolamine (HOCH ₂ CH ₂) ₂ NH 111-42-2 KL2975000	DEA; Di(2-hydroxyethyl)amine; 2,2-Dihydroxydiethylamine; Diethamine; bis(2-Hydroxyethyl)amine; 2,2'-Aminodisethanol 1 ppm = 4.37 mg/m ³	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: 518°F (Decomposes) Sol: 96% F.P.: 279°F IP: ? Sp.Gr: 1.10 Class III Combustible Liquid Combustible Solid	VP: <0.01 mm MLT: 82°F UEL: 8.8% 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; II [#3509, Amino- alcohol Compounds 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:	N.R.	TBAL	Inh Ing Con	Possible irrit eyes, skin, resp sys; in animals: liver, RBC, testicular changes	Eye: Skin: Breath: Swallow:	Irritated Soap wash Resp support Medical attention Irritated	Eyes, skin, resp sys, liver, blood, repro sys
[Dicyclopentadienyl iron]							
Skin:	Prevent skin contact	NIOSH W: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Head, dizz, nau, vomit, mal sweat, myoclonic, limb jerks, clonic, tonic convuls, coma [card] in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irritated Soap wash Resp support Medical attention Irritated	CNS, liver, kidneys, skin [in animals: lung, liver, thyroid & adrenal gland tumors]
[Dieldrin]							
Skin:	N.R.	NIOSH W: SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOVHE/SCBAE	Inh Con	Eyes irrit, pulm func changes, [card]	Breath:	Resp support	Eyes, resp sys [in animals: lung tumors]
[Diesel exhaust]							
Skin:	Prevent skin contact	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; eye burns, conj nec; skin burns; lac, cough, sneez	Eye: Skin: Breath: Swallow:	Irritated Water flush Resp support Medical attention Irritated	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, F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Diethylamine (C_2H_5) ₂ NH 109-89-7 H28750000	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 F.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	Si gel, 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_2H_5) ₂ NCH ₂ CH ₂ OH 100-37-8 KKS075000	Diethylaminoethanol, 2-Diethylaminoethyl alcohol, N,N-Diethylethanamine, 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 F.P. 126°F IP ?	VP: 1 mm FRZ: -94°F UEL ? LEL ?	Strong oxidizers, strong acids	Si gel, 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			
Diaminodethylamine (NH ₂ CH ₂ CH ₂) ₂ NH 111-40-0 IE1225000	N-(2-Aminoethyl)(1,2- ethanediamine); bis(2-Aminoethyl)amine; DETA; 2,2'-Diaminodethylamine	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: 408°F Sol: Miscible F.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/UV/D; III [#2540]
2078 29	1 ppm = 4.28 mg/m ³				Sp.Gr: 0.86 Class III Combustible Liquid			
Diethyl ketone CH ₃ CH ₂ COCH ₂ CH ₃ 98-22-8 SA5050000	DEK, Dimethylacetone, Ethyl ketone, Mecetone, 3-Pentanone, Propione	NIOSH 200 ppm (706 mg/m ³) OSHA† none	N.D.	Colorless liquid with an acetone-like odor.	MW: 98.2 BP: 215°F Sol: 6% F.P.(oc): 59°F IP: 9.32 eV	VP(77°F): 36 mm FRZ: -44°F UEL: 6.6% LEL: 1.6%	Strong oxidizers, alkalis, mineral acids, (hydrogen peroxide + nitric acid)	None available
1186 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				Target organs (See Table 5)
			Route	Symptoms (See Table 5)	First aid (See Table 6)		
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flammi) 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: CCRQV/GMFOV/PAPROV/ SA/SCBAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys. nau, 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; dermat, 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 (flammi) N.R.	TBAL	Inh Abs 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
[Diethyl ketone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TLHA 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		
Diethyl phthalate $C_8H_{10}(COOC_2H_5)_2$ 84-86-2 T11050000	DEP, Diethyl ester of phthalic acid, Ethyl phthalate	NIOSH 5 mg/m ³ OSHA† none	N.D.	Colorless to water- white, oily liquid with a very slight, aromatic odor. [pesticide]	MW: 222.3 BP: 563°F Sol(77°F): 0.7% FLP(oc): 322°F IP: 7	VP(77°F): 0.002 mm FRZ: -41°F UEL: 7 LEL(368°F): 0.7%	Strong oxidizers, strong acids, nitric acid, permanganates, water	None available
	1 ppm = 9.24 mg/m ³				Sp.Gr: 1.12 Class III Combustible Liquid; however, ignition is difficult.			
Difluorodibromomethane CBr_2F_2 75-61-6 PA7525000	Dibromodifluoromethane, Freon® 12B2, Halon® 1202	NIOSH/OSHA 100 ppm (860 mg/m ³)	2000 ppm	Colorless, heavy liquid or gas (above 76°F) with a characteristic odor.	MW 209.8 BP 76°F Sol Insoluble F/P NA IP 11.07 eV	VP 620 mm FRZ -231°F UEL NA LEL NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char(2) 2-Propanol, GC/FID, IR [#1012]
1941 58	1 ppm = 8.72 mg/m ³				Sp.Gr(59°F): 2.29 Noncombustible Liquid Nonflammable Gas			
Diglycidyl ether $C_4H_6O_3$ 2238-07-5 KN2350000	DGE, Diglycidyl ether dioxide, Di(2,3-epoxypropyl) ether, 2-Epoxypropyl ether, bis(2,3-Epoxypropyl) ether	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m ³) OSHA† C 0.5 ppm (2.8 mg/m ³)	Ca [10 ppm]	Colorless liquid with a strong, irritating odor.	MW 130.2 BP 500°F Sol ? F/P 147°F IP ?	VP(77°F): 0.09 mm FRZ ? UEL ? LEL ?	Strong oxidizers	None available
	1 ppm = 5.41 mg/m ³				Sp.Gr: 1.12 Class IIIA Combustible Liquid			
Diisobutyl ketone $[(CH_3)_2CHCH_2]_2CO$ 108-83-8 MJ5775000	DIBK, sym-Diisobutyl acetone, 2,6-Dimethyl-4-heptanone, isovalerone, Valerone	NIOSH 25 ppm (150 mg/m ³) OSHA† 50 ppm (290 mg/m ³)	500 ppm	Colorless liquid with a mild, sweet odor.	MW 142.3 BP 354°F Sol 0.05% F/P 120°F IP: 9.64 eV	VP 2 mm FRZ -43°F UEL(200°F): 7% LEL(200°F): 0.8%	Strong oxidizers	Char; CS, GC/FID, IR [#1300, Ketones I]
1157 26	1 ppm = 5.92 mg/m ³				Sp.Gr 0.81 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 6)
Skin:	N.R.	TBAL	Inh ing Con	Irrit 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:	Inj Immed Wash regularly Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, PNS, repro sys
[Diethyl phthalate]							
Skin:	Prevent skin contact	NIOSH/OSHA 1000 ppm: SA	Inh ing Con	In animals: irrit resp sys, CNS symptoms, liver damage	Eye Skin Breath Swallow	Inj Immed Water flush inj med Resp support Medical attention Immed	Resp sys, CNS, liver
Eyes:	Prevent eye contact	2000 ppm: SA:CF/SCBAF/SAF					
Wash skin:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP ASCBA					
Remove:	When wet or contain	Escape: GMFOV/SCBAE					
Change:	N.R.						
[Difluorodibromomethane]							
Skin:	Prevent skin contact	NIOSH 4 SCBAF:PD,PP/SAF:PD,PP ASCBA	Inh ing Con	Irrit eyes, skin, resp sys, skin burns, in animals: hemato sys, lung, liver, kidney damage, repro effects, [carc]	Eye Skin Breath Swallow	Inj Immed Soap wash inj med Resp support Medical attention Immed	Eyes, skin, resp sys, repro sys [in animals: skin tumors]
Eyes:	Prevent eye contact	Escape: GMFOV/SCBAE					
Wash skin:	When contain/Daily						
Remove:	When wet or contain						
Change:	Daily						
Provide:	Eyewash, Quick drench						
[Diglycidyl ether]							
Skin:	Prevent skin contact	NIOSH 500 ppm: SA:CF/PAPROV/CCRFOV/GMFOV/SCBAF/SAF	Inh ing Con	Irrit eyes, skin, nose, throat, head, dizz, derm, liver, kidney damage	Eye Skin Breath Swallow	Inj Immed Soap wash prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, liver, kidneys
Eyes:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP ASCBA					
Wash skin:	When contain	Escape: GMFOV/SCBAE					
Remove:	When wet or contain						
Change:	N.R.						
[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, II (4) [PS141]
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 -41°F UEL(320°F) 11.5% LEL(212°F) 1.6%	Carbon tetrachloride, other halogenated compounds when in contact with iron, oxidizers	Si gel, Methanol, GC/FID, II [#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 RGSD: 1.88 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, acrolein, aldehyde, fluorides, maleic anhydride, aluminum, brass, copper, zinc	Si gel, H ₂ SO ₄ / Methanol, GC/FID, II [#2010]
1032 19 (anhydrous) 1160 26 (solution)	1 ppm = 1.87 mg/m ³							
4-Dimethylamino- azobenzene DAB $C_6H_5NNC_6H_4N(CH_3)_2$ 50-11-7 IX7350000	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, II(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:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys.	Eye	Irrimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact (>6%)	125 ppm: SA CF ¹ /PAPROV ²	Abs	naeu, vomit, head, vis dist	Skin	Water wash immed	
Wash skin:	When contam	200 ppm: CC/FOV/GMFOV/PAPROV ² /SCBAF/SAF	Inh		Breath:	Resp support	
Remove:	When wet (flam)		Con		Swallow	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Provide:	Eyewash (>6%)	Escape: GMFOV/SCBAE					
[Diisopropylamine]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit skin, jaun, liver damage, depres, leth,	Eye	Irrimmed	Skin, liver, CNS
Eyes:	Prevent eye contact	100 ppm: SA	Abs	haku, delusions	Skin	Water flush immed	
Wash skin:	When contam	250 ppm: SA CF	Inh		Breath:	Resp support	
Remove:	When wet or contam	300 ppm: SCBAF/SAF	Con		Swallow:	Medical attention immed	
Change:	N.R.	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Provide:	Quick drench	Escape: GMFOV/SCBAE					
[Dimethyl acetamide]							
Skin:	Prevent skin contact (liq)/Frostbite	NIOSH/OSHA	Inh	Irrit nose, throat,	Eye	Irrimmed (liq)/Frostbite	Eyes, skin, resp sys
Eyes:	Prevent eye contact (liq)/Frostbite	250 ppm: SA CF ¹	Con (liq)	sneez, cough, dysp, pulm edema, con, derm, liq: frostbite	Skin	Water flush immed (liq)/Frostbite	
Wash skin:	When contam (liq)	500 ppm: SCBAF/SAF			Breath:	Resp support	
Remove:	When wet (flam)	§ SCBAF PD, PP/SAF PD, PP ASCBA					
Change:	N.R.	Escape: GMFS/SCBAE					
Provide:	Eyewash (liq), Quick drench (liq), Frostbite						
[Dimethylamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Enlarged liver, liver,	Eye	Irrimmed	Skin, resp sys,
Eyes:	Prevent eye contact	§ SCBAF PD, PP/SAF PD, PP ASCBA	Abs	kidney dysfunc, contact derm, cough, wheez, dysp;	Skin	Soap wash immed	liver, kidneys,
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Inh	bloody sputum, bronchial secretions, frequent urination, hemA, dysunk [carb]	Breath:	Resp support	bladder
Remove:	When wet or contam		Con		Swallow:	Medical attention immed	[in animals: liver & bladder tumors]
Change:	Daily						
Provide:	Eyewash, Quick drench						
[4-Dimethylaminobenzene]							

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		
bis[2-(Dimethylamino)- ethyl]ether $C_8H_{20}N_2O$ 3033-62-3 KR9480000	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 (NIAX® Catalyst ESN) FLP: ? IP: ? Sp.Gr: ?	VP: ? FRZ: ? UEL: ? LEL: ?	None reported	None available
Dimethylamino- propionitrile $(CH_3)_2NCH_2CH_2CN$ 1738-25-6 UG1675000	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 = 4.06 mg/m ³	NIOSH/OSHA See Appendix C (NIAX® Catalyst ESN)	N.D.	Colorless liquid.	MW: 88.2 BP: 342°F Sol: Miscible FLP: 147°F IP: ? Sp.Gr (98°F): 0.88 Class IIIA Combustible Liquid	VP (136°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	N,N-Dimethylbenzenamine, N,N-Dimethylphenylamine (Note: Also known as Dimethylaniline which is a correct synonym for Xylidine.) 2253-57 1 ppm = 5.04 mg/m ³	NIOSH 5 ppm (25 mg/m ³) ST 10 ppm (50 mg/m ³) (skin) OSHA† 8 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% FLP: 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, IR [#2002, Aromatic Amines]
Dimethyl carbamoyl chloride $(CH_3)_2NCOCl$ 78-44-7 FD4200000	Chloroformic acid dimethylamide; Dimethylcarbamoyl chloride; N,N-Dimethylcarbamoyl chloride; DMCC 2262-80 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 FLP: 186°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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Possible urinary dysfunc;	Eye:	Eyes, skin, urinary
Eye:	Prevent eye contact	4: SCBAF:PD,PP/SAF:PD,PP/ASCBA	Abs	neurological disorders;	Skin:	tract, PNS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	in animals: irrit eyes, skin	Breath:	
Remove:	When wet or contam		Con		Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[bis(2-(Dimethylamino)ethyl)ether]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin; urinary	Eye:	Eyes, skin, urinary
Eye:	Prevent eye contact	4: SCBAF:PD,PP/SAF:PD,PP/ASCBA	Abs	dysfunc; neurological	Skin:	tract, PNS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	disorders; pins & needles in	Breath:	
Remove:	When wet or contam		Con	hands & feet; musc weak,	Swallow:	
Change:	N.R.			less, nau, vomit; decr nerve		
Provide:	Eyewash, Quick drench			conduction in lower legs		
[Dimethylaminopropionitrile]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Anoxia symptoms: cyan,	Eye:	Blood, kidneys,
Eye:	Prevent eye contact	50 ppm SA	Abs	weak, dizz, ataxia, methemo	Skin:	liver, CVS
Wash skin:	When contam	100 ppm SA CF/SCBAF/SAF	Ing		Breath:	
Remove:	When wet or contam	5 SCBAF PD,PP/SAF PD,PP ASCBA	Con		Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE				
Provide:	Quick drench					
[N,N-Dimethylaniline]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eye:	Prevent eye contact	4: SCBAF:PD,PP/SAF:PD,PP/ASCBA	Abs	throat, resp sys; eye,	Skin:	liver
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	skin burns; cough, wheez,	Breath:	[in animals:
Remove:	When wet or contam		Con	laryngitis, dysp; head,	Swallow:	nasal cancer]
Change:	N.R.			nau, vomit; liver inj; [canc]		
Provide:	Eyewash, Quick drench					
[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, Fl.P., IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
Dimethyl-1,2-dibromo- 2,2-dichloroethyl phosphate (CH ₃ O) ₂ P(O)OCHBr-CHBrCl 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: 380.8 BP: Decomposes Sol: Insoluble Fl.P. NA IP: ? Sp Gr (77°F): 1.96 Noncombustible Solid	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
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 Fl.P. 136°F IP: 9.12 eV Sp Gr: 0.95 Class II Combustible Liquid	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]
1,1-Dimethylhydrazine (CH ₃) ₂ NNH ₂ 57-14-7 MV2450000	Dimazine, DMH, UDMH, Unsymmetrical dimethyl- hydrazine	NIOSH Ca See Appendix A C 0.06 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: 60.1 BP: 147°F Sol: Miscible Fl.P. 5°F IP: 8.05 eV Sp Gr: 0.79 Class IB Flammable Liquid	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.]	Sub; Pho-acid; Vis; ■ [#S143]
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% Fl.P. 295°F IP: 9.64 eV Sp Gr: 1.19 Class IIIB Combustible Liquid; however, ignition is difficult.	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							

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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash	NIOSH/OSHA 30 mg/m ³ DMF/HIE/SA 75 mg/m ³ SA CF/PAPRDMF 150 mg/m ³ HIEF/SAT CF/PAPRTHIE/ SCBAF/SAF 200 mg/m ³ SA:PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape HIEF/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, mucos; lac, head, chest tight, wheeze, lar spasm, saliv, cyan anor, nau, vomit, abdom cramp, diarr, weak, twitch, para, gidd, 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
[Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 100 ppm SA* 250 ppm SA CF* 500 ppm SAT CF*/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; nau, vomit, colic, liver damage, enlarged liver; high BP, face flush, derm; in animals kidney, heart damage	Eye Skin Breath Swallow Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, CVS
[Dimethylformamide]						
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	Irrit eyes, skin, choking, chest pain, dysp, leth, nau, anoxia, convuls, liver inq, [card]	Eye Skin Breath Swallow Irr immed Water flush immed Resp support Medical attention immed	CNS, liver, GI tract, blood, resp sys, eyes, skin [In animals: tumors of the lungs, liver, blood vessels & intestines]
[1,1-Dimethylhydrazine]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. Prevent eye contact N.R. N.R. N.R.	NIOSH/OSHA 50 mg/m ³ DMF 125 mg/m ³ SA CF*/PAPRDMF 250 mg/m ³ HIEF/SCBAF/SAF 2000 mg/m ³ SAF:PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape HIEF/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys, stomach pain	Eye Skin Breath Swallow Irr prompt Wash regularly Resp support Medical attention immed	Eyes, resp sys, GI tract
[Dimethylphthalate]						

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		
Dimethyl sulfate (CH ₃) ₂ SO ₄ 77-78-1 WS8225000	Dimethyl ester of sulfuric acid; Dimethyl sulfate; 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% FLP 182°F IP ?	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				Sp Gr 1.33 Class IIIA Combustible Liquid			
Dinitolmide (NO ₂) ₂ C ₆ H ₃ (CH ₃)CONH ₂ 148-01-8 X54200000	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 FLP: NA IP: ?	VP: ? MLT: 381°F UEL: NA LEL: NA	None reported	Filter; none; Grav; II [#6060, Nuisance Dust (total)]
					Sp.Gr: ? Noncombustible Solid			
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% FLP 302°F IP 10.71 eV	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, HPLCA/VD; II(4) [#S214]
1597 56					Sp Gr 1.57 Combustible Solid			
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% FLP 302°F IP 10.43 eV	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, HPLCA/VD; II(4) [#S214]
1597 56					Sp Gr 1.56 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 6)	
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam ILJL Eyewash, Quick drench	NIOSH § SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, head; gidd, conj. photo, periorb edema, dysphonia, aphonia, dysphagia, productive cough, chest pain, dysp, cyan, vomit, diarr, dysuria, analgesia, fever, album, hema, eye, skin burns, delirium, [canc]	Eye Skin Breath Swallow	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, CNS [in animals: nasal & lung cancer]
[Dimethyl sulfate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Ing Con	Contact eczema; in animals: methemo, liver changes	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, liver, blood
[Dinitroimide]							
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 DM 10 mg/m ³ DMXSO ₂ /HE/SA 25 mg/m ³ SA CF/PAPRDM 50 mg/m ³ HEF/SAT CF/PAPRTHIE/ SCBAF/SAF § SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: HEF/SCBAE	Inh Abs Ing Con	Anoxia, cyan, vis dist, central scotomas, bad taste, burning mouth, dry throat, thirst, yellowing hair, eyes, skin, anemia, liver damage	Eye Skin Breath Swallow	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, blood, liver, CVS, CNS
[o-Dinitrobenzene]							
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 DM 10 mg/m ³ DMXSO ₂ /HE/SA 25 mg/m ³ SA CF/PAPRDM 50 mg/m ³ HEF/SAT CF/PAPRTHIE/ SCBAF/SAF § SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: HEF/SCBAE	Inh Abs Ing Con	Anoxia, cyan, vis dist, central scotomas, bad taste, burning mouth, dry throat, thirst, yellowing hair, eyes, skin, anemia, liver damage	Eye Skin Breath Swallow	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, blood, liver, CVS, CNS
[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 F.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% F.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/UV/D; II(4) [#S214]
1597 56					Sp Gr: 1.63 Combustible Solid			
Dinitro-o-cresol $CH_3C_6H_3(OH)(NO_2)_2$ 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% F.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/UV/D; II [#S168]
1598 53					Sp Gr: 1.1 (estimated) Noncombustible Solid			
Dinitrotoluene $C_7H_7CH_3(NO_2)_2$ 25321-14-6 XT1300000	Dinitrotoluiol, 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 F.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/ Tens; 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 $C_{34}H_{38}O_4$ 117-81-7 T10350000	DEHP, Di(2-Ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)- phthalate, Octyl phthalate [C ₈ H ₁₇ (COOCH ₂ CH(C ₂ H ₅)C ₆ H ₁₃) 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% F.P.(oc): 420°F IP: ?	VP: <0.01 mm FRZ: -56°F UEL: ? LEL(474°F): 0.3%	Nitrates; strong oxidizers, acids & alkalis	Filter; CS; GC/FID; II [#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: 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 DM 10 mg/m ³ DMXSO/H:ESA 25 mg/m ³ SA CF/PAPRDM 50 mg/m ³ H:EF/SAT CF/PAPRTH:EF/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP,ASCBA Escape: H:EF/SCBAE	Inh Abs Ing Con	Anoxia, cyan, vs dist, central scotomas, bad taste, burning mouth, dry throat, thirst, yellowing hair, eyes, skin, anemia, liver damage	Eye Skin Breath Swallow Irrimed Soap wash immed Resp support Medical attention immed	Eyes, skin, blood, liver, CVS, CNS
[p-Dinitrobenzene]						
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 DMF 5 mg/m ³ H:EF/SA CF/PAPRDM/ SCBAF/SAF § SCBAF PD,PP/SAF PD,PP,ASCBA Escape: H:EF/SCBAE	Inh Abs Ing Con	Sense of well being, head, fever, lass, profuse sweat, excess thirst, tach, hyperpnea, cough, short breath, coma	Eye Skin Breath Swallow Irrimed Soap wash immed Resp support Medical attention immed	CVS, endocrine sys
[Dinitro-o-cresol]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Quick drench	NIOSH § SCBAF PD,PP/SAF PD,PP,ASCBA Escape: GMFOVH:EF/SCBAE	Inh Abs Ing Con	Anoxia, cyan, anemia, jaun, repro effects; [canc]	Eye Skin Breath Swallow Irrimed Soap wash immed Resp support Medical attention immed	Blood, liver, CVS, repro sys [in animals: liver, skin & kidney tumors]
[Dinitrotoluene]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH § SCBAF PD,PP/SAF PD,PP,ASCBA Escape: H:EF/SCBAE	Inh Ing Con	Irrit eyes, muc memb, in animals: liver damage; terato effects; [canc]	Eye Breath Swallow Irrimed Resp support Medical attention immed	Eyes, resp sys, CNS, liver, repro sys, GI tract [in animals: 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 FLP, 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 FLP: 55°F IP: 9.13 eV	VP: 29 mm FRZ: 53°F UEL: 22% LEL: 2.0%	Strong oxidizers, decaborane, trimethyl aluminum	Char, CS, GC/FID; II [#1602]
1165-26	1 ppm = 3.66 mg/m ³				Sp Gr: 1.03 Class IB Flammable Liquid			
Dioxathion <chem>C6H10O4S2P3(OC2H5)3</chem> 78-34-2 TE3350000	Delnav®; p-Dioxane-2,3-diyl ethyl phosphorodithioate; Dioxane phosphate; 2,3-p-Dioxanethiol 3,3-bis- (O,O-diethyl phospho- dithioate); Nevadale®	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: 466.6 BP: ? Sol: Insoluble FLP: 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): 1.28 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 FLP: 235°F IP: 7.95 eV	VP: 0.005 mm MLT: 156°F UEL(311°F): 5.8% LEL(232°F): 0.6%	Oxidizers	Tenax GC, CCl, GC/FID; II [#2530, Biphenyl]
	1 ppm = 6.41 mg/m ³				Sp Gr: 1.04 Combustible Solid			
Diphenylamine <chem>(C6H5)2NH</chem> 122-38-4 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, faint odor. [fungicide]	MW: 169.2 BP: 578°F Sol: 0.03% FLP: 307°F IP: 7.40 eV	VP(227°F): 1 mm MLT: 127°F UEL: ? LEL: ?	Oxidizers, hexachloro- malamine, trichloro- malamine	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:	Prevent skin contact	NIOSH	Inh	Irritates eyes, skin, nose	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	& SCBAF PD PP/SAF PD, PP ASCBA	Abs	throat, drows, head, nau,	Skin	liver, kidneys
Wash skin:	When contam	Escape GMFOV/SCBAE	Ing	vomit, liver damage, kidney	Breath	[in animals: lung,
Remove:	When wet (flam)		Con	failure, [card]	Swallow	liver & nasal cavity tumors]
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Dioxane]						
Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin; head,	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact		Abs	gidd, vert, weak; rhin,	Skin	CNS, CVS, blood chol
Wash skin:	When contam		Ing	chest tight; miosis; nau,	Breath:	
Remove:	When wet or contam		Con	vomit, abdom cramps, diarr,	Swallow:	
Change:	N.R.			saliv; musc fasc; conf,		
Provide:	Eyewash, Quick drench			drow		
[Dioxathion]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates eyes, throat,	Eye	Eyes, resp sys.
Eyes:	Prevent eye contact	10 mg/m ³ CCR/ODM/SA	Abs	head, nau, rig, numb	Skin	liver, CNS
Wash skin:	When contam	25 mg/m ³ SA:CF*/PAPROVDM*	Ing	limbs, liver damage	Breath	
Remove:	When wet or contam	50 mg/m ³ CCRFOVH/E/GMFOVH/E/	Con		Swallow	
Change:	Daily	PAPRTOVH/E*/SCBAF/SAF				
Provide:	Eyewash (molt), Quick drench (molt)	100 mg/m ³ SAF PD, PP & SCBAF PD PP/SAF PD, PP ASCBA				
[Diphenyl]						
Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin, muc memb;	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact		Abs	eczema; tacar, hypertension;	Skin:	CVS, blood, bladder,
Wash skin:	Daily		Ing	cough, sneez; methemo; incr	Breath:	resp sys
Remove:	When wet or contam		Con	BP, heart rate; prot, hema,	Swallow:	
Change:	Daily			bladder inj;		
[Diphenylamine]						
In animals: terato effects						

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>CH3OC(CH2CH2O)2CH3</chem> 34590-94-8 JM1575000	Dipropylene glycol monomethyl ether Dowanol® 50B 1 ppm = 6.16 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: 148.2 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): 1.9%	Strong oxidizers	Char, CS, GC/FID II(2) [#569]
Dipropyl ketone <chem>(CH3CH2CH2)2CO</chem> 123-19-3 MJ5800000 2710-26	Butyrone, DPK, 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]
Diquat (Diquat dibromide) <chem>C11H14N4Br2</chem> 85-00-7 JM5890000 2781-55 (solid) 2782-28 (liquid)	Diquat dibromide; 1,1'-Ethylene-2,2'- bipyridylium dibromide [Note: Diquat is a cation (C ₁₁ H ₁₄ N ₄) ²⁺ , 1,1'- Ethylene-2,2'-bipyridyl- ium ion). 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: 835°F UEL: ? LEL: ?	Alkalis, UV light, basic solutions [Note: Concentrated diquat solutions corrode aluminum.]	None available
Disulfiram <chem>[(C6H4)2NCS]2S</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: 150°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	Inh	Irritates nose, throat;	Eye	Eyes, resp sys.
Eyes:	N.R.	500 ppm: SA/SCBAF	Abs	weak, headache	Skin	CNS
Wash skin:	N.R.	5 SCBAF PD PP/SAF PD PP ASCBA	Inh		Breath	
Remove:	N.R.	Escape GMFOVHE/SCBAE	ing		Swallow	
Change:	N.R.		Con			

[Dipropylene glycol methyl ether]

Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin; CNS	Eye:	Eyes, skin, CNS,
Eyes:	Prevent eye contact		ing	depress, dizziness, somnolence,	Skin:	liver
Wash skin:	Daily		Con	breath;	Breath:	
Remove:	When wet or contain			in animals: liver inj; narco	Swallow:	
Change:	N.R.					

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[Dipropyl ketone]

Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin, muc memb,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	resp sys; rhin, epis; skin	Skin:	kidneys, liver, CNS
Wash skin:	When contam		ing	burns; nau, vomit, diar,	Breath:	
Remove:	When wet or contain		Con	mal; kidney, liver inj;	Swallow:	
Change:	Daily			cough, chest pain, dysp,		
Provide:	Quick drench			pulm edema; tremor, convuls;		
				delayed healing of wounds		

[Diquat (Diquat bromide)]

Skin:	Prevent skin contact	TBAL	Inh	Irritates eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		ing	sens derm; lass, fig,	Skin:	CNS, PNS, liver
Wash skin:	When contam		Con	tremor, restless, head,	Breath:	
Remove:	When wet or contain			dizziness; metallic taste;	Swallow:	
Change:	Daily			perit 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 ₂ H ₅ O],P(S)(CH ₂) ₂ SC ₂ H 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: ?	Alkalis	None available
2753 55	1 ppm = 11.41 mg/m³							
2,6-Di-tert-butyl- p-cresol [C(CH ₃) ₃] ₂ CH ₂ C ₆ H ₄ OH 128-37-0 GD7875000	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 III Combustible Liquid	VP: 0.01 mm MLT: 156°F UEL: ? LEL: ?	Oxidizers	Sig el; Methanol/ CS; GC/FID; E(1) [P&CAM #226]
Diuron $C_6H_3Cl_2NHCON(CH_3)_2$ 330-54-1 YS8925000	3-(3,4-Dichlorophenyl)- 1,1-dimethylurea; Direx®; Karmex®	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 Solid	VP: 0.000000002 mm MLT: 316°F UEL: NA LEL: NA	Strong acids	Filter; none; Grav; III [#0500, Nuisance Dust (total)]
Divinyl benzene $C_8H_8(HC=CH_2)_2$ 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% FLP(oc): 169°F IP: ? Sp.Gr: 0.93 Class IIIA Combustible Liquid	VP: 0.7 mm FRZ: -68°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: 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, nau, vomit, abdom cramps, diarr, saliv; head, gidd, verti, weak; run, 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	Eye, skin, resp sys, CNS, CVS, blood chol
[Disulfoton]						
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; in animals: decr growth rate, incr liver weight	Eye: Skin: Breath: Swallow: Irr Immed Soap wash Fresh air Medical attention Immed	Eye, skin
[2,6-Di-tert-butyl-p-cresol]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	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	Eye, skin, resp sys, blood
[Diuron]						
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, resp sys; skin burns; in animals: CNS depress	Eye: Skin: Breath: Swallow: Irr Immed Soap flush Immed Resp support Medical attention Immed	Eye, skin, resp sys, CNS
[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, FLP, 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 1 ppm = 8.41 mg/m ³	NIOSH C 0.8 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 16°F.]	MW: 202.4 BP: 441-478°F Sol: Insoluble FLP (oc): 190°F IP: ? Sp. Gr: 0.88 Class IIIA Combustible Liquid	VP (77°F): 3 mm FRZ: 15°F UEL: ? LEL: ?	Strong oxidizers & acids, strong bases, reducing agents, alkali metals, water, steam	None available
Emery Al_2O_3 12415-34-8 (emery) 1302-74-8 (corundum) JY3000000 (emery) GN0231000 (corundum)	Aluminum oxide, Aluminum trioxide, Corundum, Impure corundum, Natural 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) 8 mg/m ³ (resp)	N.D.	Odorless, white, crystalline powder.	See α-Alumina for physical & chemical properties.		Filter; none; Grav; II [Reference Dust: #0500 (total), #0600 (resp)]	
Endosulfan $\text{C}_{10}\text{H}_{16}\text{Cl}_2\text{O}_6\text{S}$ 115-29-7 RB9275000	Benzoepin; Endosulphan; 6,7,8,9,10-Hexachloro- 1,5,8a,6,9,9a-hexahydro- 8,9-methano-2,4,5-benzo- dioxathiepin-3-oxide; Thiodant	NIOSH 6.1 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: 408.9 BP: Decomposes Sol: 0.00001% FLP: NA IP: ? Sp. Gr: 1.74 Noncombustible Solid, but may be dissolved in flammable liquids.	VP (77°F): 0.00001 mm MLT: 223°F UEL: NA LEL: NA	Alkali, 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								
Endrin $\text{C}_{12}\text{H}_8\text{Cl}_4\text{O}$ 72-20-8 K01575000	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 FIP: NA IP: ? Sp. Gr: 1.70 Noncombustible Solid, but may be dissolved in flammable liquids	VP: Low MLT: 392°F (Decomposes) UEL: NA LEL: NA	Strong oxidizers, strong acids, paraffins [Note: May emit hydrogen chloride & phosgene when heated or burned.]	Filter/ Chrom-102, Toluene, GC/ECD, II [#5519]
2761 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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eye, skin, resp sys,
Eyes:	Prevent eye contact	8 ppm: CCROV/SA	ing	cough; dizz, dysp, weak,	Skin:	CNS, blood
Wash skin:	When contam	12.8 ppm: SA:CF/PAPROV	Con	conf, cyan; abdom pain,	Breath:	
Remove:	When wet or contam	28 ppm: CCRFOV/GMFOV/PAPRTOV/		neu; skin sens	Swallow:	
Change:	N.R.	SCBAF/SAF				
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:	Eye, skin, resp sys
Eyes:	N.R.		ing		Breath:	
Wash skin:	N.R.		Con		Swallow:	
Remove:	N.R.					
Change:	N.R.					
[Zinc]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit skin; neu, conf,	Eye:	Skin, CNS, liver,
Eyes:	Prevent eye contact		Abs	agitation, flushing, dry	Skin:	kidneys, repro sys
Wash skin:	When contam		ing	mouth, tremor, convuls,	Breath:	
Remove:	When wet or contam		Con	head;	Swallow:	
Change:	Daily			In animals: kidney, liver		
Provide:	Eyewash, Quick drench			inj; decr testis weight		
[Endosulfan]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Epilep convuls, stupor,	Eye:	CNS, liver
Eyes:	Prevent eye contact	1 mg/m ³ : CCROVDMFw/SA	Abs	head, dizz, abdom	Skin:	
Wash skin:	When contam	2 mg/m ³ : SA:CF/PAPROVDMFw/	ing	discomfort, neu, vomit,	Breath:	
Remove:	When wet or contam	CCRFOVHIE/GMFOVHIE/	Con	incom, aggressiveness,	Swallow:	
Change:	Daily	SCBAF/SAF		conf, leth, weak, anor,		
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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Ethrane CHF ₃ OCF ₂ CHClF 13538-16-9 KN6500000	2-Chloro-1-(difluoro- methoxy)-1,1,2-trifluoro- ethane; 2-Chloro-1,1,2-trifluoro- ethyl difluoromethyl ether; Ethrane® 1 ppm = 7.67 mg/m ³	NIOSH C 2 ppm (15.1 mg/m ³) (60-min) [Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Clear, colorless liquid with a mild, sweet odor. [Inhalation anesthetic]	MW: 184.6 BP: 134°F Sol: Low FLP: NA IP: ? Sp. Gr (77°F): 1.52 Noncombustible Liquid	VP: 175 mm FRZ: ? UEL: NA LEL: NA	None reported	Char (2); CS; GC/FID; OSHA [#29]
Epichlorohydrin C ₂ H ₃ OCI 106-89-8 TX4900000 2023-30	1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide, gamma-Chloropropylene oxide 1 ppm = 3.85 mg/m ³	NIOSH Ca See Appendix A OSHA† 5 ppm (19 mg/m ³) [skin]	Ca [75 ppm]	Colorless liquid with a slightly irritating, chloroform-like odor	MW 92.5 BP 242°F Sol 7% FLP 93°F IP 10.60 eV Sp Gr 1.18 Class IC Flammable Liquid	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]
EPN C ₈ H ₁₀ O ₂ NSP 2104-64-5 TB1925000	Ethyl p-nitrophenyl benzenethionophosphonate, O-Ethyl O-(4-nitrophenyl) phenylphosphonothioate [C ₈ H ₉ O(C ₆ H ₄)P(S)OC ₂ H ₅ NO ₂]	NIOSH/OSHA 0.5 mg/m ³ [skin]	5 mg/m ³	Yellow solid with an aromatic odor (pesticide) [Note: A brown liquid above 97°F.]	MW 323.3 BP ? Sol Insoluble FLP NA IP ? Sp Gr (77°F) 1.27 Noncombustible Solid	VP (212°F): 0.0003 mm MLT 97°F UEL NA LEL NA	Strong oxidizers	Filter, Isocane; GC/FPD; III [#5012]
Ethanolamine NH ₂ CH ₂ CH ₂ OH 141-43-5 KJ5775000 2491-60	2-Aminoethanol; β-Aminoethyl alcohol; Ethylolamine; 2-Hydroxyethylamine; Monoethanolamine 1 ppm = 2.54 mg/m ³	NIOSH 3 ppm (8 mg/m ³) ST 6 ppm (15 mg/m ³) OSHA† 3 ppm (8 mg/m ³)	30 ppm	Colorless, viscous liquid or solid (below 51°F) with an unpleasant, ammonia-like odor	MW 61.1 BP 339°F Sol Miscible FLP 186°F IP 8.96 eV Sp Gr 1.02 Class IIIA Combustible Liquid	VP: 0.4 mm FRZ 51°F UEL: 23.6% LEL (284°F): 3.0%	Strong oxidizers, strong acids, iron [Note: May attack copper, brass, and rubber.]	Sl gel, Methanol/ Water; GC/FID; III [#2007, Amino- ethanol Compounds]

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 8)
Skin:	N.R.	TBAL	Inh	Irrit eyes; CNS depres,	Eye:	Ir 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	
[Etidurane]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin with deep	Eye	Ir 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 (flamng)		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	Ir immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 mg/m ³ : SA/SCBAF	Abs	lac, rin, 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/SCBAE	Con	seiz, 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	Ir 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 No.	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 3,5'- 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.: 348°F IP: ? Sp.Gr: 1.22 Class III 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: ? Sp Gr 0.93 Class II Combustible Liquid	VP: 4 mm FRZ: -130°F UEL(200°F): 15.6% LEL(200°F): 1.7%	Strong oxidizers	Char/ CH ₂ Cl, 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 liquid with a mild odor	MW 132.2 BP 313°F Sol 23% F.P. 124°F IP: ? Sp Gr 0.96 Class II Combustible Liquid	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)	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 Sp.Gr: 0.90 Class IB Flammable Liquid	VP: 73 mm FRZ: -117°F UEL: 11.5% LEL: 2.0%	Nitrates, strong oxidizers, alkalis & acids	Char, CS, GC/FID; III [#349]
1173 26	1 ppm = 3.66 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 When wet or contam Daily Eyewash, Quick drench	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	Eyes: Skin: Breath: Swallow: Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Biblon]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 6 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: irrit eyes, resp sys; blood changes, liver, kidney, lung damage, repro, terato effects	Eyes: Skin: Breath: Swallow: Irrmed Water flush prompt Resp support Medical attention Irrmed	Eyes, resp sys, blood, kidneys, liver, repro sys, hemato sys
[2-Ethoxyethanol]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 6 ppm: CCROV*/SA* 12.5 ppm: SA:CF*/PAPROV* 25 ppm: CCROV/GMFOV/PAPROV*/ SCBAF/SAF 500 ppm: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, vomit, kidney damage, para, in animals: repro, terato effects	Eyes: Skin: Breath: Swallow: Irrmed Water flush prompt Resp support Medical attention Irrmed	Eyes, resp sys, GI tract, repro sys, hemato sys
[2-Ethoxyethyl acetate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (Rattn) N.R.	NIOSH/OSHA 2000 ppm: SA:CF*/PAPROV*/CCROV/ GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, narco, derm	Eyes: Skin: Breath: Swallow: Irrmed Water flush prompt Resp support Medical attention Irrmed	Eyes, skin, resp sys
[Ethyl acetate]						

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 F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Ethyl acrylate $\text{CH}_3\text{CHCHCOOC}_2\text{H}_5$ 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% F.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; II [#1450, Esters I]
1917 26 (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 F.P.: 55°F IP: 9.51 eV	VP: 44 mm FRZ: -123°F UEL: 19% LEL: 3.3%	Strong oxidizers, potassium dichromate, bromine pentafluoride, acetyl bromide, acetyl chloride, platinum, sodium	Char; 2-Butanol/ CS; GC/FID; II [#1460, 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)	800 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 F.P.: 1°F IP: 8.86 eV RQSD: 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	Si gel; H ₂ SO ₄ ; GC/FID; III(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, Phenyltoluene	NIOSH 100 ppm (435 mg/m³) ST 125 ppm (545 mg/m³) OSHA† 100 ppm (435 mg/m³)	800 ppm [LEL]	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 277°F Sol: 0.01% F.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)
Skln:	Prevent skln contact	NIOSH				
Eyes:	Prevent eye contact	§ SCBAF: PD, PP/SAF: PD, PP/ASCBA	Inh	Irrit eyes, skln, resp sys.	Eye	Eyes, skln, resp sys
Wash skln:	When contam	Escape: GMFOV/SCBAE	Abs	[carc]	Skln	[In animals:
Remove:	When wet (flamrn)		Ing		Breath	tumors of the
Change:	N.R.		Con		Swallow	forestomach]
Provide:	Eyewash, Quick drench					
[Ethyl acrylate]						
Skln:	Prevent skln contact	NIOSH/OSHA				
Eyes:	Prevent eye contact	3300 ppm: SA/SCBAF	Inh	Irrit eyes, skln, nose;	Eye:	Eyes, skln, resp sys,
Wash skln:	When contam	§ SCBAF: PD, PP/SAF: PD, PP/ASCBA	Ing	head, drow, flg, narco;	Skln:	CNS, liver, blood,
Remove:	When wet (flamrn)	Escape: SCBAE	Con	cough; liver damage;	Breath:	repro sys
Change:	N.R.			anemia; repro, terato	Swallow:	
				effects		
[Ethyl alcohol]						
Skln:	Prevent skln contact (liq)	NIOSH/OSHA				
Eyes:	Prevent eye contact (liq)	250 ppm: SA, CF/PAPRS†	Inh	Irrit eyes, skln, resp	Eye	Eyes, skln, resp sys
Wash skln:	When contam (liq)	500 ppm: CCRFS/GMFS/SCBAF/SAF	Abs	sys, skln burns, derm	Skln	
Remove:	When wet or contam (liq)	600 ppm: SAF: PD, PP	(liq)			
Change:	N.R.	§ SCBAF: PD, PP/SAF: PD, PP/ASCBA	Ing		Breath	
Provide:	Eyewash (liq), Quick drench (liq)	Escape: GMFS/SCBAE	Con		Swallow	
			(liq)			
[Ethylamine]						
Skln:	Prevent skln contact	NIOSH/OSHA				
Eyes:	Prevent eye contact	800 ppm: CCRDV*/GMFOV/PAPROV*/	Inh	Irrit eyes, skln, muc memb,	Eye	Eyes, skln, resp sys,
Wash skln:	When contam	SA*/SCBAF	Ing	head, derm, narco, coma	Skln	CNS
Remove:	When wet (flamrn)	§ SCBAF: PD, PP/SAF: PD, PP/ASCBA	Con		Breath	
Change:	N.R.	Escape: GMFOV/SCBAE			Swallow:	
[Ethyl benzene]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWAs 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 (800 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)	3000 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 dichlorohydrin <chem>CH2ClCH2OH</chem> 107-07-3 KK0875000	2-Chloroethanol, 2-Chloroethyl alcohol, Ethylene chlorhydrin	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(perl.), 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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	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 Irrimmed 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/TA* 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 Irrimmed 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 (flam) N.R.	OSHA 3600 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 Irrimmed (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, vert, inco, numb, vis dist, head, thirst, delirium, low BP, collapse, shock, coma, liver, kidney damage	Eye Skin Breath Swallow Irrimmed Water flush immed Resp support Medical attention immed	Resp sys, liver, kidneys, CNS, CVS, eyes
[Ethylene dichloride]						

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 F.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 F.P.: 93°F IP: 8.60 eV	VP: 11 mm FRZ: 47°F UEL(212°F): 12% LEL(212°F): 2.9%	Strong acids & oxidizers, carbon tetrachloride & other chlorinated organic compounds, carbon disulfide [Note: Corrosive to metals.]	XAD-2; DMF; HPLC/UV; II [#2540]
1804 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 Ce See Appendix A 0.045 ppm C 0.13 ppm [15-min] OSHA 20 ppm C 30 ppm 50 ppm [5-min max peak]	Ce [100 ppm]	Colorless liquid or solid (below 50°F) with a sweet odor [fumigant]	MW: 187.9 BP: 268°F Sol: 0.4% F.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/EC; II [#1008]
1605 55	1 ppm = 7.81 mg/m ³				Sp.Gr: 2.17 Noncombustible Liquid			
Ethylene dichloride <chem>ClCH2CH2Cl</chem> 107-06-2 KU0525000	1,2-Dichloroethane; Ethylene chloride; Glycol dichloride	NIOSH Ce See Appendix A, C (Chloroethanes) 1 ppm (4 mg/m ³) ST 2 ppm (8 mg/m ³) OSHA† 80 ppm C 100 ppm 200 ppm (5-min max peak in any 3 hrs)	Ce [80 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% F.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; II [#1003, Halo- genated 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-Ethenediol; Glycol; Glycol alcohol; Monoethylene glycol	NIOSH See Appendix D OSHA† none	N.D.	Clear, colorless, viscous, odorless liquid. [antifreeze] [Note: A solid below 9°F.]	MW: 62.1 BP: 388°F Sol: Miscible F.P.: 232°F IP: ?	VP: 6.66 mm FRZ: 9°F UEL: 15.3% LEL: 3.2%	Strong oxidizers, chromium trioxide, potassium permanganate, 2-Propenol/ sodium peroxide [Note: Hygroscopic (i.e., absorbs moisture from the air).]	Flam/ SI gal; GC/FID; II [#5500]
	1 ppm = 2.88 mg/m ³				Sp.Gr: 1.11 Class III 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 6)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit nose, resp sys,	Eye	Skin, resp sys,
Eyes:	Prevent eye contact	250 ppm: SA CF/PAPRS*	Abs	sens derm, asthma, liver,	Skin	liver, kidneys
Wash skin:	When contam/Daily	500 ppm: CCRFS/GMFS/PAPRTS*/	Inh	kidney damage	Breath	
Remove:	When wet (flam)	SCBAF/SAF	Ing		Swallow	
Change:	Daily	1000 ppm: SAF PD, PP	Con			
Provide:	Eyewash (>8%), Quick drench	5 SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFS/SCBAE				
[Ethylenediamine]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 SCBAF PD, PP/SAF PD, PP ASCBA	Abs	derm with vasc, liver,	Skin	liver, kidneys,
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh	heart, spleen, kidney	Breath	repro sys
Remove:	When wet or contam		Ing	damage; repro effects;	Swallow	[in animals:
Change:	N.R.		Con	[canc]		skin & lung
Provide:	Eyewash, Quick drench					tumors]
[Ethylene dibromide]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, corneal opac;	Eye	Eyes, skin, kidneys,
Eyes:	Prevent eye contact	5 SCBAF PD, PP/SAF PD, PP ASCBA	Abs	CNS depres, nau, vomit,	Skin	liver, CNS, CVS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh	derm, liver, kidney,	Breath	[in animals:
Remove:	When wet (flam)		Ing	CNS damage; [canc]	Swallow	fore stomach,
Change:	N.R.		Con			mammary gland &
Provide:	Eyewash, Quick drench					circulatory sys
						cancer]
[Ethylene dichloride]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	throat; nau, vomit, abdom	Skin	CNS
Wash skin:	When contam		Con	pain, weak; dizz, stupor,	Breath:	
Remove:	When wet or contam			convuls, CNS depres; skin	Swallow:	
Change:	Daily			sens		
[Ethylene glycol]						

Structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	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)
Ethylene glycol dinitrate <chem>O2NOCH2CH2ONOO2</chem> 628-96-6 KW5600000	EGDN; 1,2-Ethanediol dinitrate; Ethylene dinitrate; Ethylene nitrate; Glycol dinitrate; Nitroglycol 1 ppm = 6.12 mg/m ³	NIOSH STO 1 mg/m ³ [skin] OSHA† C 8.2 ppm (1 mg/m ³) [skin]	78 mg/m ³	Colorless to yellow, oily, odorless liquid. [Note: An explo- sive ingredient (80-85%) in dynamite along with nitrogly- cerine (40-20%).]	MW: 152.1 BP: 387°F Sol: Insoluble FLP: 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, II [#2507]
Ethylenimine <chem>C2H5N</chem> 151-56-4 KX5075000	Aminoethylene, Azirane, Aziridine, Dimethylenimine, Dimethylenimine, Ethylenimine, Ethylenimine 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 FLP: 12°F IP: 9.20 eV Sp. Gr: 0.83 Class IB Flammable Liquid	VP: 160 mm FRZ: -97°F UEL: 84.8% LEL: 3.3% Polymerizes explosively in presence of acids [Note: Explosive silver derivatives may be formed with silver alloys (e.g., silver solder).]	Sub: CHCL, HPLC/UV, II [P&CAM #300]
Ethylene oxide <chem>C2H4O</chem> 75-21-6 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 FLP: NA (Gas) -20°F (Liq) IP: 10.56 eV RQSD: 1.48 Sp. Gr: 0.82 (Liquid at 50°F) Flammable Gas Class IA Flammable Liquid	VP: 1.48 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, II [#1614]
Ethylene thiourea <chem>C2H4N2S</chem> 98-45-7 N19425000	1,3-Ethylene-2-thiourea; N,N-Ethylenethiourea; ETU; 2-Imidazolidine-2-thione 1 ppm = 1.83 mg/m ³	NIOSH Ca See Appendix A Use encapsulated form. OSHA none	Ca [N.D.]	White to pale-green, crystalline solid with a faint, amine odor. [Note: Used as an accelerator in the curing of poly- chloroprenes & other elastomers.]	MW: 102.2 BP: 446-486°F Sol: 85°F: 2% FLP: 486°F IP: 8.18 eV Sp. Gr: 7 Combustible Solid	VP: 18 mm MLT: 582°F UEL: ? LEL: ? Acrolin	Fiber, water, Vib; II [#8011]

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:	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 (flamem)	5 mg/m ³ SAT CF*/SCBAF/SAF	Inh	anxius, meltemo, delirium,	Swallow:	
Change:	Daily	75 mg/m ³ SAF:PD,PP	Con	CNS depres, mri skin,		
Provide:	Quick drench	§ SCBAF PD,PP/SAF PD,PP ASCBA		in animals: anemia,		
		Escape: GMFOVME/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	Inh	dizz, pulm edema, liver,	Breath:	kidneys
Remove:	When wet or contam		Inh	kidney damage, eye burns,	Swallow:	[in animals:
Change:	Daily		Con	skin sens, [canc]		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	Inh	throat, peculiar taste,	Skin	liver, CNS, blood,
Wash skin:	When contam (liq)	§ SCBAF PD,PP/SAF PD,PP ASCBA	Inh	head, nau, vomit, diarr,	Breath:	kidneys, repro sys
Remove:	When wet (flamem)	Escape: GMFS*/SCBAE	Con	dysp, cyan, pulm edema,	Swallow:	[in animals: cancer,
Change:	N.R.			drow, inco EKG abnor, eye,		leukemia]
Provide:	Quick drench (liq)			skin burns (liq or high		
				vap conc), liq, frostbite,		
				repro effects; [canc],		
				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	Inh	in animals: thickening of	Skin	repro sys
Wash skin:	When contam/Daily	Escape: GMFOVME/SCBAE	Inh	the skin; goiter; terato	Breath:	thyroid & lymphatic
Remove:	When wet or contam		Con	effects; [canc]	Swallow:	sys tumors]
Change:	Daily					
[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 36.0% 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 [#1462]
1190 26	1 ppm = 3.08 mg/m³				Sp Gr 0.92 Class IB Flammable Liquid			
Ethylidene norbornene C_7H_{12} 18219-75-3 RB9450000	ENB, 5-Ethylidenecyclo(2.2.1)- hept-2-ene, 5-Ethylidene-2-norbornene [Note: Due to its reactivity, ENB may be stabilized with tert-butyl catechol.]	NIOSH C 5 ppm (25 mg/m³) OSHA† none	N.D.	Colorless to white liquid with a turpentine-like odor.	MW: 120.2 BP: 298°F Sol: ? Fl.P(ec): 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; HCHOCE; GC/FPD; III [#2842]
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 6)
Skin:	Prevent skin contact	OSHA 1900 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF § SCBAF PD,PP/SAF PD,PP,ASCBA Escape GMFOV/SCBAE	Inh	Irrit eyes, skin, upper	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		ing	resp sys, dizz, drow, head,	Skin	CNS
Wash skin:	N.R.		Con	excited, narco, nau, vomit	Breath	
Remove:	When wet (flamm)				Swallow:	
Change:	N.R.				Immed Water wash Resp support Medical attention immed	
[Ethyl ether]						
Skin:	Prevent skin contact	NIOSH/OSHA 1500 ppm: SA:CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP,ASCBA Escape GMFOV/SCBAE	Inh	Irrit eyes, upper resp	Eye	Eyes, resp sys,
Eyes:	Prevent eye contact		ing	sys.	Skin	CNS
Wash skin:	When contam		Con	in animals: narco	Breath	
Remove:	When wet (flamm)				Swallow:	
Change:	N.R.				Immed Water flush Resp support Medical attention immed	
[Ethyl formate]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ab	throat; head; cough, dysp;	Skin:	CNS, liver, kidneys,
Wash skin:	Daily		ing	nau, vomit; olfactory,	Breath:	urogenital sys, bone
Remove:	When wet or contam		Con	taste changes; chemical pneu (aspir 1q); in animals: liver, kidney, urogenital inj; bone marrow effects	Swallow:	marrow
Change:	N.R.				Immed Soap wash Resp support Medical attention immed	
[Ethylidene norbornene]						
Skin:	Prevent skin contact	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA,CF/PAPROV 25 ppm: CCRFOV/GMFOV/SAT,CF/ PAPROV/SCBAF/SAF 500 ppm: SA,PD,PP § SCBAF PD,PP/SAF PD,PP,ASCBA Escape GMFOV/SCBAE	Inh	Irrit muc memb, head, nau,	Eye	Eyes, resp sys,
Eyes:	Prevent eye contact		ing	in animals: unco, weak,	Skin	liver, kidneys,
Wash skin:	When contam		Con	liver, kidney damage, damage, cyan, narco	Breath	blood
Remove:	When wet (flamm)				Swallow	
Change:	N.R.				Immed Soap wash Resp support Medical attention immed	
[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 F.P., IP, Sp. Gr., Flammability	VP, FRZ UEL, LEL		
N-Ethylmorpholine $C_4H_9ONCH_2CH_3$ 100-74-3 QE4025000	4-Ethylmorpholine 1 ppm = 4.79 mg/m ³	NIOSH 5 ppm (23 mg/m ³) [skin] OSHA† 20 ppm (84 mg/m ³) [skin]	100 ppm	Colorless liquid with an ammonia- like odor	MW 115.2 BP 281°F Sol: Miscible F.P.(oc) 90°F IP ? Sp Gr: 0.90 Class IC Flammable Liquid	VP 6 mm FRZ -81°F UEL ? LEL ?	Strong acids, strong oxidizers	Si gel, H ₂ SO ₄ , GC/FID, II(3) [#S145]
Ethyl silicate $(C_2H_5)_4SiO_4$ 76-10-4 VV9450000 1292-29	Ethyl orthosilicate, Ethyl silicate (condensed), Tetraethoxysilane, Tetraethyl orthosilicate, Tetraethyl silicate 1 ppm = 8.66 mg/m ³	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 F.P. 99°F IP 9.77 eV Sp Gr: 0.93 Class IC Flammable Liquid	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) [#S254]
Penamphos $C_{13}H_{21}NO_3P$ 22224-92-6 TB3675000	Ethyl 3-methyl-4-(methyl- thio)phenyl-(1-methyl- ethyl)phosphorimidate, Namscur® Phenamphos	NIOSH 0.1 mg/m ³ [skin] OSHA† none	N.D.	Off-white to tan, waxy solid. [Insecticide] [Note: Found commercially as a granular ingredi- ent (5-15%) or in an emulsifiable concentrate (400 g/l).]	MW: 303.4 BP: ? Sol: 0.03% F.P.: ? IP: ? Sp.Gr: 1.14	VP: 0.00005 mm MLT: 121°F UEL: ? LEL: ?	None reported [Note: May hydrolyze under alkaline conditions.]	None available
Fenathiothion $C_{11}H_{11}O_2PS_2$ 115-90-2 TF3880000	Desant®; O,O-Diethyl O-(p-methyl- sulfinyl)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% F.P.: ? IP: ? Sp.Gr: 1.20 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Alkali	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, resp sys
Eyes:	Prevent eye contact	50 ppm: CCRGV/SA*	Abs	vis dist, corn edema,	Skin	
Wash skin:	When contam	100 ppm: SA, CF*/PAPROV*/CCRFOV/ GMFOV/SCBAF/SAF	Ing	blue-gray vision, colored	Breath	
Remove:	When wet (flam)	§ SCBAF PD PP/SAF PD PP ASCBA	Con	halos	Swallow	
Change:	N.R.	Escape: GMFOV/SCBAE				
Provide:	Eyewash (>18%), Quick drench					
[N-Ethylmorpholine]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose	Eye	Eyes, resp sys
Eyes:	Prevent eye contact	100 ppm: SA*	Ing	in animals: lac, dysp	Skin	Eyes
Wash skin:	When contam	250 ppm: SA, CF*	Con	pulm edema, tremor, narco,	Breath	liver, kidneys,
Remove:	When wet (flam)	500 ppm: SCBAF/SAF		liver, kidney damage,	Swallow	blood, skin
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	vert, weak; rhin, chest	Breath:	
Remove:	When wet or contam		Con	tight; blurred vision,	Swallow:	
Change:	Daily			nausea, card irreg, musc		
Provide:	Quick drench			fasc; dysp		
[Ferriamphos]						
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, vert, weak;	Breath:	
Remove:	When wet or contam		Con	rhin, chest tight; blurred	Swallow:	
Change:	N.R.			vision, nausea, card		
Provide:	Eyewash, Quick drench			irreg, musc fasc; dysp		
[Fenvalothion]						

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		
Fenthion $C_{10}H_{14}O_3PS$ 55-38-9 TF9625000	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] 1 ppm = 11.67 mg/m 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: 0.008% Fl.P: NA IP: ? Sp.Gr: 1.25 Noncombustible Liquid	VP: 0.00003 mm FRZ: 43°F UEL: NA LEL: NA	Oxidizers	None available
Ferbam [(CH ₃) ₂ NCS] ₂ Fe 14484-64-1 NO8750000	tris(Dimethylthio- carbamato)iron, Femic dimethyl dithio- carbamate	NIOSH 10 mg/m ³ OSHA† 15 mg/m ³	500 mg/m ³	Dark brown to black, odorless solid [fungicide]	MW 416.5 BP Decomposes Sol 0.01% Fl.P ? IP. 7.72 eV Sp.Gr ? Combustible Solid	VP: 0 mm (approx) MLT: >356°F (Decomposes) UEL ? LEL ? MEC: 66 g/m ³	Strong oxidizers, moisture	None available
Ferrovanadium dust FeV 12604-58-9 LK2900000	Ferrovanadium	NIOSH* 1 mg/m ³ ST 3 mg/m ³ [*Note: The REL also applies to Vanadium metal and Vanadium carbide.] OSHA† 1 mg/m ³	500 mg/m ³	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 Sp.Gr ? Metal: Noncombustible Solid, but dust may be an explosion hazard.	VP 0 mm (approx) MLT 2696- 2768°F UEL: NA LEL: NA MEC: 1.3 g/m ³	Strong oxidizers	Filter; Acid; AAS; OSHA [#ID121 #ID125G]
Fibrous glass dust LK3651000	Fiber glass®, Fiberglass, Glass fibers, Glass wool [Note: Usually produced from borosilicate & low alkali silicate glasses.]	NIOSH 3 fibers/cm ³ (fibers ≤ 3.5 µm in diameter & ≥ 10 µm in length) 5 mg/m ³ (total) OSHA 15 mg/m ³ (total) 5 mg/m ³ (resp)	N.D.	Typically, glass filaments >3 µm in diameter or glass "wool" with diameters down to 0.06 µm & >1 µm in length.	MW: NA BP: NA Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.5 Noncombustible Fibers	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; IR [#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 6)
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; muscle fascic, dysp	Eye: Skin: Breath: Swallow: Irr Irrimed 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*HE*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 Irrimed 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*PAPRD* 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, pneumia	Eye Breath Irr Irrimed Resp support	Eyes, resp sys
[Ferrovanadium dust]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	NIOSH 6X REL: D 10X REL: DXSQ/HE/SA 25X REL: SA CF/PAPRD 60X 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 Irrimed 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, FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Fluorine F_2 7782-41-4 LM6475000	Fluorine-19	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 F/P: NA IP: 15.70 eV	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
9192-25 (cryogenic liquid) 1045-20 (compressed)	1 ppm = 1.58 mg/m ³				RGasD: 1.31 Nonflammable Gas, but an extremely strong oxidizer.			
Fluorotrichloromethane Cl_3F 75-69-4 PB6125000	Freon® 11, Monofluorotrichloromethane, Refrigerant 11, Trichlorofluoromethane, Trichloromonofluoromethane	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): 0.9% F/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, IR [#1006, Trichloro- fluoro- methane]
	1 ppm = 5.71 mg/m ³							
Fluorosane $CF_3CH_2OCH=CH_2$ 406-90-8 KO4250000	2,2,2-Trifluoroethoxy- ethene; 2,2,2-Trifluoroethyl vinyl ether	NIOSH C 2 ppm (10.3 mg/m ³) (80-min) [Note: REL for exposure to waste anesthetic gas.]	N.D.	Liquid, [anesthesia anesthetic] [Note: A gas above 108°F.]	MW: 128.1 BP: 108°F Sol: ? FLP: ? IP: ?	VP: 286 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
	1 ppm = 5.24 mg/m ³	OSHA none			Sp Gr: 1.14 Combustible Liquid [potentially EXPLOSIVE].			
Fonofos $C_{10}H_{10}OP_3$ 944-22-8 TA6950000	Dyfonate®, Dyfonale, O-Ethyl-S-phenyl ethyl- phosphorothioate, Fonophos	NIOSH 0.1 mg/m ³ [skin] OSHA† none	N.D.	Light-yellow liquid with an aromatic odor. [Insecticide]	MW: 248.3 BP: ? Sol: 0.001% FLP: >201°F IP: ?	VP(77°F): 0.0002 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
	1 ppm = 10.24 mg/m ³				Sp Gr: 1.16 Class III 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 6)	
Skin:	Prevent skin contact (liq)	NIOSH/OSHA	Inh	Irrit eyes, nose, resp sys;	Eye:	Irr. Immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm SA*	Con	lacr spasm, bron spasm,	Skin:	Water flush immed	liver, kidneys
Wash skin:	When contam (liq)	2.5 ppm SA CF*		pulm edema, eye, skin burns,	Breath:	Resp support	
Remove:	When wet or contam (liq)	5 ppm SCBAF/SAF		in animals liver, kidney			
Change:	N.R.	25 ppm SAF PD PP		damage			
Provide:	Eyewash (liq), Quick drench (liq)	§ SCBAF PD PP/SAF PD, PP ASCBA Escape GMFS/SCBAE					
[Fluorine]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Inco, tremor, derm card	Eye:	Irr. Immed	Skin, resp sys, CVS
Eyes:	Prevent eye contact	2000 ppm SA/SCBAF	Inh	army, card arrest, asphy;	Skin:	Water flush immed	
Wash skin:	N.R.	§ SCBAF PD PP/SAF PD, PP ASCBA	Con	§q frostbite	Breath:	Resp support	
Remove:	When wet or contam	Escape GMFOV/SCBAE			Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Fluorotrichloromethane]							
Skin:	N.R.	TBAL	Inh	Irrit eyes; CNS depress,	Eye:	Irr. Immed	Eyes, CNS
Eyes:	Prevent eye contact		Inh	analgesia, anes, sat,	Skin:	Soap wash	
Wash skin:	N.R.		Con	resp depress	Breath:	Resp support	
Remove:	N.R.				Swallow:	Medical attention immed	
Change:	N.R.						
[Fluoroarene]							
Skin:	Prevent skin contact	TBAL	Inh	Nau, vomit, abdom cramps,	Eye:	Irr. Immed	Resp sys, CNS, CVS,
Eyes:	Prevent eye contact		Abs	diarr, saliv; head, gidd,	Skin:	Soap flush immed	blood chol
Wash skin:	When contam		Inh	vert, weak; rhin, chest	Breath:	Resp support	
Remove:	When wet or contam		Con	tight; blurred vision,	Swallow:	Medical attention immed	
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 FLP, 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 FLP: NA (Gas) IP: 10.68 eV RGasD: 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; IR [#3500] [Note: Also XAD-2*; Toluene; GC/FID; #2541.]
Formalin (as formaldehyde) 1188 29 2208 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 IIA Combustible Liquid	VP: 1 mm FRZ: 7 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; IR [#3600] [Note: Also XAD-2*; Toluene; GC/FID; #2541.]
Formamide HCONH ₂ 75-12-7 LQ0625000	Carbamaldehyde, Methanamide 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 FLP(oc): 310°F IP: 10.20 eV Sp.Gr: 1.13 Class IIB 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 (85-85% in aqueous solution); Hydrogen carboxylic acid; Methanoic acid 1 ppm = 1.91 mg/m ³	NIOSH/OSHA 5 ppm (9 mg/m ³) Sp. Gr: 1.22 (90% solution) Class II Combustible Liquid (80% solution)	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 FI(Poc): 122°F (90% soln.) IP: 11.05 eV Sp. Gr: 1.22 (90% solution) Class II Combustible Liquid (80% 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; IR [#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 6)
Skin:	N.R.	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Trimmed	Eyes, resp sys
Eyes:	Prevent eye contact	* SCBAF PD PP/SAF PD, PP ASCBA	Con	resp sys; lac, cough,	Breath:	Resp support	[nasal cancer]
Wash skin:	N.R.	Escape: GMFS/SCBAE		bron spasm, [canc]			
Remove:	N.R.						
Change:	N.R.						
[Formaldehyde]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Trimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	* SCBAF PD, PP/SAF PD, PP ASCBA	Ing	resp sys, lac, cough,	Skin	Water flush prompt	[nasal cancer]
Wash skin:	When contam	Escape: GMFS/SCBAE	Con	bron spasm; derm; [canc]	Breath:	Resp support	
Remove:	When wet or contam				Swallow	Medical attention	
Change:	N.R.					immed	
Provide:	Eyewash, Quick drench						
[Formalin (as formaldehyde)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Trimmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	drow, rig; nau, acidosis;	Skin:	Water wash	CNS, repro sys
Wash skin:	N.R.		Con	skin eruptions;	Breath:	Resp support	
Remove:	N.R.			in animals: repro effects	Swallow:	Medical attention	
Change:	N.R.					immed	
[Formamide]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, throat,	Eye	Trimmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	30 ppm: SA*/SCBAF	Ing	skin burns, derm, lac,	Skin	Water flush immed	
Wash skin:	When contam	* SCBAF PD PP/SAF PD, PP ASCBA	Con	rhin; cough, dysp, nau	Breath	Resp support	
Remove:	When wet or contam	Escape: GMFOVH/E/SCBAE			Swallow	Medical attention	
Change:	N.R.					immed	
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-Furaldehyde	NIOSH See Appendix D OSHA† 8 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% FIP: 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, II [#2529]
1199 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† 80 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 FIP: 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 8006-61-8 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 FIP: -48°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 7782-48-2 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 FIP: NA (Gas) IP: 11.34 eV	VP: >1 atm FRZ: -267°F UEL: ? LEL: ?	Bromine	None available
2182 18	1 ppm = 3.18 mg/m³				RGasD: 2.68 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			
			Routes	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 8)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		OSHA 50 ppm: CCROV/SA* 100 ppm: SA:CF/CCRFOV/PAPROV/ GMFOV/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys, head, derm	Eye Skin Breath Swallow: Immersed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Furfural]						
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 75 ppm: CCROV/GMFOV/PAPROV/ SA*/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, muc memb; dizz; nau, dandr; duresis, resp, body temperature depres, vomit, derm	Eye Skin Breath Swallow: Immersed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys CNS
[Furfuryl alcohol]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamng) 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, muc memb; derm; head, fig, burned vision, dizz, slurred speech, conf, convulse; chemical pneu (aspir); possible liver, kidney damage; [canc]	Eye Skin Breath: Swallow: Irr Irrmed Soap flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: liver & kidney cancer]
[Gasoline]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	N.R.	TBAL	Inh	Head, head, gidd, fainting; dyp; nau, vomit; kidney ing; hemolytic effects	Breath: Resp support	CNS, kidneys, blood
[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 FLP, IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
Glutaraldehyde $\text{OCH}(\text{CH}_2)_3\text{CHO}$ 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 FLP: 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; II [#2531]
Glycerin (misl) $\text{HOCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ 56-81-5 MA8050000	Glycerin (anhydrous); Glycerol; Glycyl alcohol; 1,2,3-Propanetriol; Trihydroxypropane	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 8 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: 584°F (Decomposes) Sol: Miscible FLP: 320°F IP: ? Sp.Gr: 1.26 Class III 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; nms; Grav; II [Balance Dust: #0500 (total), #0600 (resp)]
Glycidol $\text{C}_2\text{H}_4\text{O}_2$ 556-52-5 UB4375000	2,3-Epoxy-1-propanol, Epoxypentyl 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 FLP 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 HOCH_2CN 107-18-4 AM0350000	Cyanomethanol, Formaldehyde cyanohydrin, Glycolic nitrile, Glyconitrile, Hydroxyacetonitrile	NIOSH C 2 ppm (8 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 FLP: ? IP: ? Sp.Gr (68°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	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr Irrmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	derm, sens skin; cough,	Skin:	Water flush Irrmed	
Wash skin:	When contam		ing	asthma; nau, vomit	Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention Irrmed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Glutaraldehyde]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr Irrmed	Eyes, skin, resp sys,
Eyes:	N.R.		Con	head, nau, vomit; kidney inj	Skin:	Water wash	kidneys
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Glycerin (mist)]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Irr Irrmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	150 ppm: SA*/SCBAF	ing	throat, narco	Skin:	Water wash prompt	CNS
Wash skin:	When contam	5 SCBAF PD,PP/SAF PD,PP ASCBA	Con		Breath:	Resp support	
Remove:	When wet or contam	Escape: GMFOV/SCBAE			Swallow:	Medical attention Irrmed	
Change:	N.R.						
[Glycidol]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irr Irrmed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	20 ppm: SA	Abs	head, dizz, weak, gidd,	Skin:	Water wash Irrmed	CNS, CVS
Wash skin:	When contam	50 ppm: SA/CF	ing	conf, convuls; dysp; abdom	Breath:	Resp support	
Remove:	When wet or contam	100 ppm: SCBAF/SAF	Con	pain, nau, vomit	Swallow:	Medical attention Irrmed	
Change:	Daily	250 ppm: SAF PD,PP					
Provide:	Eyewash, Quick drench	5 SCBAF PD,PP/SAF PD,PP ASCBA					
		Escape: GMFOV/SCBAE					

[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 FLP, IP, Sp, Gr, Reactivity	VP, FRZ UEL, LEL		
Grain dust (oat, wheat, barley) MD7900000	None [Note: Grain dust consists of 80-75% 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 associated with its cultivation & harvesting.	Properties depend upon the specific component of the grain dust.		None reported	Filter; none; Grav; II [Hazardous Dust (total)]
Graphite (natural) C 7782-42-5 MD9659600	Black lead, Mineral carbon, Plumbago, Silver graphite, Stone black [Note: Also see specific listing for Graphite (synthetic).]	NIOSH 2.5 mg/m ³ (resp) OSHA† 16 mpcf	1250 mg/m ³	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble FLP: NA IP: NA Sp Gr: 2.0-2.25 Combustible Solid	VP: 0 mm (approx) MLT: 8802°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; II [Hazardous Dust: 90500 (total), 90600 (resp)]
Graphite (synthetic) C 7440-44-0 FF2260100	Activated carbon [Note: Also see specific listing for Graphite (natural).]	NIOSH See Appendix D OSHA† 16 mg/m ³ (total) 8 mg/m ³ (resp)	N.D.	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble FLP: NA IP: NA Sp Gr: 1.5-1.8 Combustible Solid	VP: 0 mm (approx) MLT: 8802°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; II [Hazardous Dust: 90600 (total), 90600 (resp)]
1362 32 (carbon, activated)								
Gypsum CaSO ₄ ·2H ₂ O 13397-24-8 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) 8 mg/m ³ (resp) OSHA 16 mg/m ³ (total) 8 mg/m ³ (resp)	N.D.	White or nearly white, odorless, crystalline solid.	MW: 172.2 BP: 7 Sol(77°F): 0.2% FLP: NA IP: NA Sp Gr: 2.32 Noncombustible Solid	VP: 0 mm (approx) MLT: 262-328°F (Losses H ₂ O) UEL: NA LEL: NA	Aluminum (at high temperatures), disaccharose	Filter; none; Grav; II [Hazardous Dust: 90600 (total), 90600 (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	Irrit eyes, skin, upper resp sys; cough, dysp, wheez, asthma, bron, chronic obstructive pulm disease; conj, derm, rhinitis, grain fever	Eye: Breath:	Irr Irrimed 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	Inh	Cough, dysp, black sputum, decr pulm func, lung fib	Eye: Breath:	Irr Irrimed Fresh air	Resp sys, CVS
Eyes:	N.R.	12.5 mg/m ³ : D	Con				
Wash skin:	N.R.	25 mg/m ³ : DXSQ/SA					
Remove:	N.R.	62.5 mg/m ³ : PAPRD/SA:CF					
Change:	N.R.	125 mg/m ³ : HIEF/PAPRTHIE/SAT:CF/ SCBAF/SAF 1250 mg/m ³ : SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP/ASCB Escape: HIEF/SCBAE					
[Graphite (natural)]							
Skin:	N.R.	TBAL	Inh	Cough, dysp, black sputum, decr pulm func, lung fib	Eye: Breath:	Irr Irrimed Fresh air	Resp sys, CVS
Eyes:	N.R.		Con				
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Graphite (synthetic)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb; upper resp sys; cough, sneez, rhin	Eye: Breath:	Irr Irrimed Fresh air	Eyes, skin, resp sys
Eyes:	N.R.		Con				
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						

[Gypsum]

Chemical name, structural 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		
Hafnium Hf 7440-58-6 MG4600000 2545 40 (powder, dry) 1326 32 (powder, wet)	Cesium, 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: 6316°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 181-67-7 KH6660000	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 ₁₂ H ₈ Cl ₄ 76-44-8 PC0700000 2781 66 (organochlorine pesticide, solid, n.o.s.)	1,4,5,6,7,8,8-Heptachloro- 3a,4,7,7a-tetrahydro- 4,7-methanonidene	NIOSH Ca See Appendix A 0.5 mg/m ³ [skin] OSHA 0.5 mg/m ³ [skin]	Ca [36 mg/m ³]	White to light tan crystals with a camphor-like odor (insecticide)	MW: 373.4 BP: 293°F (Decomposes) Sol: 0.0008% 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	NIOSH 85 ppm (350 mg/m ³) C 440 ppm (1800 mg/m ³) (15-min) OSHA† 800 ppm (2000 mg/m ³)	760 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; II [#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 DMXSO/SA 12.5 mg/m ³ SA CF*/PAPRDM* 25 mg/m ³ H ₂ EF/SA CF*/PAPRTH ₂ E/ SCBAF/SAF 50 mg/m ³ : SAF:PD,PP § SCBAF PD PP/SAF PD,PP ASCBA Escape: H ₂ EF/SCBAE	Inh Ing Con	In animals: irrit eyes, skin, muc memb, liver damage	Eye: Skin: Breath: Swallow: Irritated Soap wash prompt Resp support Medical attention immed	Eyes, skin, muc memb, liver
[Methanol]						
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	Irrit eyes, skin, resp sys; conf, drow, dizz, nau, analgesia, anes; card arthr; liver, kidney damage; decr audio-visual performance; in animals: repro effects	Eye: Skin: Breath: Swallow: Irritated Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CVS, CNS, liver, kidneys, repro sys
[Methoxyethane]						
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, [card]	Eye: Skin: Breath: Swallow: Irritated Soap wash immed Resp support Medical attention immed	CNS, liver [in animals: liver cancer]
[Methoxychlor]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH 760 ppm: CCROV/GMFOV/PAPROV/ SA/SCBAF § SCBAF PD PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Lt-head, gidd, stupor, verti, inco; loss of appetite, nau, chem, chemical pneu (aspir lig); uncon	Eye: Skin: Breath: Swallow: Irritated 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)6SH</chem> 1639-09-4 MJ1400000	Heptyl mercaptan, 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 FLP: 115°F IP: ? Sp. Gr: 0.84 Class II Combustible Liquid	VP: ? FRZ: -46°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
1 ppm = 6.50 mg/m ³								
Hexachlorobutadiene <chem>Cl2C=CClCCl=CCl2</chem> 87-68-3 EJ0700000	HCBD; 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 FLP: ? IP: ? Sp. Gr: 1.56 Combustible Liquid	VP: 0.2 mm FRZ: -8°F UEL: ? LEL: ?	Oxidizers	XAD-2; Hexane; GC/ECD; III [P&CAM #397]
2279 55	1 ppm = 10.84 mg/m ³							
Hexachlorocyclopentadiene <chem>C6Cl6</chem> 77-47-4 GY1225000	HCCPD; Hexachloro-1,3-cyclo- pentadiene; 1,2,3,4,5-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) FLP: NA IP: ? Sp. Gr: 1.71 Noncombustible Liquid	VP(77°F): 0.06 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.]	Ponopak; Hexane; GC/ECD; III [#2518]
2646 55	1 ppm = 11.34 mg/m ³							
Hexachloroethane <chem>Cl6C2</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 Sp Gr 2.09 Noncombustible Solid	VP: 0.2 mm MLT 358°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							

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 5 ppm: CCROV/SA 12.5 ppm: SA/CF/PAPROV 25 ppm: CCROV/GMFOV/PAPROV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit 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, CNS, blood
[1-Heptanethiol]						
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	In animals: Irrit eyes, skin, resp sys, kidney damage; [card]	Eye: Skin: Breath: Swallow: Irr Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, kidneys [In animals: kidney tumors]
[Hexachlorobutadiene]						
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; lac; sneez, cough, dysp, saliv, pulm edema; nau, vomit, diar; In animals: liver, kidney inj	Eye: Skin: Breath: Swallow: Irr Immed Soap flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys, liver, kidneys
[Hexachlorocyclopentadiene]						
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	Irrit eyes, skin, muc memb; In animals: kidney damage; [card]	Eye: Skin: Breath: Swallow: Irr Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, kidneys [In animals: liver cancer]

[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 <chem>C12H6Cl6</chem> 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: ?	VP: <1 mm MLT: 279°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/ECD; II(2) [#S100]
					Sp Gr: 1.78 Noncombustible Solid			
1-Hexadecanethiol <chem>CH3(CH2)14SH</chem> 2817-28-2	Cetyl mercaptan, Hexadecanethiol-1, n-Hexadecanethiol, Hexadecyl mercaptan	NIOSH C 0.5 ppm (8.3 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: 7 Sol: Insoluble FLP: 216°F IP: ?	VP: 0.1 mm FRZ: -64-68°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, reducing agents	None available
	1 ppm = 10.74 mg/m ³				Sp. Gr: 0.85 Class III-B Combustible Liquid			
Hexafluoroacetone <chem>(CF3)2CO</chem> 884-18-2 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: 168.0 BP: -18°F Sol: Reacts Fl.P: NA IP: 11.81 eV	VP: 5.8 atm FRZ: -168°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
2420 18	1 ppm = 6.90 mg/m ³				R/GasD: 5.78 Nonflammable Gas, but highly reactive with water & other substances, releasing heat.			
Hexamethylene dithiocyanate <chem>OCN(CH2)6NCO</chem> 822-08-0 MO1740000	1,8-Dithiocyanatohexane; HDI; Hexamethylene- 1,8-dithiocyanate; 1,8-Hexamethylene dithiocyanate; 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: ?	VP(77°F): 0.5 mm FRZ: -98°F UEL: ? LEL: ?	Water, alcohols, strong bases, amines, carboxylic acids, organotin catalysts [Note: Reacts slowly with water to form carbon dioxide. Avoid heating above 382°F (polymerizes).]	Imp; Reagent; HPLC/AVD; II [#8621, isocya- nates]
2281 58	1 ppm = 6.98 mg/m ³				Sp.Gr(77°F): 1.04 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/SHA	Inh	Acne-form derm. nau.	Eye:	Skin, liver
Eyes:	Prevent eye contact	2 mg/m ³ SA*/SCBAF	Abs	conf, jaun, coma	Skin:	
Wash skin:	When contam/Daily	§ SCBAF PD, PP/SAF PD, PP ASCBA	Ing		Breath:	
Remove:	When wet or contam	Escape: GMFOV/SCBAE	Con		Swallow:	
Change:	Daily				Medical attention immed	
[Hexachloronaphthalene]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Abs	head, dizz, weak, cyan,	Skin:	CNS, blood
Wash skin:	When contam	12.5 ppm: SA, CF/PAPROV	Ing	nau, convuls	Breath:	
Remove:	When wet or contam	25 ppm: CCRFOV/GMFOV/PAPRTOV/	Con		Swallow:	
Change:	Daily	SCBAF/SAF			Medical attention immed	
		§: SCBAF PD, PP/SAF PD, PP ASCBA				
		Escape: GMFOV/SCBAE				
[1-Hexadecanethiol]						
Skin:	Prevent skin contact/ Frostbite	TBAL	Inh	Irrit eyes, skin, muc memb,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact/ Frostbite		Abs	resp sys, pulm edema;	Skin:	kidneys, repro sys
Wash skin:	N, R		Con	liq: frostbite;	Breath:	
Remove:	N, R			in animals, terato, repro	Resp support	
Change:	N, R			effects, kidney inj		
Provide:	Frostbite					
[Hexafluoroacetone]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.05 ppm: SA*	Ing	cough, dysp, bron, wheez,	Skin:	
Wash skin:	When contam	0.125 ppm: SA, CF*	Con	pulm edema, asthma; com	Breath:	
Remove:	When wet or contam	0.25 ppm: SCBAF/SAF		damage, skin blisters	Swallow:	
Change:	N, R	1 ppm: SAF PD, PP				
Provide:	Eyewash, Quick drench	§: SCBAF PD, PP/SAF PD, PP ASCBA			Medical attention immed	
		Escape: GMFOV/SCBAE				
[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- tri- amide, HMPPA, 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: 1.63 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: -77°F IP: 10.18 eV	VP: 124 mm FRZ: -219°F UEL: 7.5% LEL: 1.1%	Strong oxidizers	Char. CS, GCF ID, 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; 2,3-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: 0.65-0.68 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: 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, skin, resp sys; dysp; abdom pain; [canc]	Eye: Skin: Breath: Swallow: Irritmed Water flush Irritmed Resp support Medical attention Irritmed	Eyes, skin, resp sys, CNS, GI tract [In animals: cancer of the nasal cavity]
[Hexamethyl phosphoramide]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 500 ppm: SA* 1100 ppm: SA:CF*/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, h-head, nau head, perit neur numb extremities, musc weak derm: gidd, chemical pneu (aspirilq)	Eye: Skin: Breath: Swallow: Irritmed Soap wash Irritmed Resp support Medical attention Irritmed	Eyes, skin, resp sys, CNS, PNS
[n-Hexane]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 1000 ppm: SA* 2500 ppm: SA:CF* 5000 ppm: SA:CF*/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; head, gidd, dizz, li-head; nau; chemical pneu (aspir liq); derm	Eye: Skin: Breath: Swallow: Irritmed Soap wash Irritmed Resp support Medical attention Irritmed	Eyes, skin, resp sys, CNS
[Hexane isomers (excluding n-Hexane)]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 6 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	Irrit eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye: Skin: Breath: Swallow: Irritmed Soap wash Irritmed Resp support Medical attention Irritmed	Eyes, skin, resp sys, CNS, blood
[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> 591-78-8 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; IR [#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): 6.0% LEL(200°F): 12%	Strong oxidizers, potassium ter- butoxide	Char. CS; GC/FID; IR [#1300, Ketones I]
1245 26	1 ppm = 4.17 mg/m ³				Sp Gr: 0.80 Class IB Flammable Liquid			
sec-Hexyl acetate <chem>C6H12O2</chem> 106-84-9 SA7525000	1,3-Dimethylbutyl acetate, Methylisobutyl 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; IR [#1450, Esters I]
1233 26	1 ppm = 5.99 mg/m ³				Sp Gr: 0.86 Class II Combustible Liquid			
Hexylene glycol <chem>(CH3)2CONCH2CH(OH)CH3</chem> 107-41-6 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 (128 mg/m ³) OSHA† none	N.D.	Colorless liquid with a mild, sweetish odor.	MW: 118.2 BP: 358°F Sol: miscible FLP: 289°F IP: ?	VP: 0.06 mm FRZ: -58°F (Sets to glass) UEL (est): 7.6% LEL (est): 0.3%	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 III 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	Irr: eyes, nose	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	10 ppm: SA	Abs	per: neur. weak, pares.	Skin	CNS, PNS
Wash skin:	When contam.	25 ppm: SA, CF	Inh	derm., head, drow.	Breath	
Remove:	When wet (flammt)	50 ppm: SAT, CF/SCBAF/SAF	Ing		Swallow	
Change:	N.R.	1600 ppm: SAF, PD, PP § SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Con			
[2-Hexanone]						
Skin:	Prevent skin contact	NIOSH	Inh	Irr: eyes, skin, muc memb.	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF	Ing	head, narco, coma, derm., in animals: liver, kidney damage	Skin	CNS, liver, kidneys
Wash skin:	When contam.	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Con		Breath	
Remove:	When wet (flammt)	Escape: GMFOV/SCBAE			Swallow	
Change:	N.R.					
[Hexone]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irr: eyes, skin, nose	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF	Ing	throat, head,	Skin	CNS
Wash skin:	When contam.	§ SCBAF, PD, PP/SAF, PD, PP, ASCBA	Con	in animals: narco	Breath	
Remove:	When wet or contam.	Escape: GMFOV/SCBAE			Swallow	
Change:	N.R.					
[sec-Butyl acetate]						
Skin:	Prevent skin contact	TBAL	Inh	Irr: eyes, skin, resp sys.	Eye	Eyes, skin, resp sys.
Eyes:	Prevent eye contact		Ing	head, dizz, nau, inco, CNS	Skin	CNS
Wash skin:	When contam.		Con	depres; derm., skin sens	Breath	
Remove:	When wet or contam.				Swallow	
Change:	N.R.					
Provide:	Eyewash					
[Hexylene glycol]						

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		
Hydrazine H_2NNH_2 302-01-2 MUT175000	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 FLP: 99°F IP: 8.93 eV	VP: 10 mm FRZ: 36°F UEL: 96% 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.]	Sub; Reagent; Via; 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 ($\text{C}_{18}\text{H}_{14}$) 61788-32-7 WZ6538000	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 FLP: 318°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 = 12.38 mg/m ³ (40% hydrogenated)				Sp.Gr(77°F): 1.003-1.008 (40% hydrogenated) Class III 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 a liquefied compressed gas. Often used in an aqueous solution.]	MW: 80.9 BP: -88°F Sol: 49% FLP: 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 80 (solution)	1 ppm = 3.36 mg/m ³				RGSD: 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 a liquefied compressed gas.]	MW: 36.5 BP: -121°F Sol: 68°F: 67% FLP: NA IP: 12.74 eV	VP: 40.6 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) 1788 80 (solution)	1 ppm = 1.52 mg/m ³				RGSD: 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: 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 SCBAE	Inh Abs Ing Con	Irr eyes, skin, nose, throat, temporary blindness, dizz, nau, derm, eye, skin burns in animals: bron pulm edema, liver, kidney damage, convuls. [carc]	Eye Skin Breath Swallow	In: immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys CNS, liver, kidneys [in animals: tumors of the lungs, liver, blood vessels & intestine]
[Hydrazine]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Ing Con	Irr eyes, skin, resp sys; liver, kidney, hemato damage	Eye: Skin: Breath: Swallow:	In: immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, hemato sys
[Hydrogenated terphenyls]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (soln)/Frostbite Prevent eye contact (soln)/Frostbite When contam (soln) When wet or contam (soln) N.R. Eyewash (soln), Quick drench (soln), Frostbite	NIOSH/OSHA 30 ppm: SA: CF/PAPRAG/GMFAG/ SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape: GMFAG/SCBAE	Inh Ing (soln) Con	Irr eyes, skin, nose throat, soln: eye, skin burns, liq: frostbite	Eye Skin Breath Swallow	In: immed (soln)/ Frostbite Water flush immed (soln)/Frostbite Resp support Medical attention immed (soln)	Eyes, skin, resp sys
[Hydrogen bromide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (soln)/ Frostbite Prevent eye contact/Frostbite When contam (soln) When wet or contam N.R. Eyewash (soln), Quick drench (soln), Frostbite	NIOSH/OSHA 50 ppm: CCRS*/GMFS/PAPRS*/ SA*/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape: GMFAG/SCBAE	Inh Ing (soln) Con	Irr nose, throat, larynx; cough, choking, derm, soln: eye, skin burns, liq: frostbite; in animals: lar spasm, pulm edema	Eye Skin Breath Swallow	In: immed (soln)/ Frostbite Water flush immed (soln)/Frostbite Resp support Medical attention immed (soln)	Eyes, skin, resp sys
[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	Formonitrile 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 Sp Gr 0.69 Class IA Flammable Liquid Flammable Gas	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]
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 RGasD: 1.86 Sp Gr 1.00 (Liquid at 67°F) Nonflammable Gas	VP 763 mm FRZ -118°F UEL NA LEL NA	Metals, water or steam [Note: Corrosive to metals. Will attack glass and concrete]	Sil gel, NaHCO ₃ , Na ₂ CO ₃ , IC, R [#7903, Inorganic Acids] [Also #7902]
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 Sp Gr 1.39 Noncombustible Liquid, but a powerful oxidizer.	VP (86°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
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 RGasD: 2.66 Flammable Gas	VP (70°F): 8.8 atm FRZ -67°F UEL ? LEL ?	Strong oxidizers, acids, water, halogenated hydrocarbons	None available
2202 13 (anhydrous)	1 ppm = 3.37 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 8)
Skin:	Prevent skin contact	NIOSH	Inh	Asphy, weak, head conf,	Eye	Im mmed	CNS, CVS, thyroid,
Eyes:	Prevent eye contact	47 ppm SA	Abs	nau, vomit, incr rate and	Skin	Water flush immed	blood
Wash skin:	When contam	50 ppm SA CF/SCBAF/SAF	ing	depth of respiration or	Breath	Resp support	
Remove:	When wet (flam)	§ SCBAF PD PP/SAF PD PP ASCBA	Con	respiration slow and	Swallow	Medical attention	
Change:	N.R.	Escape GMFS/SCBAE		gasping, thyroid, blood		immed	
Provide:	Eyewash, Quick drench			changes			
[Hydrogen cyanide]							
Skin:	Prevent skin contact (liq)	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Im mmed (soln/liq)	Eyes, skin, resp sys,
Eyes:	Prevent eye contact (liq)	30 ppm CCRS*/PAPRS*/GMFS/	Abs	throat, pulm edema, eye,	Skin	Water flush immed	bones
Wash skin:	When contam (liq)	SA*/SCBAF	(liq)	skin burns, rhinitis; bron,	Breath	(soln/liq)	
Remove:	When wet or contam (liq)	§ SCBAF PD PP/SAF PD PP ASCBA	ing	bone changes	Swallow	Resp support	
Change:	N.R.	Escape GMFS/SCBAE	(soln)			Medical attention	
Provide:	Eyewash (liq), Quick drench (liq)		Con			immed (soln)	
[Hydrogen fluoride (as F)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, nose, throat,	Eye	Im mmed	Eyes, skin, resp
Eyes:	Prevent eye contact	10 ppm SA*	ing	cor ulcer, eryt, vesic	Skin	Water flush immed	sys
Wash skin:	When contam	25 ppm SA CF*	Con	skin, bleaching hair	Breath	Resp support	
Remove:	When wet or contam	50 ppm SCBAF/SAF			Swallow	Medical attention	
Change:	N.R.	75 ppm SAF PD PP				immed	
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:	Frostbite	Eyes, resp sys, liver
Eyes:	Frostbite	0.5 ppm SA	Con	nau, vomit, diarr, metallic	Skin:	Frostbite	
Wash skin:	N.R.	1 ppm SA CF/SCBAF/SAF		taste, garlic breath, dizz,	Breath	Resp support	
Remove:	When wet (flam)	§ SCBAF PD PP/SAF PD PP ASCBA		lass, fig liq; frostbite;			
Change:	N.R.	Escape GMFS/SCBAE		in animals: pneumitis, liver			
Provide:	Frostbite			damage			
[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, FLP, 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% FLP: NA (Gas) IP: 10.46 eV	VP: 17.8 atm FRZ: -122°F UEL: 44.0% LEL: 4.0%	Strong oxidizers, strong nitric acid, metals	Char; NH_4OH/H_2O_2 ; IC; III [§8013]
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% FLP: 329°F (Molten) IP: 7.95 eV Sp Gr: 1.33 Combustible Solid, dust cloud may explode if ignited in an enclosed area.	VP: 0.00001 mm MLT: 338°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter, CH_3COOH , $HP/LC/UV/D$, III [§5004]
2662 53								
2-Hydroxypropyl acrylate $CH_2=CHCOOCH_2CH(OH)CH_3$ 999-81-1 AT1925000	HPA, δ-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: 378°F Sol: ? FLP: 148°F IP: ?	VP: ? FRZ: ? UEL: ? LEL: 1.8%	Water [Note: Can become unstable at high temperatures & pressure or may react with water with some release of energy, but not violently.]	None available
	1 ppm = 6.41 mg/m ³				Sp.Gr: 1.08 Class IIIA Combustible Liquid			
Indene C_9H_8 96-13-6 NK8225000	Indonaphthene	NIOSH 10 ppm (48 mg/m ³) OSHA† none	N.D.	Colorless liquid. [Note: A solid below 29°F.]	MW: 118.2 BP: 358°F Sol: Insoluble FLP: 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 § SCBAF PD PP/SAF PD,PP ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, resp sys; apnea, coma, convuls, conj. eye pain, lac, photo, com vasec, 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/ SCBAF/SAF § SCBAF PD PP/SAF PD,PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, conj, kera, CNS excitement, colored urine, nausea, dizz, suffocation, rapid breath, muscle twitch, delirium, collapse, skin irrit, sens, derm	Eye Skin Breath Swallow	Irrigated Water flush Resp support Medical attention immed	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:	Irrigated Soap flush Irrigated Resp support Medical attention immed	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:	Irrigated Soap wash Resp support Medical attention immed	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 7440-74-8 NI1050000	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; H(5) [P&CAM #173]
Iodine I ₂ 7553-56-2 NI1575000	Iodine crystals Molecular iodine	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	NIOSH 0.5 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: 7 Sp.Gr: 4.01 Noncombustible Solid	VP: 7 MLT: 248°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: 7 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	Irrit eyes, skin, resp	Eye:	Irr Immed	Eyes, skin, resp sys,
Eyes:	N.R.		Ing	sys; possible liver,	Skin:	Soap wash	liver, kidneys,
Wash skin:	N.R.		Con	kidney, heart, blood	Breath:	Resp support	heart, blood
Remove:	N.R.			effects; pulm edema	Swallow:	Medical attention	
Change:	N.R.					Immed	
[Indium]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Irr Immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm: SA*	Ing	fac, head, chest tight;	Skin:	Soap wash Immed	CNS, CVS
Wash skin:	When contam	2 ppm: SA:CF/SCBAF/SAF	Con	skin burns, rash,	Breath:	Resp support	
Remove:	When wet or contam	5 SCBAF PD PP/SAF PD PP ASCBA		cutaneous hypersensitivity	Swallow:	Medical attention	
Change:	Daily	Escape GMFAGHE/SCBAE				Immed	
Provide:	Eyewash (>7%), Quick drench (>7%)						
[Iodine]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, H-head,	Eye:	Irr Immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	dizziness, nau, inco, CNS	Skin:	Soap wash Immed	liver, kidneys,
Wash skin:	When contam		Ing	depress, dysp; liver,	Breath:	Resp support	heart
Remove:	When wet or contam		Con	kidney, heart damage;	Swallow:	Medical attention	
Change:	Daily			via diet		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)]							

[illegible]

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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R. Quick drench	TBAL	Inh Abs Ing Con	Irrit 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:	In: Immed Soap flush Immed Resp support Medical attention Immed	Eyes, resp sys, CNS, liver, kidneys
[Iron pentacarbonyl (as Fe)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb; abdom pain, diarr, vomit; possible liver damage	Eye: Skin: Breath: Swallow:	In: Immed Soap wash Resp support Medical attention Immed	Eyes, skin, resp sys, liver, GI tract
[Iron salts (soluble, as Fe)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH/OSHA 1000 ppm: CCROV/PAPROV/GMFOV/SA/SCBAF 5 SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, derm in animals: narco	Eye Skin Breath Swallow	In: Immed Water flush prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[Isocetyl acetate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 500 ppm: SA:CF/CCRFOV/GMFOV/PAPROV/SCBAF/SAF 5 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	In: Immed Water flush prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[Isocetyl 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		
Isomyl alcohol (secondary) $(\text{CH}_3)_2\text{CHCH}(\text{OH})\text{CH}_3$ 528-75-4	3-Methyl-2-butanol, Secondary isomyl 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, II [#1402, Alcohols III]
1105 26	1 ppm = 3.67 mg/m ³				Sp Gr: 0.82 Class IC Flammable Liquid			
Isobutane $\text{CH}_3\text{CH}(\text{CH}_3)_2$ 78-28-8 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 RGeoD: 2.08 Flammable Gas Class IA Flammable Liquid	VP(70°F): 3.1 atm FRZ: -258°F UEL: 8.4% LEL: 1.8%	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, G-Methylpropyl ethanoate	NIOSH/OSHA 150 ppm (700 mg/m ³)	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, alkali & acids	Char, CS, GC/FID, II [#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, II [#1401, Alcohols II]
1212 26	1 ppm = 3.06 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 (flam) N.R.	NIOSH/SHA 600 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:	Immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[isomy] alcohol (secondary)]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flam) N.R. Frostbite	TBAL	Inh Con (lg)	Drow, narco, asphy; lg: 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 (flam) N.R.	NIOSH/SHA 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:	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 (flam) N.R.	NIOSH 500 ppm: CCRFOV/SA* 1250 ppm: SA:CF/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	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: 7	VP(130°F): 100 mm FRZ: -87°F UEL: 7 LEL: 7	Oxidizers, reducing agents, strong acids & bases	Char; Benzene; GC/FID; II [Adapt #1505]
2284 28	1 ppm = 2.87 mg/m ³				Sp, Gr: 0.78 Class IB Flammable Liquid			
Isooctyl alcohol C ₈ H ₁₈ CH ₂ OH 26952-21-6 N57700000	Isooctanol, Oxoctyl alcohol [Note: A mixture of closely related isomeric, primary alcohols with branched chains such as 2-Ethyl- hexanol, CH ₃ (CH ₂) ₃ 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: 7	VP: 0.4 mm FRZ: <-105°F UEL(est.): 5.7% 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 ₉ H ₁₈ O 78-59-1 GW7700000	Isopropylacetophorone, 3,5,5-Trimethyl-2-cyclo- hexanone, 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(per), CS, GC/FID; II [#2508]
1993 27 (combustible liquid, n.o.s.)	1 ppm = 5.74 mg/m ³				Sp, Gr: 0.92 Class IIIA Combustible Liquid			
Isophorone disocyanate C ₁₀ H ₁₈ N ₂ O ₂ 4098-71-9 NQ9370000	IPDI; 3-Isocyanatomethyl-3,5,5- trimethylcyclohexyl- isocyanate; Isophorone diamine disocyanate	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: 7 Sol: Decomposes FLP: 311°F IP: 7	VP: 0.0003 mm FRZ: -76°F UEL: 7 LEL: 7	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 IIB Combustible Liquid			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Routes	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 6)	
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flame) N.R. 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; abdom pain, nau, vomit	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS, CVS
[acetylonitrile]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam N.R. Eyewash	TBAL	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys
[acetyl alcohol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. 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, derm, in animals: kidney, liver damage	Eye Skin Breath Swallow	Irrmed Soap wash prompt Resp support Medical attention Irrmed	Eyes, skin, resp sys CNS, liver, kidneys
[isophorone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	NIOSH 0.06 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, pulm edema; possible resp sens, asthma	Eye: Skin: Breath: Swallow:	Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys
[isophorone dithiocarbamate]							

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 109-58-1 KL6075000	Ethylene glycol isopropyl ether, 5-Hydroxyethyl isopropyl ether, isopropyl Cellosolve®, isopropyl glycol	NIOSH See Appendix D OSHA† none	N.D.	Colorless liquid with a mild, etheral odor.	MW: 104.2 BP: 283°F Sol: Miscible Fl.P(oc): 92°F IP: ? Sp.Gr: 0.90 Class IC Flammable Liquid	VP: 3 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
1 ppm = 4.33 mg/m ³								
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 (960 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 (960 mg/m ³) ST 500 ppm (1225 mg/m ³) OSHA† 400 ppm (960 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): 127% 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† 8 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 — minimum 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: 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, pulm edema	Eye: Skin: Breath: Swallow:	In: Irrimed 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/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, derm; In animals: nerve	Eye Skin Breath Swallow:	In: Irrimed 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/CCRFOV/GMFOV/ PAPROV/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: nerve	Eye Skin Breath Swallow:	In: Irrimed 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, Quick drench	OSHA 125 ppm: SA:CF/PAPRS ¹ 250 ppm: CCRFS/GMFS/PAPRTS/ 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	In: Irrimed 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, F.P., IP, Sp. Gr., flammability	VP, FRZ, UEL, LEL		
N-isopropylaniline $C_9H_{11}NHCH(CH_3)_2$ 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 F.P.(oc): 190°F IP: ?	VP(77°F): 0.03 mm FRZ: -58°F UEL: ? LEL: ?	None reported	Filter* (2); Methanol; HPLC/UV; OSHA [#78]
	1 ppm = 5.62 mg/m ³				Sp.Gr(60°F): 0.83 Class IB Combustible Liquid			
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 [UEL]	Colorless liquid with a sharp sweet, ether-like odor	MW 102.2 BP 154°F Sol 0.2% F.P. -18°F IP 9.20 eV	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. ■ [#S368]
1159 26	1 ppm = 4.25 mg/m ³				Sp.Gr. 0.73 Class IB Flammable Liquid			
Isopropyl glycidyl ether $C_6H_{10}O_3$ 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% F.P. 92°F IP ?	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. ■ [#S77]
	1 ppm = 4.83 mg/m ³				Sp.Gr. 0.92 Class IC Flammable Liquid			
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 F.P.: NA IP: NA	VP: 6 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter, none; Grav; ■ [Note: Dust: #0500 (total), #0800 (resp)]
					Sp.Gr. 1.8-2.6 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:		TBAL	Inh Abs Ing Con	Irrit eyes, skin; head, weak, dizzy; cyan; ataxia; dysp on effort; tacer; methemo	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash prompt Resp support Medical attention Irrmed	Eyes, skin, resp sys, blood, CVS, liver, kidneys
[Di-isopropylamine]		NIOSH/OSHA 1400 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF § SCBAF PD PPI/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, resp discomfort, derm, in animals drow, dizz, uncon, nercs	Eye Skin Breath Swallow Irr Irrmed Soap wash prompt Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS
[Isopropyl ether]		NIOSH/OSHA 400 ppm: SA:CF*/SCBAF § SCBAF PD PPI/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys, skin sens, possible hemato, repro effects	Eye Skin Breath Swallow Irr Irrmed Soap wash irmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, blood, repro sys
[Isopropyl glycidyl ether]		TBAL	Inh Con	Chronic pulm fib, stomach granuloma	Eye: Breath: Irr Irrmed Fresh air	Resp sys, stomach
[Kaoilin]						

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		
Kapone $C_{10}Cl_8O$ 143-50-0 PC8575000	Chlorodecane; 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 ⁻⁴ mm MLT: 662°F (Sublimes) UEL: NA LEL: NA	Acids, acid fumes	Filter/ Imp; Benzene/ Methanol; GC/EC; II [#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: 8% LEL: 0.7%	Strong oxidizers	Char; CS; GC/FID; II [#1550, Naphthalene]
Ketene $CH_2=CO$ 463-51-4 OA7700000	Carbomethene, Ethenone, Keto-ethylene	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) 1 ppm = 1.75 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 / Vs. II(2) [#592]
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; AAS; II [#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 6)
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 N: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/HIE/SCBAE	Inh Abs Ing Con	Head, nar, tremor; liver, kidney damage; via diet; ataxia, chest pain, skin eryt; testicular atrophy, low sperm count; [canc]	Eye: Skin: Breath: Swallow:	Irr Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, liver, kidneys, repro sys [in animals: liver cancer]
[Kerosene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH 1000 ppm: CCROV/SA 2500 ppm: SA:CF/PAPROV 6000 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irr eyes, skin, nose, throat; burning sensation In chest; head, nau, weak, restless, inco, conf, drow; vomit, diarr; darr; chemical pneu (aspir tog)	Eye: Skin: Breath: Swallow:	Irr Immed Soap flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[Kerosene]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 5 ppm SA*/SCBAF § SCBAF PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con	Irr eyes, skin, nose, throat, resp sys; pulm edema	Breath	Resp support	Eyes, skin, resp sys
[Ketene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	OSHA 0.5 mg/m ³ HE/SA 1.25 mg/m ³ SA:CF/PAPRIE 2.5 mg/m ³ HIE/FISAT:CF/PAPRIE/ SCBAF/SAF 50 mg/m ³ SA:PD,PP 100 mg/m ³ SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Weak, lass, incom, facial pallor, pal eye, anor, low-wgt, malnut, constip, abdom pain, colic, anemia, gingival lead line, tremor, para wrist, ankles, encephalopathy, kidney disease; irrit eyes; hypotension	Eye: Skin: Breath: Swallow:	Irr Immed Soap flush prompt Resp support Medical attention Immed	Eyes, GI tract, CNS, kidneys, blood, gingival tissue
[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 EV9680000	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) M.L.T: 1817- 2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; IR Fluorescence Dust: #0600 (total), #0600 (resp)
Lindane $\text{C}_6\text{H}_6\text{Cl}_6$ 58-89-9 GV4900000 2761 55	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 M.L.T: 235°F UEL: NA LEL: NA	Corrosive to metals	Filter/Bub; Isocitane; GC/EConD, IR #5502
Lithium hydride LiH 7580-67-8 OJ6300000 1414 40 2805 40 (fused solid)	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) M.L.T: 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. $\text{C}_2\text{H}_2/\text{C}_2\text{H}_4/\text{C}_3\text{H}_8/\text{C}_4\text{H}_{10}$ 68476-85-7 SE7545000 1075 22	Bottled gas, Compressed petroleum gas, Liquefied hydrocarbon gas, Liquefied petroleum gas, LPG [Note: A fuel mixture of propane, propylene, butanes & butylenes.] 1ppm = 1.75-2.41 mg/m ³	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: 1.48-2.00 Flammable Gas	VP: >1 atm FRZ: ? UEL: 9.5% (Propane) 8.8% (Butane) LEL: 2.1% (Propane) 1.8% (Butane)	Strong oxidizers, chlorine dioxide	Combustible gas meter; none; none; IR(2) #S93

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.	TBAL	Inh	Irritates, skin, muc memb;	Eye:	In Immed	Eyes, skin, resp sys
Eyes:	N.R.		Con	cough, sneez, rhin; lac	Skin:	Soap wash	
Wash skin:	N.R.				Breath:	Fresh air	
Remove:	N.R.						
Change:	N.R.						
[Limestone]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose	Eye	In Immed	Eyes, skin, resp sys,
Eyes:	N.R.	5 mg/m ³ CCROVDMFu/SA	Abs	throat, head, nau, clonic	Skin	Soap wash prompl	CNS, blood, liver,
Wash skin:	When contam	12.5 mg/m ³ SA CF*/PAPROVDMFu*	Ing	convuls, resp difficulty,	Breath	Resp support	kidneys
Remove:	When wet or contam	25 mg/m ³ CCRFOVHIE/GMFOVHIE/	Con	cyan aplastic anemia,	Swallow	Medical attention	
Change:	Daily	PAPRTOVHIE*/SCBAF/SAF		muscle spasm		immed	
Provide:	Quick drench	60 mg/m ³ SAF:PD,PP		in animals, liver, kidney			
		Escape SCBAF PD,PP/SAF PD,PP ASCBA		damage			
		Escape GMFOVHIE/SCBAE					
[Lindane]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irritates, skin; eye,	Eye	In Immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	0.25 mg/m ³ HIE/SA	Ing	skin burns, mouth,	Skin	Brush (DO NOT	CNS
Wash skin:	Brush (DO NOT WASH)	0.5 mg/m ³ SA:CF*/HIEF/PAPRHIE*/	Con	esophagus burns (if		WASH)	
Remove:	When wet or contam	SCBAF/SAF		ingested) nau, muscle	Breath	Resp support	
Change:	Daily	Escape SCBAF PD,PP/SAF PD,PP ASCBA		twitches, mental conf,	Swallow	Medical attention	
Provide:	Eyewash, Quick drench (>0.5 mg/m ³)	Escape HIEF/SCBAE		blurred vision		immed	
[Lithium hydride]							
Skin:	Frostbite	NIOSH/OSHA	Inh	Li-head, drow, asphy;	Eye:	Frostbite	Resp sys, CNS
Eyes:	Frostbite	2000 ppm: SA/SCBAF	Con	liq; frostbite	Skin:	Frostbite	
Wash skin:	N.R.	Escape SCBAF PD,PP/SAF PD,PP ASCBA	(liq)		Breath:	Resp support	
Remove:	When wet (flam)						
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 method (See Table 1)
					MW, BP, SOL, F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Magnesite MgCO_3 545-93-0 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% F.P.: NA IP: NA Sp.Gr: 2.98 Noncombustible Solid	VP: 0 mm (approx) MLT: 562°F (Decomposes) UEL: NA LEL: NA	Acids, formaldehyde	Filter; none; Grav; II [Hazardous 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(66°F): 0.009% F.P.: NA IP: NA Sp.Gr: 3.58 Noncombustible Solid	VP: 0 mm (approx) MLT: 5072°F UEL: NA LEL: NA	Chlorine trifluoride, phosphorus pentachloride	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-dimethylphosphorodithioate; Diethyl (dimethoxyphosphorothio) succinate $[(\text{CH}_3\text{O})_2\text{P}(\text{S})\text{SCH}(\text{COOC}_2\text{H}_5)_2\text{CH}_2\text{COOC}_2\text{H}_5]$	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% F.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; Isocutane; GC/FPD; III [#5012]
Maleic anhydride $\text{C}_4\text{H}_2\text{O}_3$ 108-31-6 ON3675000 2215 50	cis-Butenedioic anhydride; 2,5-Furandione; Maleic acid anhydride; Toxic anhydride	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 F.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 (hydrolyzes) to form maleic acid.]	Bub; none; HPLC/UV; II [#3612]

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.	TBAL	Inh	Irrit eyes, skin, resp	Eyes:	Eyes, skin, resp sys	
Eyes:	N.R.		Con	sys, cough	Breath:		
Wash skin:	N.R.				Irr Irrimed		
Remove:	N.R.				Fresh air		
Change:	N.R.						
[Magnesia]							
Skin:	N.R.	OSHA	Inh	Irrit eyes, nose	Breath	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/PAPRODMFu		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	Eyes, skin, resp sys,	
Eyes:	Prevent eye contact	100 mg/m ³ : CCROVDMFu/SA	Abs	aching eyes, blurred vision,	Skin	liver, blood chol,	
Wash skin:	When contam	250 mg/m ³ : SA:CF/CCRFQVHIE/ GMFOVHIE/PAPROVDMFu/ SCBAF/SAF	Ing	lac saliv and/or nau, vomit,	Breath	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		
Change:	Daily						
[Malathion]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit nose, upper resp sys,	Eye	Eyes, skin resp sys	
Eyes:	Prevent eye contact	10 mg/m ³ : SA:CF/SCBAF/SAF	Ing	conj, photo double vision,	Skin		
Wash skin:	When contam	§ SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVHIE/SCBAE	Con	bronchial asthma, derm	Breath:	Soap wash immed	
Remove:	When wet or contam				Swallow	Resp support	
Change:	N.R.					Medical attention immed	
Provide:	Eyewash						
[Maleic anhydride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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		
Malonaldehyde <chem>CHOC(=O)CHO</chem> 542-78-9 TX6475000	Malonic aldehyde; Malonodialdehyde; Propenedial; 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: ? FLP: ? 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>NC#CC#N</chem> 108-77-3 OO3150000 2647 63	Cyanoacetoneitrile, Dicyanomethane, Malonic dinitrile 1 ppm = 2.78 mg/m ³	NIOSH 3 ppm (8 mg/m ³) OSHA none	N.D.	White powder or colorless crystals. [Note: Melts above 90°F. Forms cyanide in the body.]	MW: 66.1 BP: 426°F Sol: 13% FLP(oc): 268°F IP: 12.86 eV Sp.Gr: 1.19 Combustible Solid	VP: ? MLT: 90°F UEL: ? LEL: ?	Strong bases [Note: May polymerize violently on prolonged heating at 268°F, or in contact with strong bases at lower temperatures.]	Char; Toluene; GC/FID; NIOSH Nitriles Cril. 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/m ³ ST 3 mg/m ³ OSHA† C 5 mg/m ³ [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]	500 mg/m ³ (as Mn)	Metal. A lustrous, brittle, silvery solid.	MW: 54.9 BP: 3564°F Sol: insoluble FLP: 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> 12079-66-1 OO9720000	Cyclopentadienylmanganese tricarbonyl, Cyclopentadienyl tricarbonyl manganese, MCT	NIOSH 0.1 mg/m ³ [skin] OSHA† C 5 mg/m ³	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 FLP: ? 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: 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	Irrit eyes, skin, resp sys; cough; CNS depress; [canc]	Eye: Skin: Breath: Swallow: Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS [In animals: thyroid gland tumors]	
[Malononitrile]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 80 mg/m ³ : SA 200 mg/m ³ : SA:CF 400 mg/m ³ : SCBAF/SAF 667 mg/m ³ : 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; abdom pain, nau, vomit	Eye: Skin: Breath: Swallow: Irr Irrmed Water wash Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS, CVS	
[Malononitrile]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH 10 mg/m ³ : DMXSO*/SA 25 mg/m ³ : SA:CF/PAPRDM* 50 mg/m ³ : HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF/ 600 mg/m ³ : SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing	Parkinson's, asthenia, insom, mental conf, metal fume fever, dry throat, cough, chest tight, dysp, rales, flu-like fever, low-back pain; vomit, mal, fig, kidney damage	Breath: Swallow: Resp support Medical attention Irrmed	Resp sys, CNS, blood, kidneys	
[Manganese compounds and fume (as Mn)]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	In animals: irrit skin; pulm edema; convuls; CNS, resp sys, kidney changes; decr resistance to infection	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Resp support Medical attention Irrmed	Skin, resp sys, CNS, kidneys	
[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 ₂ O 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 ever manganese 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) M.L.T: 2847°F UEL: NA LEL: NA	Soluble in hydrochloric acid (liberates chlorine gas)	Filter; Acids; ICP; III [§7300, Elemental]
Marble CaCO ₃ 1317-45-3 EV9580000	Calcium carbonate, Natural calcium carbonate [Note: Marble is a metamorphic form of calcium carbonate.]	NIOSH 10 mg/m ³ (total) 8 mg/m ³ (resp) OSHA 15 mg/m ³ (total) 8 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) M.L.T: 1517- 2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; III [Mutagen Dust: §600 (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 6)
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. Daily	TBAL	Inh Ing Con	Asthenia, insom, mental conf; low-back pain, vomit; mal, ftg; kidney damage; pneumonia	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash Resp support Medical attention Immed	Resp sys, CNS, blood, kidneys
[Manganese tetroxide (as Mn)]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irrit eyes, skin, muc memb, upper resp sys; cough, sneez, rhin; lac	Eye: Skin: Breath:	Irr Irrmed Soap wash Fresh air	Eyes, skin, resp sys
[Merbute]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam Daily	See Appendix E for Respirator Recommendations for Mercury compounds [except (organo) alkyls].	Inh Abs Ing Con	Irrit eyes, skin, cough, chest pain, dysp, bron, pneumitis, tremor, insom, irrit, indecision, head, ftg, weak, stomatitis, saliv, GI dist, anor, low-wgt, prot	Eye Skin Breath Swallow	Irr Irrmed Soap wash prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, kidneys
[Mercury compounds [except (organo) alkyls] (as Hg)]							
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 0.1 mg/m ³ SA 0.25 mg/m ³ SA CF 0.5 mg/m ³ SAT CF/SCBAF/SAF 2 mg/m ³ SA:PD,PP § SCBAF PD PP/SAF PD PP ASCBA Escape SCBAE	Inh Abs Ing Con	Pares, ataxia, dysarthria, vision, hearing dist, spasticity, jerking limbs; dizz, saliv lac, nau, vomit, diarr, constip, skin burns, emotional dist, kidney inj; possible terato effects	Eye Skin Breath Swallow	Irr Irrmed Soap wash immed Resp support Medical attention Immed	Eyes, skin, CNS, PNS, kidneys
[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, FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Mesityl oxide $(CH_3)_2C=CHCOCH_3$ 141-79-7 SB4200000	Isobutyl methyl ketone, Isopropylideneacetone, Methyl isobutyl 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% FLP: 87°F IP: 9.08 eV	VP: 9 mm FRZ: -52°F UEL: 7.2% LEL: 1.4%	Oxidizers, acids	Char, Methanol/ CS, GC/ECID, III [#1301, Ketones II]
1229 26	1 ppm = 4.08 mg/m ³				Sp Gr(59°F): 0.86 Class IC Flammable Liquid			
Methacrylic acid $CH_2=C(CH_3)COOH$ 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 acid, 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 IIA Combustible Liquid			
Methomyl $CH_3C(SCH_3)NOC(O)NHCH_3$ 16752-77-5 AK2975000	Lannate®, Methyl N-[(methylamino)- carbonyloxy]methanimi- 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% FLP: 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 $(C_2H_5OCH_2)_3CHCCl_3$ 72-43-5 KJ3675000	p,p'-Dimethoxydiphenyltri- chloroethane, DMOT, 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% FLP: ? IP: ?	VP: Very low MLT: 171°F UEL: ? LEL: ?	Oxidizers	Filter, Isocetane, GC/ECID, II(4) [#3371]
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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc	Eye	Irr Irrmed	Eyes, skin, resp
Eyes:	Prevent eye contact	250 ppm: SA, CF/PAPROV ⁴	Ing	memb, narco, coma,	Skin	Water flush imm	sys, CNS, liver,
Wash skin:	When contam	500 ppm: CCRFOV/GMFOV/PAPRTOV ⁴	Con	in animals: liver, kidney	Breath	Resp support	kidneys
Remove:	When wet (flam)	SCBAF/SAF		damage; CNS effects	Swallow	Medical attention	
Change:	N.R.	1400 ppm: SAF/PD,PP				imm	
Provide:	Quick drench	§ SCBAF PD PP/SAF PD PP ASCBA					
		Escape: GMFOV/SCBAE					
[Mesityl oxide]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Irr Irrmed	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Abs	eye, skin burns	Skin:	Water flush imm	
Wash skin:	When contam		Con		Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention	
Change:	Daily					Imm	
Provide:	Eyewash, Quick drench						
[Methacrylic acid]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes; blurred vision,	Eye:	Irr Irrmed	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact		Ing	miosis, saliv; abdom cramps,	Skin:	Water flush imm	CVS, liver, kidneys,
Wash skin:	When contam		Con	naus, vomit; dysp; weak,	Breath:	Resp support	blood chol
Remove:	When wet or contam			musc twitch; liver, kidney	Swallow:	Medical attention	
Change:	Daily			damage		Imm	
Provide:	Quick drench						
[Methomyl]							
Skin:	Prevent skin contact	NIOSH	Inh	In animals: fasc trembling,	Skin	Soap wash	CNS, liver, kidneys
Eyes:	N.R.	§ SCBAF PD PP/SAF PD PP ASCBA	Ing	convuls; kidney liver	Breath	Fresh air	[In animals:
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE		damage, [canc]	Swallow	Medical attention	liver & ovarian
Remove:	When wet or contam					Imm	cancer]
Change:	Daily						
[Methoxychlor]							

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 Fl.P, IP, Sp, Gr, Reactivity	VP, FRZ UEL, LEL		
Methoxyflurane <chem>CHCl2CF2OCH3</chem> 75-38-0 KN7820000	2,2-Dichloro-1,1-difluoro-ethyl methyl ether; 2,2-Dichloro-1,1-difluoro-1-methoxyethane; Methoflurane; Methoxyfluorane; Perflurane	NIOSH† C 2 ppm (13.5 mg/m³) [80-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 (178°F): 7%	None reported	None available
	1 ppm = 8.86 mg/m³	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 ether hydroquinone	NIOSH 5 mg/m³ OSHA† none	N.D.	Colorless to white, waxy solid with an odor of caramel & phenol.	MW: 124.2 BP: 488°F Sol (77°F): 4% FLP (oc): 270°F IP: 7.50 eV	VP: <0.01 mm MLT: 136°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 A19100000	Methyl ester of acetic acid, Methyl ethanoate	NIOSH 200 ppm (610 mg/m³) ST 250 ppm (760 mg/m³) OSHA† 200 ppm (610 mg/m³)	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, ■ [#S42]
	1 ppm = 3.08 mg/m³				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/m³)	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: 11(5) [#S84]
	1 ppm = 1.67 mg/m³				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 8)	
Skin: Eyes: Wash skin: Remove: Change:	N.R. Prevent eye contact N.R. When wet or contam N.R.	TBAL	Inh Ing Con	Irrit eyes; CNS depress, analgesia; anes, sez, resp depress; liver, kidney inj.; in animals: repro, terato effects	Eye: Skin: Breath: Swallow:	Inj: Irrimed Skin: Soap wash Breath: Resp support Swallow: Medical attention Irrimed	Eyes, CNS, liver, kidneys, repro sys	
[Methoxyflurane]								
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, nose, throat, upper resp sys; eyes, skin burns; CNS depress	Eye: Skin: Breath: Swallow:	Inj: Irrimed Skin: Soap flush Breath: Resp support Swallow: Medical attention Irrimed	Eyes, skin, resp sys, CNS	
[4-Methoxyphenol]								
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: CCROV/SA* 3100 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, drow, optic nerve atrophy, chest tight; in animals: narco	Eye Skin Breath Swallow	Inj: Irrimed Water flush prompt Resp support Medical attention Irrimed	Eyes, skin, resp sys, CNS	
[Methyl acetate]								
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	NIOSH/OSHA 1700 ppm: SA/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE	Inh Con (liq)	Irrit resp sys, tremor, hyperexcitability, anes, liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Resp sys, CNS	
[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 FLP, IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Methyl acetylene- propadiene mixture $\text{CH}_3\text{C}\equiv\text{CHCH}_2=\text{C}=\text{CH}_2$ 59355-75-8 UK4920000	MAPP gas, Methyl acetylene-allene mixture, Methyl acetylene-propadiene mixture (stabilized), Propadiene-methyl acetylene, 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 FLP: 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]
1060 17 (stabilized)	1 ppm = 1.67 mg/m ³							
Methyl acrylate $\text{CH}_2=\text{CHCOOCH}_3$ 96-33-3 AT2800000	Methoxycarbonyl ethylene, Methyl ester of acrylic acid, Methyl propenoate	NIOSH/OSHA 10 ppm (35 mg/m ³) [skin]	250 ppm	Colorless liquid with an acid odor.	MW: 86.1 BP: 178°F Sol: 6% FLP: 27°F IP: 9.90 eV	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]
1919 26 (inhibited)	1 ppm = 3.58 mg/m ³				Sp.Gr: 0.96 Class IB Flammable Liquid			
Methylacrylonitrile $\text{CH}_2=\text{C}(\text{CH}_3)\text{CN}$ 126-98-7 UD1400000	2-Cyanopropene-1, 2-Cyano-1-propene, isoprene cyanide, isopropenitrile, 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% FLP: 34°F IP: ? Sp.Gr: 0.80 Class IB Flammable Liquid	VP(77°F): 71 mm FRZ: -32°F UEL: 5.8% LEL: 2%	Strong acids, strong oxidizers, alkali, light [Note: Polymerization may occur due to elevated tempera- ture, visible light, or contact with a concentrated alkali.]	None available
3079 28 (inhibited)	1 ppm = 2.79 mg/m ³							
Methylal $\text{CH}_3\text{OCH}_2\text{OCH}_3$ 109-87-5 PA8750000	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% FLP(oc): -26°F IP: 10.00 eV	VP: 330 mm FRZ: -157°F UEL: 13.8% LEL: 2.2%	Strong oxidizers, acids	Char; Hexane; GC/FID; III [#1611]
1234 28	1 ppm = 3.16 mg/m ³				Sp.Gr: 0.86 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:	Frostbite	NIOSH/OSHA	Inh	Irrit resp sys; excitement, conf, anes; liq: frostbite	Eye:	Frostbite	Resp sys, CNS
Eyes:	Frostbite	3400 ppm: SA/SCBAF	Con		Skin:	Frostbite	
Wash skin:	N.R.	§ SCBAF PD PP/SAF PD PP ASCBA	(liq)		Breath:	Resp support	
Remove:	When wet (flam)	Escape GMFS/SCBAE					
Change:	N.R.						
Provide:	Frostbite						

[Methyl acetylene-propadiene mixture]

Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, upper resp sys	Eye	Irritated	Eyes, skin, resp sys
Eyes:	Prevent eye contact	100 ppm: SA*	Abs		Skin	Water flush immed	
Wash skin:	When contam	250 ppm: SA/GF/SCBAF/SAF	Ing		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						

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[Methyl acrylate]

Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin; lac, in animals: convuls, loss of motor control in hind limbs	Eye:	Irritated	Eyes, skin, CNS
Eyes:	Prevent eye contact		Abs		Skin:	Immed wash immed	
Wash skin:	When contam		Ing		Breath:	Resp support	
Remove:	When wet (flam)		Con		Swallow:	Medical attention immed	
Change:	N.R.						

[Methylacrylonitrile]

Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, upper resp sys, anes	Eye	Irritated	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	2200 ppm: SA/SCBAF	Ing		Skin	Soap wash prompt	
Wash skin:	When contam	§ SCBAF PD PP/SAF PD PP ASCBA	Con		Breath	Resp support	
Remove:	When wet (flam)	Escape GMFOV/SCBAE			Swallow	Medical attention immed	
Change:	N.R.						

[Methylal]

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 CH ₃ OH 67-56-1 PC1400000	Carbinol, Columbian spirits, Methanol, Pyroigneous 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: 98 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 CH ₃ NH ₂ 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/FID; OSHA [#40]
1061 19 (anhydrous) 1235 58 (aqueous)	1 ppm = 1.29 mg/m ³							
Methyl (n-amy) ketone CH ₃ CO(CH ₂) ₄ CH ₃ 110-43-0 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): 1.1%	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 CH ₃ Br 74-83-9 PA4900000	Bromomethane, Monobromomethane	NIOSH Ca See Appendix A OSHA† C 20 ppm (80 mg/m ³) [skin]	Ca [260 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: 3.38 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 bromide, 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: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 2000 ppm: SA 5000 ppm: SA, CF 6000 ppm: SA, CF/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; head, drow, dizz, vert, li-head, nau, vomit, vis dist, optic nerve damage (blindness); dermat	Eye Skin Breath Swallow	Irrimmed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, GI tract
[Methyl alcohol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (soln)/Frostbite Prevent eye contact (soln)/Frostbite When contam (soln) When wet (flamm) N.R. Frostbite	NIOSH/OSHA 100 ppm: CCRFS/GMFS/PAPRS// § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFS/SCBAE	Inh Abs (soln) Ing (soln) Con (soln/liq)	Irrit eyes, skin, resp sys, cough, skin, muc memb, burns, dermat, corq, liq: frostbite	Eye Skin Breath Swallow	Irrimmed (soln)/Frostbite Water flush immed (soln)/Frostbite Resp support Medical attention immed (soln)	Eyes, skin, resp sys
[Methylamine]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 600 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb, head, narcosis, dermat	Eye Skin Breath Swallow	Irrimmed Soap wash Fresh air Medical attention immed	Eyes, skin, resp sys, CNS, PNS
[Methyl (n-amy) ketone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq) Prevent eye contact (liq) When contam (liq) When wet (flamm) N.R. Quick drench (liq)	NIOSH § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs (liq) Ing (liq) Con (liq)	Irrit eyes, skin, resp sys; muscle weak, inco, vis dist, vert; nau vomit, head, mal, hand tremor, convuls, dysp, skin vesic, liq: frostbite; [canc]	Eye Skin Breath	Irrimmed (liq) Water flush immed (liq) Resp support	Eyes, skin, resp sys, CNS [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 (0.3 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 [#1481]
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 KU2975000	Chloroethane 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	NIOSH	Inh	Irrit eyes, nose, throat;	Eye	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact	1 ppm: SA*	Abs	head, drow, weak, ataxia,	Skin	blood, kidneys,
Wash skin:	When contam	2.5 ppm: SA; CF*	Ing	tremor, som, anemic pallor,	Breath	repro sys, hemato
Remove:	When wet or contam	5 ppm: SCBAF/SAF	Con	in animals: repro, terato	Swallow	sys
Change:	N.R.	100 ppm: SA; PD, PP*		effects		
Provide:	Quick drench	200 ppm: SAF; PD, PP				
		5: SCBAF; PD, PP/SAF; PD, PP; ASCBA				
		Escape: GMFOV/SCBAE				
[Methyl Cellosolve®]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Eyes, resp sys,
Eyes:	Prevent eye contact	1 ppm: SA*	Abs	kidney, brain damage,	Skin	kidneys, brain, CNS,
Wash skin:	When contam	2.5 ppm: SA; CF*	Ing	in animals: narco,	Breath	PNS, repro sys,
Remove:	When wet or contam	5 ppm: SCBAF/SAF	Con	repro, terato effects	Swallow	hemato sys
Change:	N.R.	100 ppm: SA; PD, PP*				
		200 ppm: SAF; PD, PP				
		5: SCBAF; PD, PP/SAF; PD, PP; ASCBA				
		Escape: GMFOV/SCBAE				
[Methyl Cellosolve® acetate]						
Skin:	Frostbite	NIOSH	Inh	Dizz, nau, vomit, vis d-st,	Eye:	CNS, liver, kidneys,
Eyes:	Frostbite	4: SCBAF; PD, PP/SAF; PD, PP; ASCBA	Con	stagger, slurred speech,	Skin:	repro sys,
Wash skin:	N.R.	Escape: SCBAE	(liq)	convuls, coma; liver,	Breath	[in animals:
Remove:	When wet (flam)			kidney damage,		lung, kidney
Change:	N.R.			liq frostbite, repro,		& forestomach
Provide:	Frostbite			terato effects; [carc]		tumors]
[Methyl chloride]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin; head, lass,	Eye	Eyes, skin, CNS,
Eyes:	Prevent eye contact	700 ppm: SA*/SCBAF	Ing	CNS depres, poor equi, derm,	Skin	CVS, liver
Wash skin:	When contam	5: SCBAF; PD, PP/SAF; PD, PP; ASCBA	Con	cardiomy, liver damage	Breath	
Remove:	When wet or contam	Escape: GMFOV/SCBAE			Swallow	
Change:	N.R.					
[Methyl chloroform]						

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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl-2-cyano- acrylate <chem>CH3-C(CN)COOCH3</chem> 137-05-3 AS7000000	Meccrylate, Methyl cyanoacrylate, Methyl α-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% FLP: 174°F IP: ?	VP(77°F): 0.2 mm FRZ: ? UEL: ? LEL: ?	Molature [Note: Contact with moisture causes rapid polymerization.]	XAD-7; CH, CN/ H, PO; HPLC/UV; OSHA [#66]
	1 ppm = 4.62 mg/m³				Sp Gr(81°F): 1.10 Class IIA Combustible Liquid			
Methylcyclohexane <chem>CH3C6H11</chem> 108-87-2 GV6125000	Cyclohexylmethane, Hexahydrotoluene	NIOSH 400 ppm (1600 mg/m³) OSHA† 800 ppm (3200 mg/m³)	1200 ppm [UEL]	Colorless liquid with a faint, benzene-like odor	MW 98.2 BP 214°F Sol. Insoluble FLP 25°F IP 9.65 eV	VP 37 mm FRZ -196°F UEL 6.7% LEL 1.2%	Strong oxidizers	Char. CS, GC/FID; ■ [#1500, Hydro- carbons]
2296 27	1 ppm = 4.08 mg/m³				Sp Gr 0.77 Class IB Flammable Liquid			
Methylcyclohexanol <chem>CH3C6H11OH</chem> 25639-42-3 GW0175000	Hexahydrocresol, Hexahydromethylphenol	NIOSH 50 ppm (235 mg/m³) OSHA† 100 ppm (470 mg/m³)	800 ppm	Straw-colored liquid with a weak odor like coconut oil.	MW 114.2 BP 311-356°F Sol 4% FLP 148-188°F IP: 9.80 eV	VP(86°F): 2 mm FRZ -58°F UEL ? LEL ?	Strong oxidizers	Char. CH, Cl, GC/FID; ■ [#S374]
2617 26	1 ppm = 4.75 mg/m³				Sp Gr 0.92 Class IIA Combustible Liquid			
o-Methylcyclohexanone <chem>CH3C6H10O</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])	800 ppm	Colorless liquid with a weak, peppermint-like odor.	MW 112.2 BP 325°F Sol Insoluble FLP 118°F IP ?	VP: 1 mm FRZ 7°F UEL ? LEL ?	Strong oxidizers	Porapak, Acetone, GC/FID; ■ [#2521]
2297 26	1 ppm = 4.66 mg/m³				Sp Gr 0.93 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:	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 Irrimed Water wash Resp support Medical attention Irrimed	Eyes, skin, resp sys
[Methyl-2-cyanoacrylate]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contain When wet (flammi) 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, h-head, drow, in animals: narco	Eye Skin Breath: Swallow:	Irr Irrimed Soap wash prompt Resp support Medical attention Irrimed	Eyes, skin, resp sys, CNS
[Methylcyclohexane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contain When wet or contain 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 Irrimed Soap wash prompt Resp support Medical attention Irrimed	Eyes, skin, resp sys, CNS, kidneys, liver
[Methylcyclohexanol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contain When wet or contain 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 Irrimed Soap wash prompt Resp support Medical attention Irrimed	Skin, resp sys, liver, kidneys, CNS
[o-Methylcyclohexanone]							

Chemical name, structural formula, CAS and RTECS Nos., and DOTID 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		
Methylcyclopenta- dienylmanganese tricarbonyl (as Mn) CH ₅ C ₅ H ₅ Mn(CO) ₃ 12108-13-3 OP1460000	CI-2, Combustion Improver-2, Manganese tricarbonyl- methylcyclopentadienyl, 2-Methylcyclopentadienyl manganese tricarbonyl, MMT 1 ppm = 9.06 mg/m ³	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 FLP: 230°F IP: ? Sp.Gr: 1.39 Class III B Combustible Liquid	VP(212°F): 7 mm FRZ: 36°F UEL: ? LEL: ?	Light (decomposes)	None available
Methyl demeton C ₅ H ₁₀ O ₃ PS ₂ 8022-00-2 TG1760000	Demeton methyl; O,O-Dimethyl 2-ethylmer- captoethyl thiophosphate; Metasystox®; Methyl mercaptophos; Methyl systox® [(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] 1 ppm = 9.57 mg/m ³	NIOSH 0.5 mg/m ³ [skin] OSHA† none	N.D.	Oil, colorless to pale-yellow liquid with an unpleasant odor. [Insecticide] [Note: Technical grade consists of 2 isomers: thiono & thioato.]	MW: 230.3 BP: Decomposes Sol: 0.03-0.3% FLP: ? IP: ? Sp.Gr: 1.20 Combustible Liquid	VP: 0.0004 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, alkalis, water	None available
4,4'-Methylenebis(2- chloroaniline) CH ₂ (C ₆ H ₄ 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	Ca [N.D.]	Tan-colored pellets or flakes with a faint, amine-like odor.	MW: 267.2 BP: ? Sol: Slight FLP: ? IP: ? Sp.Gr: 1.44	VP(77°F): 0.00001 mm MLT: 230°F UEL: ? LEL: ?	Chemically active metals (e.g., potassium, sodium, magnesium, zinc)	None available
Methylene bis(4-cyclo- hexylisocyanate) CH ₂ [(C ₆ H ₁₀ NCO) ₂] 5124-30-1 NQ9250000	Dicyclohexylmethane 4,4'- diisocyanate; MDI; 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 FLP: >396°F IP: ? Sp.Gr(77°F): 1.07 Class III B Combustible Liquid	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

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 Abs Ing Con	Irrit eyes; gidd, nau, head; in animals: tremor, severe clonic spasms, weak, slow respiration; liver, kidney inj	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, CNS, liver, kidneys
[Methyl cyclopentadienyl manganese tricarbonyl (as Mn)]						
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; ache eyes, rhin; nau, head, dizz, vomit	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Methyl demeton]						
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 F: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Hema, cyan, nau, methemo, kidney irrt; [carc]	Eye: Skin: Breath: Swallow: Irr Irrmed Soap flush Irrmed Resp support Medical attention Irrmed	Liver, blood, kidneys (In animals: liver, lung & bladder tumors)
[4,4'-Methylenedianiline(2-chloroaniline)]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH 0.1 ppm: SA* 0.25 ppm: SA:CF* 0.5 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; skin, resp sens; chest tight, dysp, cough, dry throat, wheez, pulm edema; skin blisters	Eye: Skin: Breath: Swallow: Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methylene bisphenyl isocyanate <chem>CH_2(C_6H_4NCO)_2</chem> 101-68-8 N99350000 2489 55	4,4'-Diphenylmethane diisocyanate, MDI Methylene bis(4-phenyl isocyanate), Methylene di-p-phenylene ester of isocyanic acid	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 flakes [Note: A liquid above 99°F.]	MW: 250.3 BP: 697°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; IR [#5521]
Methylene chloride <chem>CH_2Cl_2</chem> 75-09-2 PA8050000 1593 74	Dichloromethane, Methylene dichloride	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% FIP: ? 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, IR [#1005]
4,4'-Methylene- diamine <chem>CH_2(C_6H_4NH_2)_2</chem> 101-77-9 BY5425000	4,4'-Diaminodiphenylmethane; para, para'-Diaminodiphenyl- methane; Diaminomethane; 4,4'-Diphenylmethanediamine; MDA	NIOSH Ca See Appendix A OSHA [1910.1060] 0.010 ppm ST 0.100 ppm	Ca [N.D.]	Pale-brown, crystalline solid with a faint, amine-like odor.	MW: 166.3 BP: 748°F Sol: 0.1% FLP: 374°F IP: 10.70 eV Sp. Gr: 1.08 (Liquid at 212°F) Combustible Solid	VP(77°F): 0.0000002 mm MLT: 198°F UEL: ? LEL: ?	Strong oxidizers	Filter; Reagent; HPLC/UV/D; IR [#5029]
Methyl ethyl ketone peroxide <chem>C_5H_{10}O_4</chem> 1338-23-4 EL9480000 2127 49 (80% MEKP) 2860 81	2-Butanone peroxide, Ethyl methyl ketone peroxide, MEKP, MEK peroxide, Methyl ethyl ketone hydroperoxide	NIOSH C 0.2 ppm (1.6 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 (80% MEKP) IP: ? Sp. Gr(89°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% dimethyl phthalate, cyclohexane peroxide, or diallyl phthalate to reduce sensitivity to shock.]	Imp; Reagent; Vis; IR [#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: GMFOVHE/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, h-head, numb tingle limbs, neu, [canc]	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: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit eyes; jaun, hepatitis; myocardial damage; In animals: heart, liver, spleen damage; [canc]	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; derr; 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 F.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% F.P. -2°F IP 10.82 eV	VP 476 mm FRZ -148°F UEL 23% LEL 4.5%	Strong oxidizers [Note: Reacts slowly with water to form methanol & formic acid]	Carbo-B(2), Ethyl acetate, GC/FID, IR(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-6-heptanone 541-85-5 MJ7350000	Amyl ethyl ketone, Ethyl amyl ketone, 3-Methyl-6-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 F.P. 138°F IP ?	VP 2 mm FRZ -70°F UEL ? LEL ?	Strong oxidizers	Char. Methanol/ CS, GC/FID, IR [#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 190°F Sol Miscible F.P. 17°F IP 8.00 eV	VP 38 mm FRZ -62°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	Sub. Pho.-acid, Vis, IR [#3510]
1244 57	1 ppm = 1.92 mg/m ³				Sp Gr(77°F) 0.87 Class IB Flammable Liquid			
Methyl iodide <chem>CH3I</chem> 74-88-4 PA9450000	Iodomethane Moniodomethane	NIOSH Ca See Appendix A 2 ppm (10 mg/m ³) [skin] OSHA† 6 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% F.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, IR [#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	Inh	Irrit eyes, nose, chest	Eye	Eyes, resp sys, CNS
Eyes:	Prevent eye contact	1000 ppm SA*	Abs	tight, dysp, vis dist,	Skin	
Wash skin:	When contam	2500 ppm SA CF*	Ing	CNS depres,	Breath	
Remove:	When wet (flam)	4500 ppm: SCBAF/SAF	Con	in animals: pulm edema, narco	Swallow	
Change:	N.R.	§ SCBAF PD PP/SAF PD PP ASCBA Escape GMFOV/SCBAE				
[Methyl formate]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb,	Eye	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	100 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF	Abs	head, narco, coma, derm	Skin	
Wash skin:	When contam	§ SCBAF PD PP/SAF PD PP ASCBA	Ing		Breath	
Remove:	When wet or contam	Escape GMFOV/SCBAE	Con		Swallow	
Change:	N.R.					
[5-Methyl-3-heptanone]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys,	Eye	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	§ SCBAF PD PP/SAF PD PP ASCBA	Abs	vomit, diarr, tremor,	Skin	CNS liver, blood, CVS
Wash skin:	When contam	Escape SCBAE	Ing	ataxia, anoxia, cyan,	Breath	[in animals:
Remove:	When wet (flam)		Con	convuls, [carc]	Swallow	lung, liver, blood vessel & intestine tumors]
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[Methyl hydrazine]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact	§ SCBAF PD PP/SAF PD PP ASCBA	Abs	nausea, vomit, vert, ataxia,	Skin	[in animals:
Wash skin:	When contam	Escape GMFOV/SCBAE	Ing	slurred speech, drow,	Breath	lung, kidney & forestomach tumors]
Remove:	When wet or contam		Con	derm, [carc]	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, F.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Methyl isobutyl ketone <chem>CH3COCH2CH2CH(CH3)2</chem> 110-12-3 MP3850000	Isobutyl 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: 0.6% F.P: 97°F IP: 8.284 eV	VP: 5 mm FRZ: -101°F UEL(200°F): 8.2% LEL(200°F): 1.0%	Oxidizers	None available
2302 26	1 ppm = 4.76 mg/m³				Sp.Gr: 0.81 Class IC Flammable Liquid			
Methyl isobutyl carbinol <chem>(CH3)2CHCH2CH(OH)CH3</chem> 108-11-2 SA7350000	Isobutylmethylcarbinol, 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% F.P 108°F IP ?	VP 3 mm FRZ -130°F UEL 5.5% LEL 1.0%	Strong oxidizers	Char. 2-Propanol/ CS GC/FID; IR [#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 (0.06 mg/m³) [skin]	3 ppm	Colorless liquid with a sharp, pungent odor.	MW 57.1 BP 139°F Sol(59°F) 10% F.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.]	XAO-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 (706 mg/m³) OSHA† none	N.D.	Colorless liquid with an acetone- like odor.	MW: 86.2 BP: 189°F Sol: Very slight F.P: ? IP: 9.32 eV	VP: 42 mm FRZ: -134°F UEL: ? LEL: ?	Oxidizers	None available
2397 26	1 ppm = 3.88 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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	500 ppm: CCROV*/SA*	Ing	head, narco, coma; derm;	Skin:	CNS, liver, kidneys
Wash skin:	When contam	1250 ppm: SA:CF*/PAPROV*	Con	in animals: liver, kidney	Breath:	
Remove:	When wet (flamm)	2500 ppm: CCRFOV/GMFOV/PAPRTOV*/		damage	Swallow:	
Change:	N.R.	SA:CF*/SCBAF/SAF				
		5000 ppm: SAF:PD,PP				
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				
		Escape: GMFOV/SCBAE				
[Methyl isoamyl ketone]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin; head,	Eye	Eyes, skin, CNS
Eyes:	Prevent eye contact	250 ppm: SA*	Abs	drow, derm.	Skin	
Wash skin:	When contam	400 ppm: SA:CF*/SCBAF/SAF	Ing	in animals: narco	Breath	
Remove:	When wet or contam	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con		Swallow	
Change:	N.R.	Escape: GMFOV/SCBAE				
[Methyl isobutyl carbonyl]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose	Eye	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.2 ppm: SA*	Abs	throat, resp sens, cough,	Skin	
Wash skin:	When contam	0.5 ppm: SA:CF*	Ing	pulm secretions, chest pain,	Breath	
Remove:	When wet (flamm)	1 ppm: SCBAF/SAF	Con	dysp, asthma, eye, skin	Swallow	
Change:	N.R.	3 ppm: SAF:PD,PP		damage;		
Provide:	Eyewash, Quick drench	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA		in animals: pulm edema		
		Escape: GMFOV/SCBAE				
[Methyl isocyanate]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		Ing	resp sys, cough	Skin:	
Wash skin:	When contam		Con		Breath:	
Remove:	When wet or contam				Swallow:	
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 (TLVAs 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 <chem>CH3SH</chem> 74-93-1 PB4375000	Mercaptomethane, Methanethiol, Methyl sulphydrate	NIOSH C 0.5 ppm (1 mg/m³) [15-min] OSHA† C 10 ppm (20 mg/m³)	160 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 RQSD: 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*, HCV/DCE, GC/FPD; II [#2842]
1064 13	1 ppm = 2.00 mg/m³							
Methyl methacrylate <chem>CH2=C(CH3)COOCH3</chem> 80-62-6 OZ5075000	Methacrylate monomer, Methyl ester of methacrylic acid, Methyl-2-methyl-2-propenoate	NIOSH/OSHA 100 ppm (410 mg/m³)	1000 ppm	Colorless liquid with an acid, fruity odor.	MW: 100.1 BP: 214°F Sol: 1.8% 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; II [#2537]
1247 28 (inhibited)	1 ppm = 4.16 mg/m³							
Methyl parathion <chem>(CH3O)2P(S)OC6H4NO2</chem> 298-66-0 TG6176000	Azophos®; O,O-Dimethyl-O-p-nitro- phenylphosphorothioate; Parathion methyl	NIOSH 0.2 mg/m³ [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: 288°F Sol(77°F): 0.008% FLP: 7 IP: 7 Sp. Gr: 1.36 Combustible Solid	VP: 6.00001 mm MLT: 96°F UEL: 7 LEL: 7	Strong oxidizers, water [Note: Explosive risk when heated above 122°F.]	None available
2763 64								
Methyl silicate <chem>(CH3O)2Si</chem> 681-54-5 VV9900000	Methyl orthosilicate, Tetramethoxysilane, Tetramethyl ester of silicic acid, Tetramethyl silicate	NIOSH 1 ppm (6 mg/m³) OSHA† none	N.D.	Clear, colorless liquid. [Note: A solid below 28°F.]	MW: 182.3 BP: 280°F Sol: Soluble FLP: 208°F IP: ? Sp. Gr: 1.02 Class III Combustible Liquid	VP(77°F): 12 mm FRZ: 28°F UEL: ? LEL: ?	Oxidizers; hexa- fluorides of rhenium, molybdenum & tungsten	None available
2808 67	1 ppm = 8.37 mg/m³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — minimum concentration for use (MUC) (See Table 4)	Health hazards			
			Route	Symptoms (See Table 6)	First aid (See Table 6)	Target organs (See Table 6)
Skin:	Prevent skin contact (liq)/Frostbite	NIOSH	Inh	Irrit eyes, skin, resp sys,	Eye:	Eye, skin, resp sys,
Eyes:	Prevent eye contact (liq)/Frostbite	5 ppm: CCROV/SA	Con	narco, cyan, convuls;	Irr: Irrimed (liq)/	CNS, blood
Wash skin:	N.R.	12.5 ppm: SA/CF/PAPROV	(liq)	liq: frostbite	Skin:	
Remove:	When wet (flam)	25 ppm: CCRFOV/GMFOV/PAPRTOV/			Breath:	
Change:	N.R.	SAT/CF/SCBAF/SAF				
Provide:	Eyewash (liq), Quick drench (liq), Frostbite	180 ppm: SA/PD,PP §: SCBAF/PD,PP/SAF/PD,PP/ASCBA Escape: GMFOV/SCBAE				
[Methyl mercaptan]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Eye, skin, resp sys
Eyes:	Prevent eye contact	1000 ppm: SA/CF/CCRFOV/GMFOV/	Ing	throat, derm	Skin:	
Wash skin:	When contam	PAPROV/SCBAF/SAF	Con		Breath:	
Remove:	When wet (flam)	§: SCBAF/PD,PP/SAF/PD,PP/ASCBA			Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE				
[Methyl methacrylate]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin; nau,	Eye:	Eye, skin, resp sys,
Eyes:	Prevent eye contact	2 mg/m ³ : CCROVDM/Fu/SA	Abs	vomit, abdom cramps, diar,	Skin:	CNS, CVS, blood chol
Wash skin:	Prevent eye contact	5 mg/m ³ : SA/CF/PAPROVDMFu	Con	sahr; head, gidd, vert,	Breath:	
Remove:	When wet or contam	10 mg/m ³ : CCRFOVHE/GMFOVHE/		weak; rhin, chest tight;	Swallow:	
Change:	Daily	PAPRTOVHE/SAT/CF/		blurred vision, miosis;		
Provide:	Eyewash, Quick drench	SCBAF/SAF		card irreg; musc fasc;		
		200 mg/m ³ : SAF/PD,PP		dysp		
		§: SCBAF/PD,PP/SAF/PD,PP/ASCBA				
		Escape: GMFOVHE/SCBAE				
[Methyl parathion]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, corn damage	Eye:	Eye, resp sys,
Eyes:	Prevent eye contact		Ing	(following even short-term	Skin:	kidneys
Wash skin:	Daily		Con	exposure to the vapor);	Breath:	
Remove:	When wet or contam		(vap/	lung, kidney inj; pulm	Swallow:	
Change:	N.R.		liq)	edema		
Provide:	Eyewash					
[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, FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
α-Methyl styrene $C_9H_8(C_6H_5)=CH_2$ 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 (485 mg/m ³)	700 ppm	Colorless liquid with a character- istic odor	MW: 118.2 BP: 330°F Sol: Insoluble FLP: 129°F IP: 8.35 eV	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 $C_7H_8N_4O_5$ 21887-84-8 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% FLP: NA IP: ?	VP: 0.0000004 mm MLT: 257°F UEL: NA LEL: NA	None reported	None available
					Sp.Gr: 1.31 Noncombustible Solid			
Mica (containing less than 1% quartz) 12001-26-2 VV8760000	Biotite, Lepidolite, Margarite, Muscovite, Phlogopite, Roscoelite, Zinnweldite	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 FLP: NA IP: NA	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter, none, Grav, II [#0500, Nussence Dust resp]]
					Sp.Gr: 2.6-3.2 Noncombustible Solid			
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 < 3.5 μ m diameter & $\geq$ 10 μ 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 μ m & >1.5 μ m in length.	MW: varies BP: NA Sol: Insoluble FLP: NA IP: NA	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none, Grav, II [#0500, Nussence 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: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 500 ppm: CCROV/SA* 700 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, drow, derm	Eye: Skin: Breath: Swallow:	In: Immed Water flush prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[α-Methyl styrene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	TBAL	Inh Ing Con	In animals: CNS depress; thyroid, liver, enzyme changes	Eye: Skin: Breath: Swallow:	In: Immed Soap wash Fresh air Medical attention Immed	CNS, thyroid, liver
[Methibuzh]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH 15 mg/m ³ : DM 30 mg/m ³ : DMXSQ/SA 75 mg/m ³ : SA:CF/PAPRODM 150 mg/m ³ : HIEF:SAF:CF/PAPRTHIE/ SCBAF:SAF 1500 mg/m ³ : SA:PD,PP § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes; pneumoconiosis, cough, dysp, weak, low wgt	Eye: Breath:	In: Immed Fresh air	Resp sys
[Mica (containing less than 1% quartz)]							
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/PAPRO 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, resp sys; dysp	Eye: Skin: Breath:	In: Immed Soap wash Fresh air	Eyes, skin, resp sys
[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 FLP, 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 FLP: 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; II [#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; II [#7300 Elements]
Monocrotophos C ₈ H ₁₀ NO ₃ P 6923-22-4 TC4378000	3-Hydroxy-N-methylcrotona- mide dimethylphosphates, 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 FLP: >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
Monomethyl aniline C ₈ H ₉ NHCH ₃ 100-61-8 BY4550000	MA, (Methylamino)benzene, N-Methyl aniline, Methylphenylamine, N-Phenylmethylaniline	NIOSH 0.5 ppm (2 mg/m³) [skin] OSHA† 2 ppm (8 mg/m³) [skin]	100 ppm	Yellow to light- brown liquid with a weak, ammonia- like odor	MW: 107.2 BP: 384°F Sol: Insoluble FLP: 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; II [#5153]
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.	OSHA	Inh	In animals: irrit eyes,	Eye:	Ir Immed	Eyes, resp sys,
Eyes:	N.R.	75 mg/m ³ : DM ^A	Ing	nose, throat, anor, diarr,	Breath	Resp support	liver, kidneys
Wash skin:	N.R.	150 mg/m ³ : DMXSO ^A /SA	Con	low-wgt listlessness,	Swallow	Medical attention	
Remove:	N.R.	375 mg/m ³ : SA: CF/PAPROM ^A		liver, kidney damage		immed	
Change:	N.R.	750 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					
[Molybdenum]							
Skin:	Prevent skin contact	OSHA	Inh	In animals: irrit eyes,	Eye	Ir Immed	Eyes, resp sys,
Eyes:	Prevent eye contact	25 mg/m ³ : DM ^A	Ing	nose, throat, anor, inco,	Skin	Water flush	kidneys, blood
Wash skin:	When contam	50 mg/m ³ : DMXSO ^A /SA ^A	Con	dysp, anemia	Breath	Resp support	
Remove:	When wet or contam	125 mg/m ³ : SA: CF ^A /PAPROM ^A			Swallow	Medical attention	
Change:	N.R.	250 mg/m ³ : HIEF/SAT: CF ^A /PAPRTHIE ^A / SCBAF/SAF				immed	
		1000 mg/m ³ : SAF PD, PP					
		§ SCBAF PD PP/SAF PD, PP ASCBA					
		Escape: HIEF/SCBAE					
[Molybdenum (soluble compounds, as Mo)]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, mucosa, blurred	Eye:	Ir Immed	Eyes, resp sys, CNS,
Eyes:	Prevent eye contact		Abs	vision; dizz, convulse; dysp;	Skin:	Water flush Immed	CVS, blood chol,
Wash skin:	When contam		Ing	saliv, abdom cramps, nau,	Breath:	Resp support	repro sys
Remove:	When wet or contam		Con	diarr, vomit;	Swallow:	Medical attention	
Change:	Daily			In animals: possible terato effects		Immed	
[Monocrotophos]							
Skin:	Prevent skin contact	NIOSH	Inh	Weak, dizz, head, dysp,	Eye	Ir Immed	Resp sys, liver,
Eyes:	Prevent eye contact	5 ppm: SA	Abs	cyan, methemo, pulm	Skin	Soap wash Immed	kidneys, blood, CNS
Wash skin:	When contam	12.5 ppm: SA: CF	Ing	edema, liver, kidney	Breath	Resp support	
Remove:	When wet or contam	25 ppm: SAT: CF/SCBAF/SAF	Con	damage	Swallow:	Medical attention	
Change:	N.R.	100 ppm: SAF PD, PP				immed	
		§ SCBAF PD PP/SAF PD, PP ASCBA					
		Escape: GMFS/SCBAE					
[Monomethyl aniline]							

Chemical name, structural 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 F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Morpholine C_4H_9ON 110-91-8 QD6475000	Diethylene imide, 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 F.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]	Sig. el. H ₂ SO ₄ /NaOH; GC/FID; II(3) [#S150]
1780 80 (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 F.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 $C_{10}H_8$ 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% F.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 dicyanate $C_{16}H_8(NCO)_2$ 3173-72-8 NQ9800000	1,8-Dicyanatonaphthalene; 1,8-Naphthalene dicyanate; 1,8-Naphthalene ester of isocyanic acid; NDI	NIOSH 0.040 mg/m ³ (0.004 ppm) C 0.170 mg/m ³ (0.020 ppm) [10-min] OSHA none	N.D.	White to light- yellow, crystalline flakes.	MW: 210.2 BP: 508°F Sol: ? F.P.(oc): 311°F IP: ?	VP(75°F): 0.003 mm MLT: 261°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 (flamms) 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. via dist. cough, in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irrit med Water flush 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, head, drow, derm, in animals: liver, kidney damage	Eye: Skin: Breath: Swallow: Irrit med 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: CCR/ODM/SA* 280 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: Irrit med Molten flush sol-lq 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: Irrit med Soap wash Resp support Medical attention immed	Eyes, resp sys
[Naphthalene disocyanate]						

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 Sp Gr: 1.12 Combustible Solid	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								
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 Sp Gr (208°F): 1.06 Combustible Solid	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								
Niaz® 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.	A liquid mixture. [Note: Used in the past as a catalyst in the manufacture of flexible poly- urethane foams.]	MW: mixture BP: ? Sol: ? FLP: ? IP: ? Sp. Gr: ?	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
Nickel carbonyl $Ni(CO)_4$ 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 Sp Gr (63°F): 1.32 Class IB Flammable Liquid	VP: 315 mm FRZ: -13°F UEL: ? LEL: 2%	Nitric acid, bromine, chlorine & other oxidizers, flammable materials	Char (low Ni) HNO ₃ ; AAS/OF; III [#6007]
1259 57	1 ppm = 7.10 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	Derm; hemorrhagic	Eye:	In/Immed	Bladder, skin
Eyes:	Prevent eye contact	✓ SCBAF PD,PP/SAF PD,PP/ASCBA	Abs	cystitis, dysp, ataxia,	Skin:	Soap wash Immed	[bladder cancer]
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Ing	methemo, hema, dysuria;	Breath:	Resp support	
Remove:	When wet or contam		Con	[canc]	Swallow:	Medical attention Immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[α-Naphthylamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Derm; hemorrhagic	Eye:	In/Immed	Bladder, skin
Eyes:	Prevent eye contact	✓ SCBAF PD,PP/SAF PD,PP/ASCBA	Abs	cystitis; dysp; alana;	Skin:	Soap wash Immed	[bladder cancer]
Wash skin:	When contam/Daily	Escape: HIEF/SCBAE	Ing	methemo, hema, dysuria;	Breath:	Resp support	
Remove:	When wet or contam		Con	[canc]	Swallow:	Medical attention Immed	
Change:	Daily						
Provide:	Eyewash, Quick drench						
[β-Naphthylamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Int; eyes, skin; urinary	Eye:	In/Immed	Eyes, skin, urinary
Eyes:	Prevent eye contact	✓ SCBAF PD,PP/SAF PD,PP/ASCBA	Abs	dysfunc; neurological	Skin:	Soap flush Immed	tract, PNS
Wash skin:	When contam	Escape: GMFOV/SCBAE	Ing	disorders; pins & needles	Breath:	Resp support	
Remove:	When wet or contam		Con	sensation in hands & feet;	Swallow:	Medical attention Immed	
Change:	Daily			musc weak, lass, nau, vomit;			
Provide:	Eyewash, Quick drench			decr nerve conduction times of lower legs			
[NIAUS Catalyst EBN]							
Skin:	Prevent skin contact	NIOSH	Inh	Head, vert; nau, vomit,	Eye:	In/Immed	Lungs, paranasal
Eyes:	Prevent eye contact	✓ SCBAF PD,PP/SAF PD,PP/ASCBA	Abs	epigastric pain; sube pain;	Skin:	Soap wash Immed	sinus, CNS, repro sys
Wash skin:	When contam	Escape: GMFS/SCBAE	Ing	cough, hyperpnea; cyan;	Breath:	Resp support	[lung & nasal
Remove:	When wet (flam)		Con	weak; leucyt; pneumite;	Swallow:	Medical attention Immed	cancer]
Change:	N.R.			delirium; convuls; [canc];			
Provide:	Eyewash, Quick drench			in animals: repro, terato effects			
[Nickel carbonyl]							

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		
Nickel metal and other compounds (as Ni) Ni (Metal) 7440-02-0 (Metal) QK5950000 (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 FLP: 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	3-(1-Methyl-2-pyrrolidyl)-pyridine	NIOSH/OSHA 0.5 mg/m ³ (skin)	5 mg/m ³	Pale-yellow to dark brown liquid with a fish-like odor when warm. (insecticide)	MW: 162.2 BP: 462°F (Decomposes) Sol: Miscible FLP: 203°F IP: 8.01 eV Sp. Gr: 1.01 Class: IIB Combustible Liquid	VP: 0.06 mm FRZ: -110°F UEL: 4.0% LEL: 0.7%	Strong oxidizers, strong acids	XAD-2; Ethyl acetate; GC/IR-FID; IK(3) [#S293]
1654 55	1 ppm = 8.74 mg/m ³							
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)	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.]	28 ppm	Colorless, yellow, or red, fuming liquid with an acid, suffocating odor.	MW: 63.0 BP: 181°F Sol: Miscible FLP: 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	Mononitrogen monoxide; Nitrogen monoxide	NIOSH/OSHA 25 ppm (30 mg/m ³)	100 ppm	Colorless gas. [Note: Shipped as nonrefrigerated compressed gas.]	MW: 30.0 BP: -241°F Sol: 5% FLP: NA IP: 9.27 eV RSD: 1.84 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 hydrocarbons, metals, carbon disulfide [Note: Reacts with water to form nitric acid. Rapidly converted in air to nitrogen dioxide.]	Mol-sieve*; Reagent; Vis; III [#S321]
1660 20	1 ppm = 1.25 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: Eye: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam/Daily When wet or contam Daily	NIOSH M: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Sens derm, allergic asthma, pneulitis; [canc]	Skin: Breath: Swallow:	Water flush Immed Resp support Medical attention immed	Nasal cavities, lungs, skin, [lung & nasal cancer]
[Nickel metal and other compounds (as Ni)]							
Skin: Eye: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	NIOSH/OSHA 5 mg/m ³ : SA/SCBAF §: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, saliv, abdom pain, vomit, diarr; head, dizz, hearing, vis dist; conf, weak, inco, paroxysmal atrial fibril, convuls, dysp; In animals: terato effects	Eye: Skin: Breath: Swallow:	Ir immed Water flush immed Resp support Medical attention immed	CNS, CVS, lungs, GI tract, repro sys
[Nicotine]							
Skin: Eye: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash (pH<2.6), Quick drench (pH<2.6)	NIOSH/OSHA 25 ppm: SA: CF*/CCRFS*/GMFS*/ SCBAF/SAF §: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFS*/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb, delayed pulm edema, pneulitis, bron, dental erosion	Eye: Skin: Breath: Swallow:	Ir immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, teeth
[Nitric acid]							
Skin: Eye: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 100 ppm: SA: CF*/CCRFS*/PAPRS*/ GMFS*/SA*/SCBAF §: SCBAF: PD, PP/SAF: PD, PP, ASCBA Escape: GMFS*/SCBAE	Inh	Irrit eyes, wet skin, nose, throat, drow, uncon; methemo	Breath:	Resp support	Eyes, skin, resp sys, blood, CNS
[Nitric oxide]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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-Nitroaniline <chem>NO2C6H4NH2</chem> 100-01-6 BY 7000000	para-Aminonitrobenzene, 4-Nitroaniline, 4-Nitrobenzenamine, p-Nitrophenylamine, PNA	NIOSH 3 mg/m ³ [skin] OSHA† 8 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% Fl.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 [P5033]
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% Fl.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 pentachloride, chemically- active metals such as tin or zinc	S: gel, 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>C12H9NO2</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, needle-like, crystalline solid with a sweetish odor	MW 199.2 BP 644°F Sol Insoluble Fl.P. 290°F IP ?	VP ? MLT 237°F UEL ? LEL ?	Strong reducers	Filter/ S: gel(2); 2-Propanol, GC/FID, II(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-Nitrochlorobenzenes, 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 Fl.P. 261°F IP 9.96 eV	VP(86°F): 0.2 mm MLT 182°F UEL ? LEL ?	Strong oxidizers, alkalis	S: gel 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 8)
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: GMFOVDMFu/SCBAE	Inh Abs Ing Con	Irrit nose, throat; cyan, ataxia, tacer, tachypnea, dysp, irrity, vomit, diarr, convuls, resp arrest, anemia, methemo, jaundice	Eye: Skin Breath Swallow: Irrimed 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 CCRGV/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	Irrit eyes, skin, anoxia, derm, anemia, methemo; in animals: liver, kidney damage, testicular effects	Eye Skin Breath Swallow Irrimed 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, [canc]	Eye Skin Breath Swallow Irrimed Soap wash immed Resp support Medical attention immed	Bladder, blood [in animals: bladder tumors]
[4-Nitrophenyl]						
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; [canc]	Eye Skin Breath Swallow: Irrimed 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 $\text{CH}_3\text{CH}_2\text{NO}_2$ 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: 10.58 eV	VP(77°F): 21 mm FRZ: -130°F UEL: ? LEL 3.4%	Amines, strong acids, alkalis & oxidizers, hydrocarbons, combustibles, metal oxides	XAD-2(2), Ethyl acetate, GC/FID, II [#2526]
2842 26	1 ppm = 3.12 mg/m ³				Sp Gr 1.05 Class IC Flammable Liquid			
Nitrogen dioxide NO_2 10102-44-0 QW9800000	Dinitrogen tetroxide (N_2O_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_2O_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, Vis, II [#6700]
1067 20	1 ppm = 1.91 mg/m ³							
Nitrogen trifluoride NF_3 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 a nonliquefied compressed gas.]	MW 71.0 BP: -200°F Sol: Slight Fl.P: NA IP: 12.97 eV RGasD: 2.66 Nonflammable Gas	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							
Nitroglycerine $\text{CH}_3\text{NO}_2\text{CHNO}_2\text{CH}_2\text{NO}_2$ 55-63-0 QX2100000 1204 26 (1% soln. in alcohol) 3084 26 (1-8% 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]	78 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 (60-80%).]	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 (1910.106).]	Tenax GC, Ethanol, GC/ECD, II [#2507]

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: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1000 ppm SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape SCBAE	Inh Ing Con	Derm, in animals: tec. dysp, pulm rates, edema, liver, kidney inj, narco	Eye: Skin Breath Swallow: Immed Soap wash prompt Resp support Medical attention immed	Skin, resp sys, CNS, kidneys, liver
[Nitroethane]						
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 20 ppm: SA:CF/SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFS/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; cough, mucoid frothy sputum, decr pulm func, chronic bron, dysp, chest pain, pulm edema, cyan, tachypnea, lacr	Eye: Skin Breath Swallow: Immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, CVS
[Nitrogen dioxide]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 100 ppm CCRS/SA 250 ppm SA CF/PAPRS 500 ppm CCRFS/GMFS/PAPRST/ SAT CF/SCBAF/SAF 1000 ppm: SAF/PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFS/SCBAE	Inh	In animals: anoxia, cyan, methemo, weak, dizz, head, liver, kidney inj	Breath Resp support	Blood, liver, kidneys
[Nitrogen trifluoride]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) Daily Quick drench	NIOSH 1 mg/m ³ SA* 2.5 mg/m ³ SA, CF* 5 mg/m ³ SAT CF/SCBAF/SAF 75 mg/m ³ : SAF/PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Throb head, dizz, nau, vomit, abdom pain, hypotension, flush, pale, methemo, delirium, CNS depres, angina, skin irrit	Eye: Skin: Breath Swallow: Immed Soap wash immed Resp support Medical attention immed	CVS, blood, skin, CNS
[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 CH_3NO_2 75-52-5 PA9600000	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: 11.06 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 $\text{C}_{10}\text{H}_7\text{NO}_2$ 581-89-5 QJ9760000	8-Nitronaphthalene	NIOSH Ca* See Appendix A [Note: Since metabolized to 8-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 $\text{CH}_3\text{CH}_2\text{CH}_2\text{NO}_2$ 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: 10.81 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 $(\text{CH}_3)_2\text{CHNO}_2$ 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,
Eyes:	Prevent eye contact	760 ppm: SA/CF/SCBAF/SAF	Ing	in animals: irrit eyes, resp	Skin	liver
Wash skin:	When contam	§ SCBAF PD PP/SAF PD, PP ASCBA	Con	sys; convuls, narco; liver	Breath	
Remove:	When wet (flam)	Escape: SCBAE		damage	Swallow:	
Change:	N.R.					
[Nitromethane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit skin, resp sys;	Eye:	Skin, resp sys
Eyes:	Prevent eye contact	1: SCBAF PD, PP/SAF PD, PP ASCBA	Abs	derm; [canc]	Skin	[bladder cancer]
Wash skin:	When contam/Daily	Escape: GMFOVHE/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, neu,	Eye	Eyes, CNS,
Eyes:	Prevent eye contact	250 ppm: SA*	Ing	vom, diarr;	Skin	liver, kidneys
Wash skin:	N.R.	625 ppm: SA/CF*	Con	in animals: liver,	Breath	
Remove:	When wet (flam)	1000 ppm: SCBAF/SAF		kidney damage	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,
Eyes:	Prevent eye contact	1: SCBAF PD, PP/SAF PD, PP ASCBA	Ing	resp sys: head, anor, neu,	Skin	CNS, kidneys, liver
Wash skin:	When contam	Escape: SCBAE	Con	vomit, diarr; kidney, liver	Breath:	[in animals:
Remove:	When wet (flam)			damage; [canc]	Swallow:	liver tumors]
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 $(\text{CH}_3)_2\text{N}_2\text{O}$ 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 ₂ Cl ₂ , GC/FID, III [#2522]
	1 ppm = 3.08 mg/m ³				Sp Gr 1.005 Combustible Liquid			
o-Nitrotoluene $\text{NO}_2\text{C}_6\text{H}_4\text{CH}_3$ 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]
1664 55	1 ppm = 5.70 mg/m ³				Sp Gr 1.16 Class IIIB Combustible Liquid			
m-Nitrotoluene $\text{NO}_2\text{C}_6\text{H}_4\text{CH}_3$ 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 58°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 1.8%	Strong oxidizers, sulfuric acid	Si gel, Methanol, GC/FID, III [#2005, Nitro- benzenes]
1664 55	1 ppm = 5.70 mg/m ³				Sp Gr 1.18 Class IIIB Combustible Liquid			
p-Nitrotoluene $\text{NO}_2\text{C}_6\text{H}_4\text{CH}_3$ 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 1.8%	Strong oxidizers, sulfuric acid	Si gel, Methanol, GC/FID, III [#2005, Nitro- benzenes]
1664 55	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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Nau, vomit, diarr,	Eye	Irmmmed	Liver, kidneys,
Eyes:	Prevent eye contact	& SCBAF PD PP/SAF PD PP ASCBA	Abs	abdom cramps, head,	Skin	Soap wash immed	lungs
Wash skin:	When contam/Daily	Escape HIEF/SCBAE	Ing	fever, enlarged liver,	Breath	Resp. support	[In animals:
Remove:	When wet or contam		Con	jaun, decr liver, kidney,	Swallow	Medical attention	lung, kidney,
Change:	Daily			pulmfunc; [canc]		immed	liver & nasal
Provide:	Eyewash, Quick drench						cavity tumors]
[N-Nitrosodimethylamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan, head,	Eye	Irmmmed	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm SA*	Abs	weak, dizz, ataxia,	Skin	Soap wash immed	skin, GI tract
Wash skin:	When contam	50 ppm SA CF*	Ing	dysp, tacar, nau, vomit	Breath	Resp. support	
Remove:	When wet or contam	100 ppm SAT CF*/SCBAF/SAF	Con		Swallow	Medical attention	
Change:	N.R.	200 ppm SAF PD PP				immed	
		& SCBAF PD PP/SAF PD PP ASCBA					
		Escape GMFOVHIE/SCBAE					
[o-Nitrotoluene]							
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan, head,	Eye	Irmmmed	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm SA*	Abs	weak, dizz, ataxia,	Skin	Soap wash immed	skin, GI tract
Wash skin:	When contam	50 ppm SA CF*	Ing	dysp, tacar, nau, vomit	Breath	Resp. support	
Remove:	When wet or contam	100 ppm SAT CF*/SCBAF/SAF	Con		Swallow	Medical attention	
Change:	N.R.	200 ppm SAF PD PP				immed	
		& SCBAF PD PP/SAF PD PP ASCBA					
		Escape GMFOVHIE/SCBAE					
[m-Nitrotoluene]							
Skin:	Prevent skin contact	NIOSH	Inh	Anoxia, cyan, head,	Eye	Irmmmed	Blood, CNS, CVS,
Eyes:	Prevent eye contact	20 ppm SA*	Abs	weak, dizz, ataxia,	Skin	Soap wash immed	skin, GI tract
Wash skin:	When contam	50 ppm SA CF*	Ing	dysp, tacar, nau, vomit	Breath	Resp. support	
Remove:	When wet or contam	100 ppm SAT CF*/SCBAF/SAF	Con		Swallow	Medical attention	
Change:	Daily	200 ppm SAF PD PP				immed	
		& SCBAF PD PP/SAF PD PP ASCBA					
		Escape GMFOVHIE/SCBAE					
[p-Nitrotoluene]							

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		
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 [#6800]
Nonane $CH_3(CH_2)_7CH_3$ 111-84-2 RA8115000 1920 27	n-Nonane, Nonyl hydride 1 ppm = 5.33 mg/m ³	NIOSH 200 ppm (1060 mg/m ³) OSHA† none	N.D.	Colorless liquid with a gasoline- like odor.	MW: 128.3 BP: 303°F Sol: Insoluble F.P.: 58°F IP: 10.21 eV Sp.Gr: 0.72 Class IC Flammable Liquid	VP: 3 mm FRZ: -40°F UEL: 2.9% LEL: 0.6%	Strong oxidizers (e.g., peroxides, nitrates, perchlorates)	None available
1-Nonanethiol $CH_3(CH_2)_8SH$ 1455-21-6	1-Mercaptononane, n-Nonyl mercaptan, Nonylthiol 1 ppm = 6.66 mg/m ³	NIOSH 0.8 ppm (3.3 mg/m ³) [16-min] OSHA none	N.D.	Liquid.	MW: 160.3 BP: ? Sol: Insoluble F.P.: ? IP: ? Sp.Gr: ? Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
Octachloronaphthalene $C_{10}Cl_8$ 2734-13-1 QK0250000	Halowax® 1051, 1,2,3,4,5,6,7,8-Octa- chloronaphthalene Perchloronaphthalene OSHA† 0.1 mg/m ³ [skin]	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: ? Sp.Gr: 2.00 Noncombustible Solid	VP: <1 mm MLT: 368°F UEL: NA LEL: NA	Strong oxidizers	Filter, Heads, GC/FID, II(2) [#597]

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:	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
Eyes:	Frostbite						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
Provide:	Frostbite						
[Nitrous oxide]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit 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 Immed Medical attention Immed	Eyes, skin, resp sys, CNS
Eyes:	Prevent eye contact						
Wash skin:	Daily						
Remove:	When wet (flamm)						
Change:	N.R.						
Provide:	Eyewash						
[Nonane]							
Skin:	Prevent skin contact	NIOSH	Inh Ing Con	Irrit 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
Eyes:	Prevent eye contact	5 ppm: CCROV/SA					
Wash skin:	When contam	12.5 ppm: SA/CF/PAPROV					
Remove:	When wet or contam	25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF					
Change:	N.R.	5: SCBAF-PD, PP/SAF-PD, PP/ASCBA Escape: GMFOV/SCBAE					
[1-Nonanethiol]							
Skin:	Prevent skin contact	NIOSH/OSHA	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
Eyes:	Prevent eye contact	1 mg/m ³ SA/SCBAF					
Wash skin:	When contam/Daily	5: SCBAF-PD, PP/SAF-PD, PP/ASCBA					
Remove:	When wet or contam	Escape: GMFOVHIE/SCBAE					
Change:	Daily						
[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, F.P., IP, Sp. Gr., Flammability	VP, FRZ, UEL, LEL		
1-Octadecanethiol <chem>CH3(CH2)16SH</chem> 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: 296.6 BP: ? Sol: insoluble F.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 <chem>CH3CH27CH3</chem> 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 (2360 mg/m ³)	1000 ppm [LEL]	Colorless liquid with a gasoline- like odor.	MW 114.2 BP 258°F Sol(77°F): 0.00007% F.P. 56°F IP: 9.82 eV Sp.Gr: 0.70 Class IB Flammable Liquid	VP 10 mm FRZ -70°F UEL 8.5% LEL 1.0%	Strong oxidizers	Char; CS; GC/FID; II [#1500, Hydro- carbons]
1262-27	1 ppm = 4.75 mg/m ³							
1-Octanethiol <chem>CH3(CH2)6SH</chem> 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 FLP(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; II [#2810]
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 F.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; II [#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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH 8 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 28 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:	Irritated Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS, blood
[1-Octadecanethiol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam) N.R.	NIOSH 750 ppm: SA* 1000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, drow, derm, chemical pneu (aspir lit); In animals: narco	Eye Skin Breath Swallow	Irritated Soap wash prompt Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[Octane]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 8 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 28 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye: Skin: Breath: Swallow:	Irritated Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, blood, CNS
[1-Octanethiol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam Daily	NIOSH/OSHA 50 mg/m ³ : HIE/SA 125 mg/m ³ : SA:CF/PAPRHE 250 mg/m ³ : HIEF/SAT:CF/PAPRTHE/ SCBAF/SAF 2500 mg/m ³ : SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin, resp sys	Skin Breath	Soap wash Fresh air	Eyes, skin, resp sys
[Olefin (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 Fl.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, acid, chlorine-like odor [Note: A liquid above 105°F.]	MW 254.2 BP 266°F Sol(77°F) 6% Fl P NA IP 12 60 eV Sp Gr 5.10 Noncombustible Solid	VP 7 mm MLT 105°F UEL NA UEL NA	Hydrochloric acid, easily oxidized organic materials [Note: Begins to sublime below BP. Contact with other materials may cause fire.]	None available
Oxalic acid HOOC-COOH·2H ₂ O 144-62-7 RO2450000	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% Fl 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% Fl 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 RS6225000	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% Fl 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. lit) [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	Inn med	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.1 mg/m ³ CCRFSH/E/GMFSH/E/	Inh	vis dist, conc, head,	Skin	Soap wash inn med	
Wash skin:	When contam	SCBAF/SAF	Ing	cough, dysp, derm	Breath	Resp support	
Remove:	When wet or contam	1 mg/m ³ SAF PD,PP	Con		Swallow:	Medical attention inn med	
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	Inn med	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	25 mg/m ³ SA CF/MPAPDMF	Inh	eye burns, local pain,	Skin	Water flush prompt	kidneys
Wash skin:	When contam	50 mg/m ³ HIEF/SCBAF/SAF	Ing	cyan, shock, collapse,	Breath	Resp support	
Remove:	When wet or contam	500 mg/m ³ SAF PD,PP	Con	convuls, kidney damage	Swallow:	Medical attention inn med	
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	Inn med	Eyes, skin, resp sys
Eyes:	N.R.	0.5 ppm SA/SCBAF	Con	head, pulm edema, eye,	Skin	Water flush inn med	
Wash skin:	N.R.	§ SCBAF PD,PP/SAF PD,PP/ASCBA		skin burns (from contact	Breath:	Resp support	
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	Medical attention	Eyes, resp sys
Eyes:	N.R.	1 ppm CCRS/SA	Con	pulm edema, chronic	Breath	Fresh air, 100% O ₂	
Wash skin:	N.R.	2.5 ppm SA CF/PAPRS		resp disease			
Remove:	N.R.	5 ppm CCRFS/GMFS/SAF 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 (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		
Paraffin wax fume $C_{25}H_{52}$ 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., $C_{25}H_{52}$)]	MW: 350-420 BP: ? Sol: Insoluble FLP: 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) $CH_3(C_6H_4N)_2CH_3 \cdot 2Cl$ 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 ($C_8H_8N_2^+$); 1,1-dimethyl-4,4'-bipyridinium]; 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 FLP: NA IP: ? Sp Gr: 1.24 Noncombustible Solid	VP: <0.0000001 mm MLT: 572°F (Decomposes) UEL: NA LEL: NA	Strong oxidizers, alkylaryl-sulfonate wetting agents [Note: Corrosive to metals. Decomposes in presence of ultraviolet light.]	Filter, Water, HPLC/AVD, II [#5003]
Parathion $(C_8H_{10}O_5P_1(S)OC_6H_4NO_2)$ 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% FLP(oc): 392°F IP: ? Sp Gr: 1.27 Class IIB Combustible Liquid	VP: 0.00004 mm FRZ: 43°F UEL: ? LEL: ?	Strong oxidizers, alkaline materials	Filter, Isocutane, GC/FPD, II [#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; II [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: Eyes: Wash skin: Remove: Change:	N.R. Prevent eye contact N.R. N.R. N.R.	TBAL	Inh Con	Irrit eyes, skin, resp sys; discomfort, nau	Eye: Breath:	Irrimmed Resp support	Eyes, skin, resp sys
[Paraffin wax fume]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH 1 mg/m ³ : CCROVDMFu*/PAPROVDMFu/ SA*/SCBAF § SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, resp sys; epis; derm; fingernail damage; irrit GI tract, heart, liver, kidney damage	Eye Skin Breath: Swallow	Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, heart, liver, kidneys, GI tract
[Paraquat]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 0.5 mg/m ³ : CCROVDMFu/SA 1.25 mg/m ³ : SA CF/PAPROVDMFu 2.5 mg/m ³ : CCRFOVHIE/SAT CF/ PAPRTOVHIE/SCBAF/SAF 10 mg/m ³ : SA/PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit 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	Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Perathion]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irrit eyes, skin, throat, upper resp sys	Eye: Breath:	Irrimmed Fresh air	Eyes, skin, resp sys
[Particulates 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 (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		
Pentaborane B_5H_9 19624-22-7 R18925000	Pentaboron nonahydride	NIOSH 0.005 ppm (0.01 mg/m ³) STEL 0.015 ppm (0.03 mg/m ³) OSHA 0.005 ppm (0.01 mg/m ³)	1 ppm	Colorless liquid with a pungent odor like sour milk.	MW: 63.1 BP: 140°F Sol: Reacts FLP: 86°F IP: 9.90 eV	VP: 171 mm FRZ: -52°F UEL: ? LEL: 0.42%	Oxidizers, halogens, water, halogenated hydrocarbons [Note: May ignite SPONTANEOUSLY in most 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				Sp Gr: 0.62 Class IC Flammable Liquid			
Pentachloroethane $CHCl_2CCl_2$ 78-01-7 K18300000	Ethane pentachloride, Pentallin	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: 0.06% FLP: ? IP: 11.28 eV	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.]	Pompaik; Hexane; GC/ECD; II [#2517]
1888 55	1 ppm = 8.41 mg/m ³				Sp.Gr: 1.88 Combustible Liquid			
Pentachloronaphthalene $C_{10}H_6Cl_5$ 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 FLP: NA IP: ? Sp.Gr: 1.87 Noncombustible Solid	VP: <1 mm MLT: 248°F UEL: NA LEL: NA	Strong oxidizers	Filter/Bub; Isocetane; 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% FLP: 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/UV; II [#5512]
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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) N.R. Eyewash, Quick drench	NIOSH/OSHA 0.05 ppm SA 0.125 ppm SA/CF 0.25 ppm SAT CF/SCBAF/SAF 1 ppm: SA/PD/PP § SCBAF PD/PP/SAF PD/PP ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, dizz, head, drow, li-head, inco, tremor, convuls, behavioral changes; tonic spasm face, neck, abdom, limbs	Eye Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CNS
[Pentaborane]						
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	In animals: Irrit eyes, skin; weak, restless, irreg respiration, musc inco; liver, kidney, lung changes	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Pentachloroethane]						
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 SA*/SCBAF § SCBAF PD/PP/SAF PD/PP ASCBA Escape: GMFOVH/SCBAE	Inh Abs Ing Con	Head, rig, verti, anor, pruritus, acne-form skin eruptions, jaun, liver nec	Eye Skin Breath Swallow: Irr immed Soap prompt/molten flush immed Resp support Medical Attention immed	Skin, liver, CNS
[Pentachloronaphthalene]						
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 2.6 mg/m ³ : CEROVDMFu/PAPROVDMFu/ SA*/SCBAF § SCBAF PD/PP/SAF PD/PP ASCBA Escape: GMFOVH/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, sneez, cough, weak, anor low-wgt, sweat, head, dizz, nau, vomit, dysp, chest pain, high fever, derm	Eye Skin Breath Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS, liver, kidneys, CNS
[Pentachlorophenol]						

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		
Pentaerythritol $C(CH_2OH)_4$ 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% monopentaerythritol & 12% dipen- taerythritol.]	MW: 138.2 BP: Sublimes Sol (59°F): 8% F.P.: ? 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; II [Hazardous Dust: #0800 (total), #0800 (resp)]
n-Pentane $CH_3CH_2CH_2CH_2CH_3$ 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 (2960 mg/m ³)	1500 ppm [UEL]	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% F.P. -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, GCFID; III [#1500, Hydro- carbons]
1-Pentanethiol $CH_3(CH_2)_4SH$ 110-86-7 SA3150000	Amyl hydrosulfide, Amyl mercaptan, Amyl sulthydrate, 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: 280°F Sol: Insoluble F.P.(oc): 88°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
1111 27	1 ppm = 4.33 mg/m ³							
2-Pentanone $CH_3COCH_2CH_2CH_3$ 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% F.P. 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, GCFID; II [#1300, Ketones I]
1249 26	1 ppm = 3.58 mg/m ³							

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — minimum 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:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Ing Con	Irrit eyes, resp sys	Eye: Skin: Breath: Swallow:	In/Immed Water wash Fresh air Medical attention Immed	Eyes, resp sys
[Pentamethylol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	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 pneum, (aspir Itch); drow; In animals: narco	Eye Skin Breath Swallow:	In/Immed 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 (flam)	NIOSH 6 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, neu, dizz; vomit, diarr; derm, skin sens	Eye: Skin: Breath: Swallow:	In/Immed Soap wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[1-Pentanethiol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	NIOSH 1500 ppm: CCRGV*/PAPROV*/GMFOV/ SA*/SCBAF \$ SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb, head, derm, narco, coma	Eye Skin Breath Swallow:	In/Immed 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 FLP, IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
Perchloromethyl mercaptan Cl_3CSCl 594-42-3 PB0370000 1670 55	PCM, PMM, Trichloromethane sulfonyl chloride, Trichloromethyl sulfur chloride 1 ppm = 7.73 mg/m ³	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 FLP: NA IP: ? Sp. Gr: 1.69 Noncombustible Liquid, but will support combustion.	VP: 3 mm FRZ: ? UEL: NA LEL: NA	Alkali, amines, hot iron, water [Note: Corrosive to most metals. Forms HCl, sulfur & CO ₂ on contact with water.]	None available
Perchloryl fluoride ClO_3F 7616-94-6 SD1925000 3083 20	Chlorine fluoride oxide, Chlorine oxyfluoride, Trioxychlorofluoride 1 ppm = 4.26 mg/m ³	NIOSH 3 ppm (14 mg/m ³) ST 6 ppm (28 mg/m ³) OSHA† 3 ppm (13.8 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% FLP: NA IP: 13.60 eV RGasD: 3.64 Nonflammable Gas, but will support combustion.	VP: 10.8 atm FRZ: -234°F UEL: NA LEL: NA	Combustibles, strong bases, amines, finely divided metals, reducing agents, alcohols	None available
Perlite 93763-70-3 806254000	Expanded perlite [Note: An amorphous material consisting of fused sodium potassium aluminosilicates.]	NIOSH 10 mg/m ³ (total) 8 mg/m ³ (resp) OSHA 18 mg/m ³ (total) 8 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% FLP: NA IP: NA Sp. Gr: 2.2-2.4 (crude) 0.06-0.3 (expanded) Noncombustible Solid	VP: 0 mm (approx) M.L.T.: >2000°F UEL: NA LEL: NA	None reported	Filter; none; Grav; ■ [Nuisance Dust: 80600 (total), 80600 (resp)]
Petroleum distillates (naphtha) 8002-05-9 SE7449000 1256 27	Aliphatic petroleum naphtha, Petroleum naphtha, Rubbers solvent 1 ppm = 4.11 mg/m ³ (approx)	NIOSH 350 mg/m ³ C 1800 mg/m ³ [15-min] OSHA† 800 ppm (3000 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: 86-460°F Sol: Insoluble FLP: -86 to -86°F IP: ? Sp. Gr: 0.63-0.86 Flammable Liquid	VP: 40 mm (approx) FRZ: -99°F UEL: 5.9% LEL: 1.1%	Strong oxidizers	Char; CS; GC/FID; ■ [P1550, Naphthas]

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:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 ppm CCR OV*/SA*	Abs	throat, iac, cough,	Skin	liver, kidneys
Wash skin:	When contam	2.5 ppm SA CF*/PAPROV*	ing	dysp, deep breath pain,	Breath	
Remove:	When wet or contam	5 ppm CCR OV/GMFOV/PAPROV*/ SA CF*/SCBAF/SAF	Con	coarse rales, vomit, pallor, tacer, acidosis, anuria, liver, kidney damage	Swallow	
Change:	N.R.	10 ppm SAF PD/PP § SCBAF PD/PP/SAF PD/PP ASCBA Escape GMFOV/SCBAE				
[Perchloromethyl mercaptan]						
Skin:	Frostbite	NIOSH/OSHA	Inh	Irrit resp sys,	Eye:	Skin, resp sys, blood
Eyes:	Frostbite	30 ppm SA	Con	lip; frostbite;	Skin:	
Wash skin:	N.R.	75 ppm SA CF*	(liq)	in animals, methemo, cyan, weak, dizz, head, palm edema, pneumonia, anoxia	Breath:	
Remove:	N.R.	100 ppm SCBAF/SAF				
Change:	N.R.	§ SCBAF PD/PP/SAF PD/PP ASCBA Escape GMFS/SCBAE				
Provide:	Frostbite					
[Perchloryl fluoride]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, throat,	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Con	upper resp sys	Breath:	
Wash skin:	N.R.					
Remove:	N.R.					
Change:	N.R.					
[Perlite]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	850 ppm SA	ing	dizz, drow, head, neu,	Skin	CNS
Wash skin:	When contam	1100 ppm SA CF*/SCBAF/SAF	Con	dry cracked skin, chemical pneu (aspir liq)	Breath:	
Remove:	When wet (flamm)	§ SCBAF PD/PP/SAF PD/PP ASCBA Escape GMFOV/SCBAE			Swallow:	
Change:	N.R.					
[Petroleum distillates (naphtha)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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 106-95-2 SJ3325000 1671 55 (solid) 2312 55 (molten) 2621 55 (solution)	Carbolic acid, Hydroxybenzene, Monohydroxybenzene, Phenyl alcohol, Phenyl hydroxide 1 ppm = 3.91 mg/m ³	NIOSH 5 ppm (19 mg/m ³) C 15 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 5% water.]	MW 94.1 BP 359°F Sol(77°F) 9% Fl.P 175°F IP 8.50 eV Sp Gr 1.08 Combustible Solid	VP 0.4 mm MLT 109°F UEL 8.6% LEL 1.8%	Strong oxidizers, calcium hypochlorite, aluminum chloride, acids	XAD-7, Methanot, HPLC/UV, OSHA [832]
Phenothiazine $S(C_6H_4)_3NH$ 92-84-2 SH6076000	Dibenzothiazine, Fenothiazine, Thiodiphenylamine	NIOSH 8 mg/m ³ [skin] OSHA† none	N.D.	Grayish-green to greenish-yellow solid. [Insecticide]	MW: 198.3 BP: 700°F Sol: Insoluble Fl.P: 7 IP: 7 Sp.Gr: 7 Combustible Solid, but not a high fire risk.	VP: 0 mm (approx) MLT: 365°F UEL: 7 LEL: 7	None reported	None available
p-Phenylenediamine $C_6H_4(NH_2)_2$ 106-50-3 SS8050000 1673 53	4-Aminocinnoline, 1,4-Benzenediamine, p-Diaminobenzene, 1,4-Diaminobenzene, 1,4-Phenylenediamine	NIOSH/OSHA 0.1 mg/m ³ [skin]	25 mg/m ³	White to slightly red crystalline solid	MW 108.2 BP 513°F Sol(78°F): 4% Fl.P 312°F IP 6.89 eV Sp Gr 7 Combustible Solid	VP <1 mm MLT 295°F UEL 7 LEL 7	Strong oxidizers	Filter*, EDTA, HPLC/UV; OSHA [887]
Phenyl ether (vapor) $C_6H_5OC_6H_5$ 101-84-6 KN8970000	Diphenyl ether, Diphenyl oxide, Phenocyclohexene, Phenyl oxide 1 ppm = 7.06 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 III Combustible Liquid	VP(77°F): 0.02 mm MLT 82°F UEL 6.0% LEL 0.7%	Strong oxidizers	Char, CS, GC/FID, ■ [872]

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 50 ppm CCR/ODM/SA 125 ppm SA CF/PAPROVDM 250 ppm CCRFOVHIE/GMFOVHIE/ PAPRTOVHIE/SCBAF/SAF § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat, anor, low-wgt, weak muscle ache, pain, dark urine, cyan, liver, kidney damage, skin burns, derm, ochronosis, tremor, convuls, twitch	Eye Skin Breath, Swallow Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[Phenol]						
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam/Daily Remove: When wet or contam Change: Daily		TBAL	Inh Abs Ing Con	itching, irrit, reddening skin; hepatitis, hemolytic anemia, abdom cramps, tacer; kidney damage; skin photo sens	Eye: Skin: Breath: Swallow: Irrimmed Soap wash prompt Resp support Medical attention immed	Skin, CVS, liver, kidneys
[Phenothiazine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily		NIOSH/OSHA 2.5 mg/m ³ SA CF ¹ 5 mg/m ³ SCBAF/SAF 25 mg/m ³ SAF PD PP § SCBAF PD PP/SAF PD PP ASCBA Escape GMFSHE/SCBAE	Inh Abs Ing Con	Irrit pharynx, larynx, bronchial asthma, sens derm	Eye Skin Breath Swallow Irrimmed Soap wash prompt Resp support Medical attention immed	Resp sys, skin
[p-Phenylenediamine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.		NIOSH/OSHA 25 ppm SA CF ¹ /PAPROVDM ¹ 50 ppm CCRFOVHIE/GMFOVHIE/ SCBAF/SAF 100 ppm SAF PD PP § SCBAF PD PP/SAF PD PP ASCBA Escape GMFOVHIE/SCBAE	Inh Con	Irrit eyes, nose, skin, nau	Eye Skin Breath Irrimmed Soap wash prompt Resp support	Eyes, skin, resp sys
[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		
Phenyl ether-biphenyl mixture (vapor) <chem>C6H5OC6H4C6H5C6H5</chem> 8004-13-5 DV1500000	Diphenyl oxide-diphenyl mixture, Dowtherm® A 1 ppm = 8.90 mg/m³ (approx)	NIOSH/OSHA 1 ppm (7 mg/m³)	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: 186 (approx) BP: 495°F Sol: Insoluble FLP: 239°F IP: ? Sp Gr(77°F): 1.05 Class IIIB Combustible Liquid	VP(77°F): 0.08 mm FRZ: 54°F UEL: ? LEL: ?	Strong oxidizers	Si gel; Benzene; GC/FID; ■ [§S73]
Phenyl glycidyl ether <chem>C6H4O2</chem> 122-60-1 TZ3675000	1,2-Epoxy-3-phenoxy propane; Glycidyl phenyl ether; PGE; Phenyl 2,3-epoxypropyl ether 1 ppm = 6.24 mg/m³	NIOSH Ca See Appendix A C 1 ppm (6 mg/m³) [15-min] OSHA† 10 ppm (66 mg/m³)	Ca [100 ppm]	Colorless liquid [Note: A solid below 36°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: 36°F UEL: ? LEL: ?	Strong oxidizers, amines, strong acids, strong bases	Char; CS; GC/FID; ■ [§S74]
Phenyldiazine <chem>C6H4N2NH2</chem> 100-63-0 MW8925000 2572 53	Hydrazinobenzene, Monophenyldiazine 1 ppm = 4.49 mg/m³	NIOSH Ca See Appendix A C 0.14 ppm (skin) (0.6 mg/m³) [2-hr] OSHA† 6 ppm (22 mg/m³) [skin]	Ca [18 ppm]	Colorless to pale- yellow liquid or solid (below 67°F) with a faint, aromatic odor	MW: 106.1 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	Sub; Pho-acid; Vis; ■ [§S160]
N-Phenyl-8-naphthyl- amine <chem>C10H7NHC6H5</chem> 138-68-8 QM4660000	2-Anilinonaphthalene, 8-Naphthylphenylamine, P8NA, 2-Phenylnaphthalene, Phenyl-8-naphthylamine OSHA none	NIOSH Ca See Appendix A [Note: Since metabolized to 8-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 8-Naphthylamine.]	MW: 218.3 BP: 743°F Sol: Insoluble FLP: ? IP: ? Sp Gr: 1.24 Combustible Solid	VP: ? MLT: 228°F UEL: ? LEL: ?	Oxidizers	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — minimum 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: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 10ppm: SA:CF/CCRFOVHIE/ GMFOVHIE/PAPROVDM/ SCBAF/SAF § SCBAF-PD,PP/SAF-PD,PP-ASCBA Escape: GMFOVHIE/SCBAE	Inh Con	Irrit eyes, nose, skin; nau	Eye Skin Breath: Irr immed Soap wash prompt Resp support	Eyes, skin, resp sys
[Phenyl ether-biphenyl mixture (vapor)]						
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, upper resp sys, skin sens; narco, possible hemato, repro effects; [canc]	Eye Skin Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, CNS, hemato sys, repro sys [in animals: nasal cancer]
[Phenyl glycidyl ether]						
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: SCBAE	Inh Abs ing Con	Skin sens, hemolytic anemia, dysp, cyan, jaun, kidney damage, vascular thrombosis, [canc]	Eye Skin Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Blood, resp sys, liver, kidneys, skin [in animals: tumors of the lungs, liver, blood vessels & intestine]
[Phenythydrazine]						
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	Irritation; leucoplakia; sore; hypersensitivity to sunlight; [canc]	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, bladder [bladder cancer]
[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, FLP, IP, Sp, Gr, Flammability	VP, FRZ, UEL, LEL		
Phenylphosphine $C_6H_5PH_2$ 638-21-1 S22100000	Fenylfosfin, PF, Phosphiniline	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 FLP: ? IP: ? Sp.Gr(59°F): 1.001 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	None reported [Note: Spontaneously combustible in high concentrations in air. Potential exposure to gaseous phenylphosphine when polyphenylphosphines are heated above 392°F.]	None available
Phorate ($C_4H_9O_3P(S)SCH_2SC_2H_5$) 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 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: 280.4 BP: ? Sol: 0.005% FLP(oc): 320°F IP: ? Sp.Gr(77°F): 1.18 Class IIB Combustible Liquid, but does not readily ignite.	VP: 0.0008 mm FRZ: -45°F UEL: ? LEL: ?	Water, alkalis [Note: Hydrolyzed in the presence of moisture and by alkalis.]	None available
Phosdrin® $C_2H_5PO_3$ 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_3O) 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 FI P(oc): 347°F IP: ? Sp.Gr: 1.25 Class IIB Combustible Liquid	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]
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 FLP: NA IP: 11.55 eV RQASD: 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; Via; #(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 6)
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; dermat	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	Irrit eyes, skin, resp sys; miosis; rhin; head, chest tight, wheez, lar spasm, saliv, 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
[Phosgene]							
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 5 SCBAF PD PP/SAF PD PP ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; miosis; rhin, head, chest tight, wheez, lar spasm, saliv, 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
[Phosgene]							
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 5 SCBAF PD PP/SAF PD PP ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit 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 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		
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 F.P. NA (Gas) IP: 9.96 eV RQGasD: 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 ₂ O / buffer; IC; OSHA [M160]
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 F.P. NA IP: ? Sp. Gr. (77°F): 1.87 (pure) 1.33 (50% soln.) Noncombustible Solid	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.]	Sigal†; NaHCO ₃ / Na ₂ CO 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 lumes in air [Note: Usually shipped or stored in water.]	MW: 124.0 BP: 536°F Sol: 0.0003% F.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 F.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, dimethylformamide, metals (except nickel & lead) [Note: Decomposes in water to hydrochloric & phosphoric acids.]	None available
1810 39	1 ppm = 8.37 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 8)
Skin:	Frostbite	NIOSH/OSHA	Inh	Nau, vomit, abdom pain,	Eye:	Frostbite	Resp sys
Eyes:	Frostbite	3 ppm SA	Con	diarr, thirst, chest tight,	Skin:	Frostbite	
Wash skin:	N.R.	7.5 ppm SA CF	(liq)	dysp, musc pain, chills,	Breath:	Resp support	
Remove:	When wet (flam)	15 ppm GMFS/SCBAF/SAF		stupor or syncope, pulm			
Change:	N.R.	80 ppm SA:PD,PP		edema, liq; frostbite			
Provide:	Frostbite	5 SCBAF PD,PP/SAF PD,PP ASCBA					
		Escape GMFS/SCBAE					
[Phosphine]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin upper	Eye	Irrimed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	25 mg/m ³ SA CF*	Ing	resp sys; eye, skin burns,	Skin	Water flush immed	
Wash skin:	When contam	50 mg/m ³ HIEF/SCBAF/SAF	Con	derm	Breath:	Resp support	
Remove:	When wet or contam	1000 mg/m ³ SAF:PD,PP			Swallow	Medical attention immed	
Change:	Daily	5 SCBAF PD,PP/SAF PD,PP ASCBA					
Provide:	Eyewash (>1.8%), Quick drench (>1.8%)	Escape HIEF/SCBAE					
[Phosphoric acid]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, resp tract, eye	Eye	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1 mg/m ³ SA	Ing	skin burns, abdom pain, nau,	Skin	Water flush immed	liver, kidneys, jaw,
Wash skin:	When contam	2.5 mg/m ³ SA CF*	Con	jaun, anemia, cachexia,	Breath:	Resp support	teeth, blood
Remove:	When wet or contam	5 mg/m ³ SCBAF/SAF		dental pain, saliv, jaw	Swallow	Medical attention immed	
Change:	Daily	5 SCBAF PD,PP/SAF PD,PP ASCBA		pain, swell			
Provide:	Eyewash, Quick drench [* Note: Flame retardant personal protective equipment should be provided.]	Escape SCBAE					
[Phosphorus (yellow)]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	eye, skin burns; dysp,	Skin:	Water flush immed	CNS, kidneys
Wash skin:	When contam		Con	cough, lung edema; dizz,	Breath:	Resp support	
Remove:	When wet or contam			head, weak; abdom pain,	Swallow:	Medical attention immed	
Change:	N.R.			nau, vomit; neph			
Provide:	Eyewash, Quick drench						
[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 T86125000 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: 3.80 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 P ₄ S ₃ /P ₄ S ₅ 1314-80-3 TH4375000 1340 41	Phosphorus persulfide, Phosphorus sulfide, Sulfur phosphide	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	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 C ₈ H ₄ (CO) ₂ O 85-44-9 T13150000 2214 60	1,2-Benzenedicarboxylic anhydride, PAN, Phthalic acid anhydride	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 0.0018 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/UVD, 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 6)	First aid (See Table 6)	Target organs (See Table 6)
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,		
Remove:	When wet or contam	50 mg/m ³ SCBAF/SAF		kerato-conj, corn vesic,	Breath:	
Change:	Daily	250 mg/m ³ SAF-PD,PP		dizz, head, rig, irrity,	Swallow:	
		§ 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:	H.R.	Escape: GMFS/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	50 mg/m ³ DMXSC/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 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		
m-Phthalodinitrile $C_6H_4(CN)_2$ 826-17-8 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 FLP: ? 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 $C_6H_5Cl_3O_2N_2$ 1918-02-1 TJ7525000	4-Amino-3,5,8-trichloro- picolinic acid; 4-Amino-3,5,8-trichloro- 2-picolinic acid; ATCP; Grasson®; Tordon®	NIOSH See Appendix D OSHA† 16 mg/m ³ (total) 8 mg/m ³ (resp)	N.D.	Colorless to white crystals with a chlorine-like odor. [herbicide]	MW: 241.5 BP: Decomposes Sol: 0.04% FLP: ? IP: ?	VP(95°F): 0.0000006 mm MLT: 424°F (Decomposes) UEL: ? LEL: ?	Hot concentrated alkali (hydrolyzes)	Filter; none; Grav; II [Nuisance Dust: #500 (total), #500 (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 (1910.108).]	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% FIP: 302°F IP: ?	VP(383°F): 1mm 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/UVD, II(4) [#S228]
Sp.Gr 1.76 Combustible Solid								
Pindone $C_6H_5O_2C(O)C(CH_3)_3$ 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% FIP ? 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, neu, conf; in animals: irrit eyes, skin	Eye: Skin: Breath: Swallow:	Irritated 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; neu; in animals: liver, kidney changes	Eye: Skin: Breath: Swallow:	Irritated 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 DMXSO/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	Irritated 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 DMXSO/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	Irritated 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 $C_4H_{10}N_2 \cdot 2HCl$ 142-84-3 TL4025000	Piperazine hydrochloride [Note: The monochloride, $C_4H_{10}N_2 \cdot HCl$ 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: ? Sp. Gr: 7 Combustible Solid, but does not ignite easily.	VP: ? MLT: 635°F UEL: ? LEL: ?	Water [Note: Slightly hygroscopic (i.e., absorbs moisture from the air).]	None available
Plaster of Paris $CaSO_4 \cdot 0.5H_2O$ 26499-85-0 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 Sp. Gr: 2.5 Noncombustible Solid	VP: 0 mm (approx) MLT: 325°F (Loses H_2O) UEL: NA LEL: NA	Moisture, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum.]	Filter; none; Grav; II [Balance Dust: #0500 (total), #0400 (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 Sp. Gr: 21.48 Noncombustible Solid in bulk form, but finely divided powder can be dangerous to handle.	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; II [#7300, Elements]
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 6)
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Abs	skin burns, sens; asthma;	Skin:	CNS
Wash skin:	When contam		Ing	GI upset, head, nau, vomit,	Breath:	
Remove:	When wet or contam		Con	inco, musc weak	Swallow:	
Change:	Daily					
Provide:	Eyewash, Quick drench					
[Piperazine dihydrochloride]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb,	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Ing	resp sys; cough	Breath:	
Wash skin:	N.R.		Con		Swallow:	
Remove:	N.R.					
Change:	N.R.					
[Pleaser of Paris]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Ing	derm	Skin:	
Wash skin:	N.R.		Con		Breath:	
Remove:	N.R.				Swallow:	
Change:	Daily					
[Platinum]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes nose cough,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.05 mg/m ³ SA CF ¹	Ing	dysp wheez, cyan derm,	Skin:	
Wash skin:	When contam	0.1 mg/m ³ HEF/SCBAF/SAF	Con	sens skin, lymphocytosis	Breath:	
Remove:	When wet or contam	4 mg/m ³ SAF PD PP			Swallow:	
Change:	Daily	5 SCBAF PD PP/SAF PD PP ASCBA				
		Escape HEF/SCBAE				
[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 (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		
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/Buf, KOH, ISE, III [#7904, Cyanides] [Also #6010, Hydrogen Cyanide]
Potassium hydroxide KOH 1310-58-3 TT2100000 1813 60 (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: 718°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, Thistle, III [#7401, Alkaline Dusts]
Propane CH ₃ CH ₂ CH ₃ 74-98-6 TX2275000 1978 22	Bottled gas, Dimethyl methane, 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 RQGasD: 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, none, II(2) [#587]

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 50 mg/m ³ D 100 mg/m ³ DXSD/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 Ing Con	Irr eyes, skin, nose, cough, expectoration, exhalation dysp, wheez, chronic bron, derm	Eye: Skin Breath Swallow Irr immed Soap wash prompt Fresh air Medical attention immed	Eyes, skin, resp sys
[Portland cement]						
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: GMFSHE/SCBAE	Inh Abs Ing Con	Irr eyes, skin, upper resp sys; asphy, weak, head, conf, nau, vomit, incr rate resp, slow gasping resp, thyroid, blood changes	Eye: Skin Breath Swallow Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CVS, CNS, thyroid, blood
[Potassium cyanide (as CN)]						
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	Irr eyes, skin, resp sys; cough, sneez; eye, skin burns; vomit, diar	Eye: Skin: Breath: Swallow: Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Potassium hydroxide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flam) N.R. Frostbite	NIOSH/OSHA 2100 ppm: SA/SCBAF & SCBAF PD PP/SAF PD PP ASCBA Escape: SCBAE	Inh Con (liq)	Dizz, conf, excitation, asphy; liq: frostbite	Eye: Skin: Breath: Frostbite Frostbite Resp support	CNS
[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 F.P., IP, Sp. Gr, flammability	VP, FRZ UEL, LEL		
Propane sulfone $C_3H_6O_2S$ 1120-71-4 RPS425000	3-Hydroxy-1-propenesul- fonic acid sulfone; 1,3-Propane sulfone	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: ? Sol: 10% F.P.: >235°F IP: ? Sp. Gr: 1.39 Combustible Solid	VP: ? MLT: 86°F UEL: ? LEL: ?	None reported	None available
1-Propanethiol $CH_3CH_2CH_2SH$ 107-03-9 TZ7300000 2402 27	3-Mercaptopropane, Propane-1-thiol, Propyl mercaptan, n-Propyl mercaptan 1 ppm = 3.17 mg/m ³	NIOSH C 0.5 ppm (1.6 mg/m ³) [15-min] OSHA none	N.D.	Colorless liquid with an offensive, cabbage-like odor.	MW: 76.2 BP: 163°F Sol: Slight F.P.: -6°F IP: 9.196 eV Sp. Gr: 0.84 Class IB Flammable Liquid	VP(77°F): 16 mm FRZ: -172°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals, calcium hypochlorite	None available
Propargyl alcohol $HC \equiv CCH_2OH$ 107-19-7 UK6075000 1986 28	1-Propyn-3-ol; 2-Propyn-1-ol; 2-Propynyl alcohol 1 ppm = 2.33 mg/m ³	NIOSH 1 ppm (2 mg/m ³) [skin] OSHA† none	N.D.	Colorless to straw- colored liquid with a mild, garlicky odor.	MW: 56.1 BP: 237°F Sol: Miscible F.P.(oc): 97°F IP: 10.81 eV Sp. Gr: 0.97 Class IC Flammable Liquid	VP: 12 mm FRZ: -62°F UEL: ? LEL: ?	Phosphorus pentoxide, oxidizers	None available
β-Propiolactone $C_3H_4O_2$ 57-57-8 RQ7350000	BPL, Hydroacrylic acid, β-lactone, 3-Hydroxy-β-lactone, 3-Hydroxy-propionic acid, β-Lactone, 2-Oxetanone, 3-Propiolactone 1 ppm = 3.00 mg/m ³	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% F.P: 165°F IP: ? Sp. Gr: 1.15 Class IIIA Combustible Liquid	VP(77°F): 3 mm FRZ: -26°F UEL: ? LEL: 2.9%	Acetates, halogens, thiocyanates, thiosulfates [Note: May polymerize upon storage.]	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				
Eyes:	Prevent eye contact	M: SCBAF; PD, PP/SAF; PD, PP/ASCBA	Inh	In animals: Irrit eyes,	Eye:	Eyes, skin, resp sys
Wash skin:	When contam/Daily	Escape: GMFOVHIE/SCBAE	Abs	skin, muc memb; [carc]	Skin:	[In animals:
Remove:	When wet or contam		Ing		Breath:	skin tumors,
Change:	Daily		Con		Swallow:	leukemia,
Provide:	Eyewash, Quick drench					gliomas]
[Propane sulfone]						
Skin:	N.R.	NIOSH				
Eyes:	Prevent eye contact	5 ppm: CCROV/SA	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Wash skin:	N.R.	12.5 ppm: SA; CF/PAPROV	Ing	throat, resp sys, head, nau,	Skin:	CNS, blood, liver,
Remove:	When wet (flam)	25 ppm: CCROV/GMFOV/PAPROV/	Con	dizz, cyan;	Breath:	kidneys
Change:	N.R.	SCBAF/SAF		In animals: liver, kidney	Swallow:	
Provide:	Eyewash	Escape: GMFOV/SCBAE		damage		
[1-Propanethiol]						
Skin:	Prevent skin contact	TBAL				
Eyes:	Prevent eye contact		Inh	Irrit skin, muc memb;	Eye:	Skin, resp sys, CNS,
Wash skin:	When contam		Abs	CNS depres;	Skin:	liver, kidneys
Remove:	When wet or contam		Ing	In animals: liver, kidney	Breath:	
Change:	N.R.		Con	damage	Swallow:	
Provide:	Eyewash, Quick drench					
[Propargyl alcohol]						
Skin:	Prevent skin contact	NIOSH				
Eyes:	Prevent eye contact	M: SCBAF; PD, PP/SAF; PD, PP/ASCBA	Inh	Skin irrit, blistering,	Eye:	Kidneys, skin,
Wash skin:	When contam/Daily	Escape: GMFOV/SCBAE	Abs	burns, corneal opac,	Skin:	lungs, eyes
Remove:	When wet or contam		Ing	frequent urination	Breath:	[In animals:
Change:	Daily		Con	dysuria, hema; [carc]	Swallow:	tumors of the
Provide:	Eyewash, Quick drench					liver, skin &
[3-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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Propionic acid <chem>CH3CH2COOH</chem> 79-09-4 UE5950000	Carboxyethane, Ethenecarboxylic acid, Ethylformic acid, Metacetic acid, Methyl acetic acid, Propanoic acid	NIOSH 10 ppm (30 mg/m ³) ST 15 ppm (45 mg/m ³) OSHA† none	N.D.	Colorless, oily liquid with a pungent, disagree- able, rancid odor. [Note: A solid below 5°F.]	MW: 74.1 BP: 296°F Sol: Miscible FLP: 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 = 3.06 mg/m ³				Sp.Gr: 0.99 Class II Combustible Liquid			
Propionitrile <chem>CH3CH2CN</chem> 107-12-0 UF9626000	Cyanoethane, Ethyl cyanide, Propanenitrile, Propionic nitrile, Propiononitrile	NIOSH 6 ppm (14 mg/m ³) 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% FLP: 38°F IP: 11.84 eV	VP: 38 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/ID; IR [Adapt #1806]
2404 28	1 ppm = 2.29 mg/m ³				Sp.Gr: 0.78 Class IB Flammable Liquid			
Proposar <chem>CH3NHCOOC6H4OCH(CH3)2</chem> 114-26-1 FC3160000	Aprocarb®, Baygon®, o-Isopropoxyphenyl- N-methylcarbamate, N-[4-ethyl-2-isopropoxyphenyl]- carbamate	NIOSH 0.5 mg/m ³ OSHA† none	N.D.	White to tan, crystalline powder with a faint, characteristic odor. [Insecticide]	MW: 209.3 BP: Decomposes Sol: 0.2% FLP: >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: 7 Class IIB Combustible Liquid			
n-Propyl acetate <chem>CH3COOCH2CH2CH3</chem> 109-60-4 AJ3675000	Propylacetate, n-Propyl ester of acetic acid	NIOSH 200 ppm (840 mg/m ³) ST 250 ppm (1050 mg/m ³) OSHA† 200 ppm (840 mg/m ³)	1700 ppm	Colorless liquid with a mild, fruity odor	MW: 102.2 BP: 215°F Sol: 2% FLP: 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/ID, IR [#1450, Esters 1]
1276 26	1 ppm = 4.25 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 6)	First aid (See Table 6)	Target organs (See Table 6)	
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, nose, throat; blurred vision; corn burns; skin burns; abdom pain, nau, vomit	Eye: Skin: Breath: Swallow:	Irritated Water flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys
[Propionic acid]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH 60 ppm: CCRFOV/SA 150 ppm: SA:CF/PAPROV 300 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, resp sys; nau, vomit; chest pain; weak; stupor, convuls; In animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irritated Water flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CVS, CNS, liver, kidneys
[Propionitrile]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	TBAL	Inh Abs Ing Con	Nausea, blurred vision; sweat, saliv; abdom cramps, nau, diarr, vomit; head, weak, muscle twitch	Eye: Skin: Breath: Swallow:	Irritated Soap wash Immed Resp support Medical attention Immed	CNS, liver, kidneys, GI tract, blood chol
[Proposur]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flaming) N.R.	NIOSH/OSHA 1700 ppm: SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: irrit eyes, nose, throat, derm, narco	Eye Skin Breath Swallow:	Irritated Water flush Immed Resp support Medical attention Immed	Eyes, skin, resp sys, CNS
[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]	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: 18 mm FRZ: -196°F UEL: 13.7% LEL: 2.2%	Strong oxidizers	Char. 2-Propanol/ CS; GC/FID; II [#1401, Alcohols II]
1274 26	1 ppm = 2.50 mg/m ³	OSHA† 200 ppm (500 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 (360 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; II [#1013, 1,2-Di- chloro- propane]
1279 27	1 ppm = 4.70 mg/m ³				Sp Gr: 1.18 Class IB Flammable Liquid			
Propylene glycol dinitrate <chem>CH3CHO2CH2CHNO2OH</chem> 8423-43-4 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: 186.1 BP: ? Sol: 0.1% FLP: ? IP: ?	VP(72°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>CH3OCH2CH2OH</chem> 107-98-2 UB7700000	Dowtherm® 208, 1-Methoxy-2-hydroxypropane, 1-Methoxy-2-propanol, 2-Methoxy-1-methylethanol, Propylene glycol methyl ether	NIOSH 100 ppm (380 mg/m ³) ST 150 ppm (540 mg/m ³) OSHA† none	N.D.	Clear, colorless liquid with a mild, ethereal odor.	MW: 80.1 BP: 248°F Sol: Miscible FLP: 97°F IP: ?	VP(77°F): 12 mm FRZ: -136°F (Sets to glass) UEL(calc): 13.8% LEL(calc): 1.6%	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: 0.88 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 6)	First aid (See Table 6)		Target organs (See Table 6)
Skin:	Prevent skin contact	NIOSH/SHA	Inh	Irrit eyes, nose, throat,	Eye	Irr Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	800 ppm: CCROV*/PAPROV*/GMFOV/	Abs	dry cracking skin, drow,	Skin	Water flush	GI tract, CNS
Wash skin:	When contam	SA*/SCBAF	Inh	head, ataxia, GI pain,	Breath	Resp support	
Remove:	When wet (flamrn)	§ SCBAF PD PP/SAF PD PP ASCBA	Ing	abdom cramps, nau, vomit,	Swallow	Medical attention	
Change:	N.R.	Escape GMFOV/SCBAE	Con	vomit, diarr,		imed	
[n-Propyl alcohol]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye	Irr Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	§ SCBAF PD PP/SAF PD PP ASCBA	Abs	drow, li-head, liver, kidney	Skin	Soap wash prompt	liver, kidneys, CNS
Wash skin:	When contam	Escape GMFOV/SCBAE	Ing	damage;	Breath	Resp support	[In animals:
Remove:	When wet (flamrn)		Con	in animals: CNS depre,	Swallow	Medical attention	liver & mammary
Change:	N.R.			[carc]		imed	gland tumors]
Provide:	Eyewash, Quick drench						
[Propylene dichloride]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes; conj; methemo;	Eye	Irr Irrimed	Eyes, CNS, blood,
Eyes:	Prevent eye contact		Abs	head, impaired balance,	Skin:	Soap wash	liver, kidneys
Wash skin:	N.R.		Ing	vis dist;	Breath:	Resp support	
Remove:	N.R.		Con	in animals: liver, kidney	Swallow:	Medical attention	
Change:	N.R.			damage		imed	
[Propylene glycol dintrate]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Irr Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		Ing	throat; head, nau, li-head,	Skin:	Water wash	CNS
Wash skin:	N.R.		Con	drow, inco; vomit, diarr	Breath:	Resp support	
Remove:	When wet (flamrn)				Swallow:	Medical attention	
Change:	N.R.					imed	
[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, FLP, IP, Sp, Gr, flammability	VP, FRZ, UEL, LEL		
Propyleneimine C_3H_5N 75-55-8 CM8050000	2-Methylaziridine, 2-Methylethyleneimine, Propyleneimine, Propylene amine (inhibited), Propyleneimine	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 FLP: 25°F IP: 9.00 eV	VP: 112 mm FRZ: -85°F UEL: ? LEL: ?	Acids, strong oxidizers, water, carbonyl compounds, quinones, sulfonfyl halides [Note: Subject to violent polymerization in contact with acids. Hydrolyzes in water to form methylethanoxamine.]	None available
1921 30 (inhibited)	1 ppm = 2.37 mg/m ³				Sp Gr: 0.80 Class IB Flammable Liquid			
Propylene oxide C_3H_6O 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% FLP: -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; II [#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 FLP: 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 $C_{21}H_{34}O_2/C_{21}H_{34}O_3$ $C_{21}H_{34}O_2/C_{21}H_{34}O_3$ $C_{21}H_{34}O_2/C_{21}H_{34}O_3$ 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 FLP: 180-190°F IP: ?	VP: Low MLT: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH/CN; HPLC/UV/D; II [#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	Im/med	Eye, skin
Eyes:	Prevent eye contact	4 SCBAF PD, PP/SAF PD, PP, ASCBA	Abs		Skin	Water flush/med	[in animals: nasal tumors]
Wash skin:	When contam	Escape GMFS/SCBAE	Ing		Breath	Resp support	
Remove:	When wet (flam)		Con		Swallow	Medical attention/med	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
[Propylene imine]							
Skin:	Prevent skin contact	NIOSH	Inh	Im/eye, skin, resp sys, blisters, burns, [carc]	Eye	Im/med	Eye, skin, resp sys
Eyes:	Prevent eye contact	4 SCBAF PD, PP/SAF PD, PP, ASCBA	Ing		Skin	Water flush/med	[in animals: nasal tumors]
Wash skin:	When contam	Escape GMFS/SCBAE	Con		Breath	Resp support	
Remove:	When wet (flam)				Swallow	Medical attention/med	
Change:	N.R.						
Provide:	Quick drench						
[Propylene oxide]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	In animals: im/eye, skin, methemo, anoxia, cyan, dysp, weak, dizz, head	Eye	Im/med	Eye, skin, blood
Eyes:	Prevent eye contact	250 ppm: SA	Ing		Skin	Soap wash prompt	
Wash skin:	When contam	500 ppm: SA; CF/SCBAF/SAF	Con		Breath	Resp support	
Remove:	When wet (flam)	4 SCBAF PD, PP/SAF PD, PP, ASCBA			Swallow:	Medical attention/med	
Change:	N.R.	Escape GMFS/SCBAE					
[n-Propyl nitrate]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Erythema, derm, papules, pruritus, rhin, sneez; asthma	Eye	Im/med	Resp sys, skin, CNS
Eyes:	Prevent eye contact	50 mg/m ³ : CCROVDMFu/SA*	Ing		Skin	Soap wash/med	
Wash skin:	When contam	125 mg/m ³ : SA; CF*PAPROVDMFu*	Con		Breath	Resp support	
Remove:	When wet or contam	250 mg/m ³ : CCRFOVH/E/PAPRTOVH/E/			Swallow:	Medical attention/med	
Change:	Daily	SCBAF/SAF					
		5000 mg/m ³ : SAF PD, PP					
		4 SCBAF PD, PP/SAF PD, PP, ASCBA					
		Escape GMFOVH/E/SCBAE					
[Pyrethrum]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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		
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 FLP: 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 $C_6H_4O_2$ 106-51-4 DK2625000	1,4-Benzoquinone; p-Benzoquinone; 1,4-Cyclohexadiene dione; 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: 106.1 BP: Sublimes Sol: Slight FLP: 100-200°F IP: 8.68 eV	VP(77°F): 0.1 mm MLT: 240°F UEL: ? LEL: ?	Strong oxidizers	XAD-2; Ethanol/ Hexane; HPLC/UV/D; II(4) [#S161]
2587 55	1 ppm = 4.49 mg/m ³				Sp Gr: 1.32 Combustible Solid			
Resorcinol $C_6H_4(OH)_2$ 108-46-3 VG8625000	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% FLP: 261°F IP: 8.63 eV Sp.Gr: 1.27 Class IIB Combustible Liquid, but may be difficult to ignite.	VP(77°F): 0.0002 mm MLT: 228°F UEL: ? LEL: (382°F): 1.4%	Acetonitrile, 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 = 4.56 mg/m ³							
Rhodium (metal fume and insoluble compounds, as Rh) Rh (Metal) 7440-16-6 (Metal) VI9069000 (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 FLP: NA IP: NA	VP: 0 mm (approx) MLT: 3571°F UEL: NA LEL: NA	Chlorine trifluoride, Oxygen difluoride	Filter; Acid; AAS; II(3); [#S188]
					Sp Gr: 12.41 (Metal) Metal: Noncombustible Solid in bulk form, but flammable as dust or powder.			

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/OSHA 125 ppm: SA, CF ¹ /PAPROV ⁴ 250 ppm: CCRFOV/GMFOV/PAPRTOV ⁵ / SCBAF/SAF 1000 ppm: SAF: PD, PP § SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes; head, ner, dizz, incoord; nau, anor, derm, liver, kidney damage	Eye: Immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS, liver, kidneys, GI tract
[Pyridine]						
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 10 mg/m ³ : SA, CF ¹ 20 mg/m ³ : SCBAF/SAF 100 mg/m ³ : SAF: PD, PP § SCBAF: PD, PP/SAF: PD, PP: ASCBA Escape: GMFOV/HIE/SCBAE	Inh Ing Con	Eye irrit, conj, kerat, skin irrit	Eye: Immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin
[Quinone]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash		TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat, upper resp sys; methemo, cyan, convuls; restles, bluish skin, incr heart rate, dysap; dizz, drow, hypothermia, hemog; spleen, kidney, liver changes; derm	Eye: Immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CVS, CNS, blood, spleen, liver, kidneys
[Pascorinol]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 0.5 mg/m ³ : DM ⁴ 1 mg/m ³ : DMXSQ ⁴ /SA 2.5 mg/m ³ : SA, CF/PAPRDMFu 5 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	Possible resp aers	Breath: Resp support Swallow: Medical attention immed	Resp sys
[Rhodium (metal fume and insoluble compounds, as Rh)]						

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		
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; I(3) [#S189]
Ronal (CH ₃ O) ₃ P(S)OC ₆ H ₄ Cl 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 108°F.]	MW: 321.6 BP: Decomposes Sol(77°F): 0.004% FLP: NA IP: ? Sp.Gr: 1.49 Noncombustible Solid	VP(77°F): 0.0008 mm MLT: 108°F UEL: NA LEL: NA	Strong oxidizers	Filter/ Chrom-102, Toluene, GC/FPD, ■ [#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 aromatic 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; Vie; ■ [#3800, Formalde- hyde]
Rotenone C ₂₂ H ₂₀ O ₆ 83-79-4 DJ2600000	1,2,12,12a-Tetrahydro-8,9- dimethoxy-2-(1-methyl- ethenyl)-[1]benzopyrano [3,4-b]furo[2,3-h][1] benzopyran-8(8aH)-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 FLP: ? IP: ?	VP: <0.00004 mm MLT: 330°F UEL: ? LEL: ?	Strong oxidizers, acids	Filter; CH,CN, HPLC/UVD, ■ [#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 6)
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	In animals: irrit eyes,	Eye	Eye, CNS
Eyes:	Prevent eye contact	0.010 mg/m ³ HiE*/SA*	Ing	CNS damage	Skin	
Wash skin:	When contam	0.025 mg/m ³ SA CF*/PAPRHiE*	Con		Breath	
Remove:	When wet or contam	0.050 mg/m ³ HiE*/PAPRTHiE*/			Swallow	
Change:	N.R.	SCBAF/SAF				
		2 mg/m ³ SAF PD PP				
		§ SCBAF PD PP/SAF PD PP ASCBA				
		Escape: HiE*/SCBAE				
[Rhodium (soluble compounds, as Rh)]						
Skin:	Prevent skin contact	NIOSH	Inh	In animals: irrit eyes,	Eye	Eyes, liver
Eyes:	Prevent eye contact	100 mg/m ³ CCROVDMFu/SA	Ing	chol inhibition liver,	Skin	kidneys, blood
Wash skin:	When contam	250 mg/m ³ SA CF*/PAPROVDMFu	Con	kidney damage	Breath	plasma
Remove:	When wet or contam	300 mg/m ³ CCRFOVHiE/GMFOVHiE/			Swallow	
Change:	Daily	PAPRTOVHiE*/SCBAF/SAF				
		§ SCBAF PD PP/SAF PD PP ASCBA				
		Escape: GMFOVHiE/SCBAE				
[Ronne]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, nose, throat,	Eye:	Eyes, resp sys
Eyes:	N.R.			upper resp sys	Breath:	[nasal cancer;
Wash skin:	N.R.	In presence of Formaldehyde,				thyroid gland
Remove:	N.R.	Acetaldehyde, or Malonaldehyde:				tumors in animals
Change:	N.R.	NIOSH				(In presence of
		§ SCBAF PD PP/SAF PD PP ASCBA				Formaldehyde,
		Escape: GMFOVHiE/SCBAE				Acetaldehyde, or
						Malonaldehyde]]
[Rosin core solder, pyrolysis products (as formaldehyde)]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, resp sys;	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	5 mg/m ³ CCROVDMFu/SA	Ing	numb muc memb nau vomit,	Skin	CNS
Wash skin:	When contam	125 mg/m ³ SA CF*/PAPROVDMFu	Con	abdom pain, musc tremor,	Breath	
Remove:	When wet or contam	250 mg/m ³ CCRFOVHiE/GMFOVHiE/		inco clonic convuls,	Swallow	
Change:	Daily	PAPRTOVHiE*/SAT CF/		stupor		
		SCBAF/SAF				
		2500 mg/m ³ SA PD PP				
		§ SCBAF PD PP/SAF PD PP ASCBA				
		Escape: GMFOVHiE/SCBAE				
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Rouge Fe₂O₃ 1309-37-1 NO7400000	Iron(III)oxide, iron oxide red, Red iron oxide, Red oxide	NIOSH See Appendix D OSHA† 15 mg/m ³ (total) 5 mg/m ³ (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: 7 Sol: Insoluble FLP: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2549°F UEL: NA LEL: NA	Calcium hypochlorite, carbon monoxide, hydrogen peroxide	Filter; none; Grav; IR [Reference Dust: #0500 (total), #0600 (resp)]
Selenium Se 7782-49-2 VS7700000	Elemental selenium, Selenium alloy	NIOSH*OSHA* 0.2 mg/m ³ [*Note: The REL and PEL also apply to other selenium compounds (as Se) except Selenium hexafluoride.]	1 mg/m ³ (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 FLP: 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; IR(7) [#S190]
2658 53 (powder)								
Selenium hexafluoride SeF₆ 7783-79-1 VS9450000	Selenium fluoride	NIOSH 0.05 ppm OSHA 0.05 ppm (0.4 mg/m ³)	2 ppm	Colorless gas.	MW: 193.0 BP: -30°F Sol: Insoluble FLP: NA IP: 7 RGasO: 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 = 7.89 mg/m ³							
Silica, amorphous SiO₂ 7631-86-9 VV7310000	Diatomaceous earth, Diatomaceous silica, Diatomite, Precipitated amorphous silica, Silica gel, Silicon dioxide (amorphous)	NIOSH 5 mg/m ³ OSHA† See Appendix C (Mineral Dusts)	3000 mg/m ³	Transparent to gray, odorless powder. [Note: Amorphous silica is the non-crystalline form of SiO ₂ .]	MW: 60.1 BP: 4046°F Sol: Insoluble FLP: 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; IR [#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 6)
Skin:	N.R.	TBAL	Inh Con	Irrit eyes, skin, resp sys	Eye:	Irr Irrmed Fresh air	Eyes, skin, resp sys
Eyes:	N.R.				Breath:		
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Fluore]							
Skin:	Prevent skin contact	NIOSH/OSHA 1 mg/m ³ : DMF*/DMFu*/HIEF/PAPRDM*/ PAPRDMFu*/SA*/SCBAF § SCBAF PD,PP/SAF PD,PP/ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, vis dist, head; chills, fever; dysp, bron; metallic taste, garlic breath; GI dist, derm, eye, skin burns in animals: anemia, liver nec, crr; kidney, spleen damage	Eye:	Irr Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, liver, kidneys, blood, spleen
Eyes:	N.R.				Swallow:		
Wash skin:	When wet or contam						
Remove:	N.R.						
Change:	N.R.						
Provide:	Quick drench						
[Selenium]							
Skin:	N.R.	NIOSH/OSHA 0.5 ppm: SA 1.25 ppm: SA-CF 2 ppm: SAT-CF/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP/ASCBA Escape: GMFS/SCBAE	Inh	In animals: pulm int, edema	Breath:	Resp support	Resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Selenium hexafluoride]							
Skin:	N.R.	NIOSH 30 mg/m ³ : DM 60 mg/m ³ : DMXSO/SA 150 mg/m ³ : SA-CF/PAPRDM 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	Inh Con	Irrit eyes, pneumoconiosis	Eye:	Irr Irrmed Fresh air	Eyes, resp sys
Eyes:	N.R.				Breath:		
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[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 Fl.P., IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Silica, crystalline (as respirable dust) SiO ₂ 14808-60-7 VV7330000	Cristobalite, 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)	Colorless, odorless solid. [Note: A component of many mineral dusts.]	MW: 80.1 BP: 4048°F Sol: Insoluble Fl.P.: 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; II [#7500]
Silicon II 7440-21-3 VW0400000	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.	Steel to gray, lustrous, needle- like crystals. [Note: The amorphous form is a dark-brown powder.]	MW: 28.1 BP: 4271°F Sol: Insoluble Fl.P.: NA IP: NA Sp.Gr: 2.33 Combustible Solid in powder form.	VP: 0 mm (approx) MLT: 2570°F UEL: NA LEL: NA MEC: 180 g/m ³	Chlorine, fluorine, oxidizers, calcium, cesium carbide, alkaline carbonates	Filter; none; Grav; II [Hazardous Dust: #0590 (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 crystals.	MW: 40.1 BP: Sublimes Sol: Insoluble Fl.P.: 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; II [Hazardous Dust: #0500 (total), #0600 (resp)]
Silicon tetrahydride SiH ₄ 7803-62-5 VV1400000	Monoallene, Silane, Silicene	NIOSH 5 ppm (7 mg/m ³) OSHA† none	N.D.	Colorless gas with a repulsive odor.	MW: 32.1 BP: -186°F Sol: Decomposes Fl.P.: NA (Gas) IP: ? RQasD: 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
2203 17	1 ppm = 1.34 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 0.5 mg/m ³ HfE 1.25 mg/m ³ PAPR/HfE/SA/CF 2.5 mg/m ³ HfE/PAPR/HfE 25 mg/m ³ SA,PO,PP 4-SCBA/PO,PP/SA/PO,PP/ASCBA Escape:HfE/SCBAE	Inh Con	Cough, dysp, wheez, decr pulm func, progressive resp symptoms (silicosis); Irrit eyes; [canc]	Eye: Breath:	Irritated Fresh air	Eyes, resp sys [in animals: lung cancer]
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Silica, crystalline (as respirable dust)]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; cough	Eye: Breath: Swallow:	Irritated Fresh air Medical attention Irrated	Eyes, skin, resp sys
Eyes:	Prevent eye contact						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Silicon]							
Skin:	N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; cough	Eye: Breath: Swallow:	Irritated Fresh air Medical attention Irrated	Eyes, skin, resp sys
Eyes:	N.R.						
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Silicon carbide]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb; neck, head	Breath:	Resp support	Eyes, skin, resp sys, CNS
Eyes:	N.R.						
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 F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Silver (metal dust and soluble compounds, as Ag) Ag (Metal) 7440-22-4 (Metal) VV3500000 (Metal)	Silver metal Argentum Synonyms of soluble silver compounds such as Silver nitrate (AgNO_3) vary depending upon the specific compound	NIOSH/OSHA 0.1 mg/m ³	10 mg/m ³ (as Ag)	Metal. White lustrous solid.	MW: 107.9 BP: 3632°F Sol: Insoluble F.P.: NA IP: NA	VP: 0 mm (approx) MLT: 1761°F UEL: NA LEL: NA	Acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethylenimine, 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† 20 mppcf	3000 mg/m ³	Odorless, white-gray powder	MW: 379.3 BP: ? Sol: Insoluble F.P.: NA IP: NA	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter, none, Grav, III [#0500, Nuisance Dust (total)]
Sodiumaluminum fluoride (as F) Na ₂ AlF ₆ 15096-52-3 WA9625000	Cryolite, 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% F.P.: NA IP: NA	VP: 0 mm (approx) MLT: 1832°F UEL: NA LEL: NA	Strong oxidizers	Pad†/pre-Filter; Reagents; ISE; II [#7902, Fluorides]
Sodium azide NaN ₃ 26428-22-8 VY8050000 1687 58	Azide, Azum, 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% F.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

Sp Gr: 10.49 (Metal)
Metal: Noncombustible Solid, but flammable in form of dust or powder

Sp Gr: 2.7-2.8
Noncombustible Solid

Sp Gr: 2.90
Noncombustible Solid

Sp.Gr: 1.85
Combustible Solid (If heated above 572°F).

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:	Prevent skin contact	NIOSH/OSHA	Inh	Blue-gray eyes, nasal	Eye	Irritated	Nasal septum,
Eyes:	Prevent eye contact	0.25 mg/m ³ SA CF ⁴ /PAPRHE ⁴	ing	septum, throat, skin,	Skin	Water flush	skin, eyes
Wash skin:	When contam	0.5 mg/m ³ H ₂ EF/SCBAF/SAF	Con	irrit, ulceration skin,	Breath	Resp support	
Remove:	When wet or contam (AgNO ₃)	10 mg/m ³ SAF/PD,PP		GI dist	Swallow:	Medical attention	
Change:	Daily	§ SCBAF PD PP/SAF PD,PP ASCBA				immed	
Provide:	Eyewash	Escape: H ₂ EF/SCBAE					
[Silver (metal dust and soluble compounds, as Ag)]							
Skin:	N.R.	NIOSH	Inh	Pneumoconiosis: cough,	Eye	Irritated	Resp sys, CVS
Eyes:	N.R.	30 mg/m ³ DM	Con	dysp, digital clubbing,	Breath	Resp support	
Wash skin:	N.R.	60 mg/m ³ DMXSO ₂ /SA		cyan, basal crackles,			
Remove:	N.R.	150 mg/m ³ PAPRDM		cor pulmonale			
Change:	N.R.	300 mg/m ³ H ₂ EF/SAT CF ⁴ /PAPRTH ₂ E ⁴					
		SCBAF/SAF					
		3000 mg/m ³ SAF PD,PP					
		§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape: H ₂ EF/SCBAE					
[Soapstone (containing less than 1% quartz)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irr eyes, resp sys,	Eye	Irritated	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	12.5 mg/m ³ DM	ing	nau, abdom pain, diarr,	Skin	Soap wash prompt	CNS, skeleton,
Wash skin:	When contam	25 mg/m ³ DMXSO ₂ /SA ⁴	Con	sah, thirst, swell,	Breath	Fresh air	kidneys
Remove:	When wet or contam	62.5 mg/m ³ SA CF ⁴ /PAPRDM ⁴		stiff spine, dermat,	Swallow:	Medical attention	
Change:	Daily	125 mg/m ³ H ₂ EF+/SCBAF/SAF		calcification of		immed	
		250 mg/m ³ SAF/PD,PP		ligaments of ribs, pelvis			
		§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape: H ₂ EF+/SCBAE					
[Sodium aluminum fluoride (as F)]		+Note: May need acid gas sorbent					
Skin:	Prevent skin contact	TBAL	Inh	Irr eyes, skin; head,	Eye:	Irritated	Eyes, skin, CNS,
Eyes:	Prevent eye contact		Ab	dizz, weak, blurred vision;	Skin:	Water flush	CVS, kidneys
Wash skin:	When contam		ing	dysp; low BP, bradycardia;	Breath:	Resp support	
Remove:	When wet or contam		Con	kidney changes	Swallow:	Medical attention	
Change:	Daily					immed	
Provide:	Eyewash, Quick drench						
[Sodium azide]							

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		
Sodium bisulfite NaHSO₃ 7631-90-5 VZ2000000	Monosodium salt of sulfurous acid, Sodium acid bisulfite, Sodium bisulphite, Sodium hydrogen 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% F.P.: NA IP: NA Sp.Gr: 1.48 Noncombustible Solid	VP: ? MLT: Decomposes UEL: NA LEL: NA	Heat (decomposes) [Note: Slowly oxidized to the sulfate on exposure to air.]	Filter; none; Gaw; II [90500, Nuisance Dust (total)]
2693 80 (solution)								
Sodium cyanide (as CN) NaCN 143-33-9 VZ7530000 1689 55	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% F.P. NA IP NA Sp Gr: 1.60 Noncombustible Solid, but contact with acids releases highly flammable hydrogen cyanide.	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]
Sodium fluoride (as F) NaF 7681-49-4 WB0350000 1690 54	Fluorine, 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% F.P. NA IP NA Sp Gr: 2.78 Noncombustible Solid	VP: 0 mm (approx) MLT: 1819°F UEL: NA LEL: NA	Strong oxidizers	Fed*/pre- Filter; Reagents; ISE; III [#7902, Fluorides]
Sodium fluoroacetate FCH₂COONa 62-74-8 AH9100000 2629 53	SFA, Sodium monofluoroacetate	NIOSH 0.05 mg/m ³ ST 0.15 mg/m ³ [skin] OSHA† 0.05 mg/m ³ [skin]	2.6 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 F.P. NA IP ? Sp Gr: ? Noncombustible Solid	VP: Low MLT: 382°F UEL: NA LEL: NA	None reported	Filter; Water; IC; II(5) [#S301]

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.	TBAL	Inh	Irrit eyes, skin, muc memb	Eye:	Irr irritmed	Eyes, skin, resp sys
Eyes:	N.R.		Ing		Breath:	Fresh air	
Wash skin:	N.R.		Con		Swallow:	Medical attention	
Remove:	N.R.					Irrmed	
Change:	N.R.						
[Sodium bisulfite]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, asphy.	Eye	Irr irritmed	Eyes, skin, CVS, CNS,
Eyes:	Prevent eye contact	25 mg/m ³ SA/SCBAF	Abs	weak, head, conf, nau,	Skin	Soap wash irritmed	thyroid, blood
Wash skin:	When contam	§ SCBAF PD PP/SAF PD PP ASCBA	Ing	vomit, incr resp rate	Breath	Resp support	
Remove:	When wet or contam	Escape GMF/SHIE/SCBAE	Con	slow gasping respiration; thyroid, blood changes	Swallow	Medical attention	
Change:	Daily					Irrmed	
Provide:	Eyewash, Quick drench						
[Sodium cyanide (as CN)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, resp sys, nau,	Eye	Irr irritmed	Eyes skin resp sys,
Eyes:	Prevent eye contact	12.5 mg/m ³ DM	Ing	abdom pain, diarr, saliv,	Skin	Soap wash prompt	CNS, skeleton,
Wash skin:	When contam	25 mg/m ³ DMXSO/SA*	Con	thirst, sweat, stiff spine,	Breath	Fresh air	kidneys
Remove:	When wet or contam	62.5 mg/m ³ SA CF/PAPRDM*		derm, calcification of	Swallow	Medical attention	
Change:	Daily	125 mg/m ³ HIEF+SCBAF/SAF		ligaments of ribs, pelvis		Irrmed	
		250 mg/m ³ SAF:PD,PP					
		§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape HIEF+SCBAE					
[Sodium fluoride (as F)]							
+Note: May need acid gas sorbent							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Vomit, appre, auditory	Eye	Irr irritmed	Resp sys, CVS, liver,
Eyes:	Prevent eye contact	0.25 mg/m ³ DM	Abs	hau, facial pares, twitch	Skin	Water flush irritmed	kidneys, CNS
Wash skin:	When contam	0.5 mg/m ³ DMXSO/SA	Ing	face musc, pulsus alternans,	Breath	Resp support	
Remove:	When wet or contam	1.25 mg/m ³ SA CF/PAPRDM	Con	ectopic heartbeat, tacer,	Swallow	Medical attention	
Change:	Daily	2.5 mg/m ³ HIEF/SAT CF/PAPRTHIE/		venfib, pulm edema,		Irrmed	
Provide:	Quick drench	SCBAF/SAF		nystagmus, convuls,			
		§ SCBAF PD PP/SAF PD,PP ASCBA		liver, kidney damage			
		Escape HIEF/SCBAE					
[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 FLP, 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% FLP: 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; II [#7401, Alkaline Dusts]
Sodium metabisulfite Na ₂ S ₂ O ₅ 7881-57-4 UX6225000	Disodium pyrosulfite, Sodium metabisulfite, 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% FLP: 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; II [#0500, Nuisance Dust (total)]
Starch (C ₆ H ₁₀ O ₅) _n 9005-26-8 GM6090000	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 28% amylose & 72% amylopectin.]	MW: varies BP: Decomposes Sol: Insoluble FLP: 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; II [Nuisance Dust: #0500 (total), #0500 (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: -11°F Sol: Slight FLP: NA (Gas) IP: 9.51 eV RQASD: 4.31 Flammable Gas	VP: >1 atm FRZ: -126°F UEL: ? LEL: ?	Acids, halogenated hydrocarbons, oxidizers, moisture, chlorine, ozone, ammonia	Si gel, HCL Vis; II [#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 6)	
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, muc memb;	Eye	Eyes, skin, resp sys	
Eyes:	Prevent eye contact	10 mg/m ³ : SA:CF/HIEF/PAPRDM/	Ing	pneumts, eye, skin burns,	Skin		
Wash skin:	When contam	SCBAF/SAF	Con	temporary loss of hair	Breath:		
Remove:	When wet or contam	§ SCBAF PD,PP/SAF PD,PP ASCBA			Swallow:		
Change:	Daily	Escape HIEF/SCBAE					
Provide:	Eyewash, Quick drench						
[Sodium hydroxide]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb	Eye:	Eyes, skin, resp sys	
Eyes:	N.R.		Ing		Breath:		
Wash skin:	N.R.		Con		Swallow:		
Remove:	N.R.						
Change:	N.R.						
[Sodium metasilicate]							
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Eyes, skin, resp sys	
Eyes:	Prevent eye contact		Ing	cough, chest pain; dermat;	Skin:		
Wash skin:	Daily		Con	rhin	Breath:		
Remove:	When wet or contam				Swallow:		
Change:	Daily						
[Starch]							
Skin:	N.R.	NIOSH/OSHA	Inh	Head, weak, nau, abdom	Breath:	Blood, liver	
Eyes:	N.R.	1 ppm SA		pain, lumbar pain, hemog,		kidneys, resp sys	
Wash skin:	N.R.	2.5 ppm SA CF		hema, hemolytic anemia,			
Remove:	N.R.	5 ppm SAT CF/SCBAF/SAF		jaun, pulm irrit			
Change:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA					
		Escape GMFS/SCBAE					
[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 103-110°F, boiling point of 309-396°F, and containing >66% C ₆ or higher hydrocarbons.]	NIOSH 350 mg/m ³ C 1800 mg/m ³ [15-min] OSHA† 600 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; II [#1550]
Strychnine C ₂₁ H ₃₃ N ₂ O ₆ 57-24-9 WL2275000 1692 53	Nux vomica, 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	Fiter, Reagent; HPLCA/VD; II [#5016]
Styrene C ₈ H ₈ CH=CH ₂ 100-42-5 WL3675000 2055 27 (inhibited)	Ethanyl 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.: 68°F IP: 8.40 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; II [#1501, Aromatic Hydro- carbons]
Subtilins 1396-21-7 (BPN) 8014-01-1 (Carlsberg) CO8480000 (BPN) CO8480000 (Carlsberg)	Bacillus subtilis, Bacillus subtilis BPN, Bacillus subtilis Carlsberg, Proteolytic enzymes, Subtilin BPN, Subtilin Carlsberg [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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam 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 20,000 mg/m ³ SAF:PD,PP § SCBAF PD PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; dizz, derm, chemical pneu (aspirin); in animals: kidney damage	Eye Skin Breath Swallow	Irritated Soap wash prompt Resp support Medical attention needed	Eyes, skin, resp sys, CNS, kidneys
[Stoddard solvent]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam N.R. Daily	NIOSH/OSHA 0.75 mg/m ³ DM 1.5 mg/m ³ DMXSO/SA 3 mg/m ³ SA:CF/PAPRDM/HIEF/ SCBAF/SAF § SCBAF PD PP/SAF PD,PP ASCBA Escape HIEF/SCBAE	Inh Ing Con	Stiff neck, facial musc, restless, appreh, incr acuity of perception, incr reflex excitability, cyan, tetanic convuls with opisthotonos	Eye Skin Breath Swallow	Irritated Soap wash prompt Resp support Medical attention needed	CNS
[Strychnine]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 500 ppm CCROV/SA* 700 ppm SA:CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF § SCBAF PD PP/SAF PD,PP ASCBA Escape GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, resp sys; head, rig, dizz, conf, mal, drow, weak, unsteady gait, narco, defatting derm possible liver inf, reprod effects	Eye Skin Breath Swallow	Irritated Water flush Resp support Medical attention needed	Eyes, skin, resp sys, CNS, liver, reprod sys
[Styrene]							
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; resp sens (enzyme asthma); sweat, head, chest pain, flu-like symptoms, cough, breathlessness, wheez	Eye: Skin: Breath: Swallow:	Irritated Soap wash Resp support Medical attention needed	Eyes, skin, resp sys
[Sublimine]							

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 F.P., IP, Sp. Gr., flammability	VP, FRZ UEL, LEL		
Succinonitrile NCCH ₂ CH ₂ CN 110-61-2 WN3850000	Butanedinitrile; 1,2-Dicyanoethane; Dinitrile; Ethylene cyanide; Ethylene dicyanide; Succinic dinitrile	NIOSH 5 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% F.P.: 270°F IP: 7 Sp.Gr: 0.99 Combustible Solid	VP(212°F): 2 mm MLT: 134°F UEL: ? LEL: ?	Oxidizers	Char; Toluene; GC/FID; NIOSH Nitrile
Sucrose C ₁₂ H ₂₂ O ₁₁ 57-50-1 WN6500000	Beet 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% F.P.: NA IP: NA Sp.Gr: 1.59 Noncombustible Solid, but fine airborne dust may explode.	VP: 9 mm (approx) MLT: 320-367°F (Decomposes) UEL: NA LEL: NA MEC: 48 g/m ³	Oxidizers, sulfuric acid, nitric acid	Filter; none; Grav; II [Sulfuric Dust: #0500 (total), #0500 (resp)]
Sulfur dioxide SO ₂ 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% F.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 II [Note: Reacts with water to form sulfurous acid (H ₂ SO ₃).]	Filters(2), NaHCO ₃ / Na ₂ CO ₃ , IC, II [#6004]
Sulfur hexafluoride SF ₆ 2561-62-4 WS4900000	Sulfur fluoride [Note: May contain highly toxic sulfur pentafluoride as an impurity.]	NIOSH/OSHA 1000 ppm (8000 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% F.P.: NA IP: 19.30 eV RGasD: 5.11 Nonflammable Gas	VP: 21.5 atm FRZ: -83°F (Sublimes) UEL: NA LEL: NA	Dilute	Bag; none; GC/TEA; II(5) [#5244]
1000 12	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:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	60 ppm: SA	Abs	head, dizz, weak, gidd,	Skin:	CNS, CVS
Wash skin:	When contam	150 ppm: SA:CF	Ing	conf, convuls; blurred	Breath:	
Remove:	When wet or contam	250 ppm: SCBAF/SAF	Con	vision; dysp; abdom pain,	Swallow:	
Change:	Daily	§: SCBAF-PD,PP/SAF-PD,PP-ASCBA		naus, vomit		
Provide:	Eyewash	Escape: GMFOV/SCBAE				
[Succinonitrile]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Eyes, resp sys
Eyes:	N.R.		Con	resp sys; cough	Breath:	
Wash skin:	N.R.				In: Irrimed	
Remove:	N.R.				Fresh air	
Change:	N.R.					
[Sucrose]						
Skin:	Frostbite	NIOSH	Inh	Irrit eyes, nose, throat,	Eye:	Eyes, skin, resp sys
Eyes:	Frostbite	20 ppm: CCRS/SA*	Con	rhin, choking, cough,	Skin:	
Wash skin:	N.R.	50 ppm: SA CF*/PAPRS*		reflex bronchoconstriction;	Breath:	
Remove:	When wet or contam (liq)	100 ppm: CCRFS/GMFS/PAPRTS*/		liq: frostbite	Frostbite	
Change:	N.R.	SAT CF*/SCBAF/SAF			Frostbite	
Provide:	Frostbite	§: SCBAF-PD,PP/SAF-PD,PP-ASCBA			Resp support	
		Escape: GMFS/SCBAE				
[Sulfur dioxide]						
Skin:	Frostbite	TBAL	Inh	Asphy: incr breath rate,	Eye:	Resp sys
Eyes:	Frostbite			pulse rate; slight musc	Skin:	
Wash skin:	N.R.			incn, emotional upset;	Breath:	
Remove:	N.R.			rig, naus, vomit, convuls	Frostbite	
Change:	N.R.				Frostbite	
Provide:	Frostbite				Resp support	
[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, F.P., 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 vitrol, Sulfuric acid (aqueous)	NIOSH/OSHA 1 mg/m ³	15 mg/m ³	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 F.P.: 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.]	Signal: NaHCO ₃ / Na ₂ CO 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 F.P.: 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 pentasulfide S_5F_{10} 5714-22-7 WS4480000 1 ppm = 10.56 mg/m ³	Disulfur decasulfide, Sulfur decasulfide 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 F.P.: NA IP: ? Sp Gr(32°F): 2.06 RGasD: 6.77 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	Tetrafluorosulfurane 1 ppm = 4.48 mg/m ³	NIOSH C 0.1 ppm (0.4 mg/m ³) OSHA† none	N.D.	Colorless gas with an odor like sulfur dioxide. [Note: Shipped as a liquefied compressed gas.]	MW: 106.1 BP: -41°F Sol: Reacts F.P.: NA IP: 12.63 eV RGasD: 3.78 Nonflammable Gas	VP(70°F): 10.5 atm FRZ: -186°F UEL: NA LEL: NA	Moisture, concentrated sulfuric acid, dioxxygen 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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash (>1%), Quick drench (>1%)	NIOSH/OSHA 15 mg/m ³ : SA CF/PAPRAGH/E ¹ CCRFAGH/E/GMFAGH/E/ SCBAF/SAF § SCBAF-PD,PP/SAF-PD,PP ASCBA Escape: GMFAGH/E/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, pulm edema, bronch, emphy, conj, stomatis; dental erosion, trachbronc; eye, skin burns, dermat	Eye: Skin: Breath: Swallow: Irrigated Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, teeth
[Sulfuric acid]						
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 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: Skin: Breath: Swallow: Irrigated Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Sulfur monochloride]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact N.R. When wet or contam N.R. 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: Skin: Breath: Swallow: Irrigated Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Sulfur pentafluoride]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	TBAL	Inh Con	Irrit eyes, muc memb; eyes, skin burns (from SF ₆ releasing hydrofluoric acid on exposure to moisture); liq: frostbite; in animals: dysp, weak, rhin	Eye: Skin: Breath: Frostbite Frostbite 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/m ³) ST 10 ppm (40 mg/m ³) OSHA† 5 ppm (20 mg/m ³)	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; II [§5012]
2191 15	1 ppm = 4.24 mg/m ³				RGasD: 3.72 Nonflammable Gas			
Sulprofos $\text{C}_{11}\text{H}_{10}\text{O}_7\text{P}_2\text{S}_2$ 35400-43-2 TE4166000	Bolstar® O-Ethyl O-(4-methylthio)- phenyl S-propyl- phosphorodithioate	NIOSH 1 mg/m ³ OSHA† none	N.D.	Tan-colored liquid with a sulfide-like odor.	MW: 322.6 BP: ? Sol: Low FLP: ? IP: ?	VP: <8 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
	1 ppm = 13.40 mg/m ³				Sp.Gr: 1.20			
2,4,5-T $\text{Cl}_2\text{C}_6\text{H}_3\text{OCH}_2\text{COOH}$ 93-76-5 AJ8400000	2,4,5-Trichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m ³	250 mg/m ³	Colorless to tan, odorless, crystalline solid. [herbicide]	MW: 255.5 BP: Decomposes Sol(77°F): 0.03% Fl.P: ? IP: ?	VP: <1 x 10 ⁻⁴ mm MLT: 307°F UEL: ? LEL: ?	None reported	Filter; Methanol; HPLC/UV/D; II [§5001]
2765 55					Sp.Gr: 1.80 Combustible Solid, but burns with difficulty.			
Talc (containing no asbestos and less than 1% quartz) $\text{Mg}_3\text{Si}_2\text{O}_8(\text{OH})_2$ 14807-96-8 WW2710000	Hydrous magnesium silicate, Serpentine talc	NIOSH 2 mg/m ³ (resp) OSHA† 20 mppcf	1000 mg/m ³	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; II [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 6)
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 (liq)	Conj. rhinitis, pharyngitis, parent, liq; 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:	Prevent skin contact N.R. When contam When wet or contam N.R.	TBAL	Inh ing	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	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/m ³ : DM 100 mg/m ³ : DMXSO/SA 250 mg/m ³ : 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/m ³ : DM 20 mg/m ³ : DMXSO/SA 50 mg/m ³ : PAPRDM/SA, CF 100 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	Inh Con	Fibrotic pneumoconiosis, irit 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 F.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/m³ (as Ta)	Metal: Steel-blue to gray solid or black, odorless powder.	MW: 180.9 BP: 9797°F Sol: Insoluble F.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, Nussance Dust (total)]
TEDP [(CH ₃ CH ₂ O) ₃ PS] ₂ O 3689-24-5 XN4375000 1704-55	Bladefum® , Dithion, Sulfotop , Tetraethyl dithiono- pyrophosphate, Tetraethyl dithiopyro- phosphate, Thiotapp®	NIOSH/OSHA 0.2 mg/m ³ [skin]	10 mg/m³	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% F.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, Metalium 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 Blennith telluride.]	25 mg/m³ (as Te)	Odorless, dark-gray to brown, amorphous powder or grayish- white, brittle solid	MW: 127.6 BP: 1614°F Sol: Insoluble F.P.: NA IP: NA Sp Gr: 6.24 Combustible: Solid	VP: 0 mm (approx) MLT: 842°F UEL: NA LEL: NA	Oxidizers, chlorine, cadmium	Filter; Acid; AAS; II(3) [#S204]
Tellurium hexafluoride (as Te) TeF₆ 7783-80-4 WY2800000 2195-15	Tellurium fluoride	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 F.P.: NA IP: ? RGEAD: 6.34 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				
Eyes:	N.R.	25 mg/m ³ DM*	Con	Irritation eyes, skin; in animals: pulm irrit	Eye: Breath	Irr Irrimed Resp support	
Wash skin:	N.R.	50 mg/m ³ DMXSO*/DMFu/SA					
Remove:	N.R.	125 mg/m ³ SA CF/PAPRDM*					
Change:	N.R.	250 mg/m ³ H ₂ EF/SAT CF/PAPRTHIE/ SCBAF/SAF					
		2500 mg/m ³ SA PD,PP					
		§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape: H ₂ EF/SCBAE					
[Tantalum (metal and oxide dust, as Ta)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh				
Eyes:	Prevent eye contact	2 mg/m ³ SA	Abs	Irritation eyes, skin, eye pain, blurred vision, lacr. rhin.	Eye	Irr Irrimed	
Wash skin:	When contam	5 mg/m ³ SA CF	Ing	head, cyan, anor nau, vomit, diarr, local sweat, weak, twitch para, Cheyne-Stokes respiration, convuls, low BP, card irreg	Skin	Soap wash immmed	
Remove:	When wet or contam	10 mg/m ³ SCBAF/SAF	Con		Breath	Resp support	
Change:	N.R.	§ SCBAF PD PP/SAF PD,PP ASCBA			Swallow	Medical attention immmed	
Provide:	Eyewash, Quick drench	Escape: GMFOVHIE/SCBAE					
[TEDP]							
Skin:	N.R.	NIOSH/OSHA	Inh				
Eyes:	N.R.	0.5 mg/m ³ DM*	Ing	Garlic breath, sweat, dry mouth, metallic taste, som, anor, nau, no sweat, derm, in animals: CNS, red blood cell effects	Eye	Irr Irrimed	
Wash skin:	N.R.	1 mg/m ³ DMXSO*/DMFu/SA	Con		Skin	Soap wash prompt	
Remove:	N.R.	2.5 mg/m ³ SA CF/PAPRDM*			Breath	Resp support	
Change:	N.R.	5 mg/m ³ H ₂ EF/SAT CF/PAPRTHIE/ SCBAF/SAF			Swallow	Medical attention immmed	
		25 mg/m ³ SA PD,PP					
		§ SCBAF PD PP/SAF PD,PP ASCBA					
		Escape: H ₂ EF/SCBAE					
[Tellurium]							
Skin:	N.R.	NIOSH/OSHA	Inh				
Eyes:	N.R.	0.2 ppm SA		Head, dysp, garlic breath, in animals: pulm edema	Breath	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 (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		
Tetraphos $[C_4H_4O_4P(S)(OCH_3)_2]_n$ 3383-98-8 TF8890000	Abate®; Tetrafos; O,O,O',O'-Tetraethylthio,O,O'- thiodi-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: 7 IP: ? Sp.Gr: 1.32 Combustible Solid	VP(77°F): 0.00000007 mm MLT: 87°F UEL: ? LEL: ?	None reported	None available
TEPP $[C_2H_5CH_2O_3P(O)_2O]_n$ 107-49-3 UX6825000 2783 55	Ethyl pyrophosphate; Tetraethyl pyrophosphate; Tetrafos®	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: 0.00016 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; ■ (#2504, Tetraethyl Pyrophos- phate)
o-Terphenyl $C_{12}H_{10}$ 84-15-1 WZ6472000	o-Diphenylbenzene; 1,2-Diphenylbenzene; 2-Phenylbiphenyl; 1,2-Terphenyl; ortho-Terphenyl; o-Triphenyl	NIOSH C 5 mg/m³ (0.5 ppm) OSHA† C 5 mg/m³ (1 ppm)	500 mg/m³	Colorless or light- yellow solid.	MW: 230.3 BP: 630°F Sol: Insoluble Fl.P(oc): 328°F IP: 7.99 eV Sp.Gr: 1.1 Combustible Solid	VP: Very low MLT: 138°F UEL: ? LEL: ?	None reported	Filter; CS; GC/FID; ■ (#5021)
m-Terphenyl $C_{12}H_{10}$ 92-98-8 WZ6470000	m-Diphenylbenzene; 1,3-Diphenylbenzene; meta-Diphenylbenzene; 3-Phenylbiphenyl; 1,3-Terphenyl; meta-Terphenyl; m-Triphenyl	NIOSH C 5 mg/m³ (0.5 ppm) OSHA† C 5 mg/m³ (1 ppm)	500 mg/m³	Yellow solid (needles).	MW: 230.3 BP: 689°F Sol: Insoluble Fl.P(oc): 378°F IP: 8.01 eV Sp.Gr: 1.23 Combustible Solid	VP: Very low MLT: 182°F UEL: ? LEL: ?	None reported	Filter; CS; GC/FID; ■ (#5021)

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: Eyes: Wash skin: Remove: Change: Decontam:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	Irrit eyes, blurred vision; dizz, conf; dysp; saliv; abdom cramps, nau, diarr, vomit	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Irrmed Resp support Medical attention Irrmed	Eyes, resp sys, CNS, CVS, blood chol
[Ternaphos]						
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 0.5 mg/m ³ SA 1.25 mg/m ³ SA, CF 2.5 mg/m ³ SAT, CF/SCBAF/SAF 5 mg/m ³ SA, PD, PP § SCBAF, PD, PP/SAF, PD, PP ASCBA Escape: GMFOVH/SCBAE	Inh Abs Ing Con	Eye pain, blurred vision, lac, rhin, head, chest tight, cyan, anor, nau, vomit, diarr, weak, hunch, para, Cherny-Stokes respiration, convuls, low BP, card Irreg; sweat	Eye Skin Breath Swallow Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, resp sys, CNS, CVS, GI tract, blood chol
[TEPP]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m ³ DMF 50 mg/m ³ DMXSO/SAF 125 mg/m ³ SA, CF/PAPDMF 250 mg/m ³ HIEF/SCBAF/SAF 500 mg/m ³ SAF, PD, PP § SCBAF, PD, PP/SAF, PD, PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; thermal skin burns, head, sore throat, In animals: liver, kidney damage	Eye Skin Breath Swallow Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, liver, kidneys
[o-Terphenyl]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m ³ DMF 50 mg/m ³ DMXSO/SAF 125 mg/m ³ SA, CF/PAPDMF 250 mg/m ³ HIEF/SCBAF/SAF 500 mg/m ³ SAF, PD, PP § SCBAF, PD, PP/SAF, PD, PP ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; thermal skin burns, head, sore throat, In animals: liver, kidney damage	Eye Skin Breath Swallow Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, liver, kidneys
[m-Terphenyl]						

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, F.P., IP, Sp. Gr., Flammability	VP, FRZ UEL, LEL		
p-Terphenyl <chem>C6H5C6H4C6H5</chem> 92-84-4 WZ8475000	p-Diphenylbenzene; 1,4-Diphenylbenzene; 4-Phenylbiphenyl; 1,4-Terphenyl; para-Terphenyl; p-Triphenyl 1 ppm = 9.67 mg/m ³	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 F.P. 405°F IP: 776 eV Sp Gr: 1.23 Combustible Solid	VP: Very low MLT: 418°F UEL: ? LEL: ?	None reported	Filter, CS, GC/FID; II [#5021]
2,3,7,8-Tetrachloro- dibenzo-p-dioxin <chem>C12H4Cl4O2</chem> 1746-01-8 HP3600000	Dioxin; Dioxine; TCDD; 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 workplaces.]	MW: 322.0 BP: Decomposes Sol: 0.00000002% F.P.: ? IP: ? Sp.Gr: 7	VP(77°F): 0.000002 mm MLT: 681°F UEL: ? LEL: ?	UV light (decomposes)	None available
1,1,1,2-Tetrachloro- 2,2-difluoroethane <chem>CCl3CClF2</chem> 76-11-9 K1425000	2,2-Difluoro-1,1,1,2- tetrachloroethane; Freon® 112a; Halocarbon 112a; Refrigerant 112a 1 ppm = 8.47 mg/m ³	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% F.P. NA IP: ? Sp.Gr: 1.86 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 <chem>CCl2FCCl2F</chem> 76-12-0 K1420000	1,2-Difluoro-1,1,2,2- tetrachloroethane; Freon® 112; Halocarbon 112; Refrigerant 112 1 ppm = 8.47 mg/m ³	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% F.P. NA IP: 11.30 eV Sp.Gr: 1.86 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]

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 6)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m ³ DMF 50 mg/m ³ DMXSO ₄ /SA ⁴ 125 mg/m ³ SA GF/PAPRDM ⁴ 250 mg/m ³ H ₂ F/SCBAF/SAF 500 mg/m ³ SAF PD, PP § SCBAF PD, PP/SAF PD, PP ASCBA Escape: H ₂ F/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; thermal skin burns, head, sore throat, In animals: liver, kidney damage	Eye Skin Breath Swallow: Imm ed Water flush imm ed Resp support Medical attention	Eyes, skin, resp sys, liver, kidneys
[p-Terphenyl]						
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 ₂ /SCBAE	Inh Abs Ing Con	Irrit eyes; allergic derm, chloracne; porphyria; GI dist; possible repro, terato effects; In animals: liver, kidney damage; hemorrh; [canc]	Eye: Skin: Breath: Swallow: Imm ed Soap flush imm ed Resp support Medical attention	Eyes, skin, liver, kidneys, repro sys [In animals: tumors at many sites]
[2,3,7,8-Tetrachloro-dibenzo-p-dioxin]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 2000 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin CNS depress, pulm edema, drow, dysp	Eye Skin Breath Swallow: Imm ed Soap wash prompt Resp support Medical attention	Eyes, skin, resp sys, CNS
[1,1,1,2-Tetrachloro-2,2-difluoroethane]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 2000 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	In animals: Irrit eyes, skin, conj, pulm edema, nausea	Eye Skin Breath Swallow: Imm ed Soap wash prompt Resp support Medical attention	Eyes, skin, resp sys, CNS
[1,1,2,2-Tetrachloro-1,2-difluoroethane]						

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		
1,1,1,2-Tetrachloro- ethane <chem>CCl3CH2Cl</chem> 630-20-6 K18460000	None	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes)	N.D.	Yellowish-red liquid.	MW: 167.9 BP: 267°F Sol: 0.1% F.P.: ? IP: ?	VP(77°F): 14mm FRZ: -84°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	OSHA none			Sp.Gr: 1.54			
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% F.P.: NA IP: 11.10 eV	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, IR [#1019]
1702 55	1 ppm = 7.00 mg/m ³				Sp.Gr(77°F): 1.59 Noncombustible Liquid			
Tetrachloroethylene <chem>Cl4C=CCl2</chem> 127-18-4 KX3850000	Perchloroethylene, Perchloroethylene, Park, Tetrachloroethylene	NIOSH Ca See Appendix A Minimize workplace exposure concentrations limit number of workers exposed. OSHA† 100 ppm C 200 ppm 300 ppm (5-min max peak in any 3 hrs)	Ca [100 ppm]	Colorless liquid with a mild, chloroform-like odor.	MW: 165.8 BP: 250°F Sol: 0.02% F.P.: NA IP: 9.32 eV	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, IR [#1003, Halogen- ated Hydro- carbons]
1897 74	1 ppm = 6.89 mg/m ³				Sp. Gr: 1.82 Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.			
Tetrachloronaphthalene <chem>C10H6Cl4</chem> 1335-88-2 QK3700000	Halowax®, Nibran wax, Seekay wax	NIOSH/OSHA 2 mg/m ³ [skin]	Unknown	Colorless to pale- yellow solid with an aromatic odor.	MW: 265.9 BP: 699-680°F Sol: Insoluble F.P.(oc): 410°F IP: ?	VP: <1 mm MLT: 360°F UEL: ? LEL: ?	Strong oxidizers	Fater/Sub, none; GC/FID; IR(2) [#130]
					Sp.Gr: 1.59-1.85 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	TBAL	Inh	Irrit eyes, skin; weak,	Eye:	Eyes, skin, CNS,
Eyes:	Prevent eye contact		ing	restless, irreg respiration,	Skin:	liver
Wash skin:	When contam		Con	muscle; in animals: liver changes	Breath:	
Remove:	When wet or contam				Swallow:	
Change:	N.R.					
Provide:	Eyewash, Quick drench					
[1,1,1,2-Tetrachloroethane]						
Skin:	Prevent skin contact	NIOSH	Inh	Nau, vomit, abdom pain,	Eye	Skin, liver, kidneys,
Eyes:	Prevent eye contact	✓ SCBAF PD, PP/SAF PD, PP, ASCBA	Abs	tremor fingers, jaun,	Skin	CNS, GI tract
Wash skin:	When contam	Escape GMFOV/SCBAE	ing	hepatitis, liver tend,	Breath:	[in animals:
Remove:	When wet or contam		Con	derm, monoc, kidney	Swallow:	liver tumors]
Change:	N.R.			damage, [canc]		
Provide:	Eyewash, Quick drench					
[1,1,2,2-Tetrachloroethane]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	✓ SCBAF PD, PP/SAF PD, PP, ASCBA	Abs	nau, flush face, neck,	Skin	liver, kidneys, CNS
Wash skin:	When contam	Escape GMFOV/SCBAE	ing	vert, dizz, inco, head,	Breath:	[in animals:
Remove:	When wet or contam		Con	son, skin eryt, liver	Swallow:	liver tumors]
Change:	N.R.			damage, [canc]		
Provide:	Eyewash, Quick drench					
[Tetrachloroethylene]						
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Acne-form derm, head,	Eye	Liver, skin, CNS
Eyes:	Prevent eye contact	20 mg/m ³ SCBAF/SAF	Abs	fig, anor, vert, jaun,	Skin	
Wash skin:	When contam	6 SCBAF PD, PP/SAF PD, PP, ASCBA	ing	liver it	Breath:	
Remove:	When wet or contam	Escape GMFOVH/E/SCBAE	Con		Swallow:	
Change:	Daily					
[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, F.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% F.P.: 200°F IP: 11.10 eV	VP: 0.2 mm FRZ: -202°F UEL: ? LEL: 1.6%	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; II [#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-Epoxybutane, Tetramethylene 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 F.P.: 6°F IP: 9.45 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; II [#1609]
2056 26	1 ppm = 3.00 mg/m ³				Sp Gr: 0.89 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% F.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; II [#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 F.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 6)
Skin:	Prevent skin contact (>0.1%)	NIOSH/OSHA	Inh	Insom, less anxiety,	Eye	Ir/med	CNS, CVS,
Eyes:	Prevent eye contact	0.75 mg/m ³ SA	Abs	tremor, hyper-reflexia,	Skin	Soap wash immed	kidneys, eyes
Wash skin:	When contam (>0.1%)	1.875 mg/m ³ SA/CF	Ing	spasticity, bradycardia,	Breath	Resp support	
Remove:	When wet or contam (>0.1%)	3.75 mg/m ³ SAT CF/SCBAF/SAF	Con	hypotension, hypothermia,	Swallow	Medical attention	
Change:	Daily	40 mg/m ³ SA PD PP		pallor, nau, anor, low-wgt,		immed	
Provide:	Quick drench (>0.1%)	§ SCBAF PD PP/SAF PD PP ASCBA		conf, disorientation, hdu,			
		Escape GMFOV/SCBAE		psychosis, mania, convuls,			
				coma, eye irrit			
[Tetraethyl lead (as Pb)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, upper resp sys,	Eye	Ir/med	Eyes, resp sys,
Eyes:	Prevent eye contact	2000 ppm: SA/CF/CCRFOV/GMFOV/	Abs	nau, dizz, head, CNS depres	Skin	Water flush prompt	CNS
Wash skin:	When contam	PAPROV/SCBAF/SAF	Ing		Breath	Resp support	
Remove:	When wet (flamem)	§ SCBAF PD PP/SAF PD PP ASCBA	Con		Swallow	Medical attention	
Change:	NLR	Escape GMFOV/SCBAE				immed	
[Tetrahydrofuran]							
Skin:	Prevent skin contact (>0.1%)	NIOSH/OSHA	Inh	Insom, bad dreams,	Eye	Ir/med	CNS, CVS, kidneys
Eyes:	Prevent eye contact	0.75 mg/m ³ SA	Abs	restless, anxious,	Skin	Soap wash immed	
Wash skin:	When contam (>0.1%)	1.875 mg/m ³ SA/CF	Ing	hypotension, nau, anor,	Breath	Resp support	
Remove:	When wet or contam (>0.1%)	3.75 mg/m ³ SAT CF/SCBAF/SAF	Con	delirium, mania, convuls,	Swallow	Medical attention	
Change:	Daily	40 mg/m ³ SA PD PP		coma		immed	
Provide:	Quick drench (>0.1%)	§ SCBAF PD PP/SAF PD PP ASCBA					
		Escape GMFOV/SCBAE					
[Tetramethyl lead (as Pb)]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Head, nau, convuls,	Eye	Ir/med	CNS, liver,
Eyes:	Prevent eye contact	28 mg/m ³ SA/SCBAF	Abs	coma, liver, kidney,	Skin	Soap wash prompt	kidneys, GI tract
Wash skin:	When contam	§ SCBAF PD PP/SAF PD PP ASCBA	Ing	GI effects	Breath	Resp support	
Remove:	When wet or contam	Escape GMFOV/SCBAE	Con		Swallow	Medical attention	
Change:	Daily					immed	
[Tetramethyl succinonitrile]							

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		
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/Atk-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 $Na_4P_2O_7$ 7722-88-8 UX7350000	Pyrophosphate, Sodium pyrophosphate, Tetrasodium diphosphate, Tetrasodium pyrophosphate (anhydrous), TSP [†]	NIOSH 8 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 $(NO_2)_3C_6H_4N(NO_2)CH_3$ 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]	18 mg/m ³ (as TI)	Appearance and odor vary depending upon the specific soluble thallium compound.	Properties vary depending upon the specific soluble thallium compound.		Varies	Filter, Acid, AAS; II(3) [#S306]
1707 53 (compounds)								

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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flam)	NIOSH/OSHA 4 ppm: SA:CF/CCRFS/GMFS/H PAPRS/SCBAF/SAF § SCBAF PD,PP/SAF PD,PP/ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, dizz, head, chest pain, dysp, methemo, cyan, skin burns	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, blood, CNS
[Tetratromethane]							
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:	Irrimmed 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 DMXSO ² /SA* 37.5 mg/m ³ SA CF/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, hera, swell; anemia, fig, cough, coryza, eryt, mal, head, lass, insom; neu, vomit, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irrimmed 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 DMXSO ² /SA 2.5 mg/m ³ SA CF/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; per neuritis, tremor, retailer tight, chest pain, pulm edema, sez, chorea, psychosis, liver, kidney damage, alopecia, pares legs	Eye: Skin: Breath: Swallow:	Irrimmed Water flush prompt Resp support Medical attention immed	Eyes, resp sys, CNS, liver, kidneys, GI tract, body hair
[Thallium (soluble compounds, as TII)]							

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		
4,4'-Thiobis(6-tert-butyl-m-cresol) [CH ₃ (OH)C ₆ H ₂ 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-6-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: 7 Sol: 0.08% F.P.: 420°F IP: 7 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 86-11-1 AJS950000 1940 60	Acetyl mercaptan, Mercaptoacetate, Mercaptoacetic acid, 2-Mercaptoacetic 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: 7 Sol: Miscible F.P.: >230°F IP: 7 Sp.Gr: 1.32 Class III Combustible Liquid	VP(64°F): 10mm FRZ: 2°F UEL: 7 LEL: 6.9%	Air, strong oxidizers, bases, active metals (e.g., sodium, potassium, magnesium, calcium) [Note: Readily oxidized by air.]	None available
Thionyl chloride SOCl ₂ 7719-08-7 XN6150000 1838 39	Sulfinyl chloride, Sulfur chloride oxide, Sulfurous dichloride, Sulfurous oxychloride, Thionyl dichloride	NIOSH C 1 ppm (6 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: 118.0 BP: 108°F Sol: Reacts F.P.: NA IP: 7 Sp.Gr: 1.64 Noncombustible Liquid	VP(70°F): 100mm 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 ₂ H ₄ N ₂ S ₂ 137-26-8 J01400000 2771 55	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% F.P.: ? IP: ? Sp. Gr: 1.29 Combustible Solid	VP: 0.0000006 mm MLT: 312°F UEL: ? LEL: ?	Strong oxidizers, strong acids, oxidizable materials	Filter, CH,CN, HP[CA/VD, # [#5005]

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	Irrit eyes, skin, resp sys	Eye: Breath: Swallow:	Irr Irrmed Fresh air Medical attention Irrmed	Eyes, skin, resp sys
[4,4'-Thiobis(6-tert-butyl-m-cresol)]							
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, nose, throat; lac, corn damage; skin burns, blistering; in animals: weak; gasping respirations; convulse	Eye: Skin: Breath: Swallow:	Irr Irrmed Water/flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys
[Thioglycolic acid]							
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, muc memb; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr Irrmed Water/flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys
[Thionyl chloride]							
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 : CCROVDMFu*/SA* 100 mg/m ³ : SA:CP*/CCRFVHIE/ GMFOVHIE/PAPROVDMFu*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; derm. Antabuse-like effects	Eye: Skin: Breath: Swallow:	Irr Irrmed Soap wash prompt Resp support Medical attention Irrmed	Eyes, skin, resp sys, CNS
[Thiram]							

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		
Tin Sn 7440-31-5 XP7320000	Metallic tin, Tin flakes, Tin metal, Tin powder	NIOSH*OSHA* 2 mg/m ³	100 mg/m ³ (as Sn)	Gray to almost silver-white, ductile, malleable, lustrous solid	MW: 118.7 BP: 4545°F Sol: Insoluble FLP: NA IP: NA	VP: 0 mm (approx) MLT: 449°F UEL: NA LEL: NA	Chlorine, turpentine, acids, alkalis	Filter; Acid; AAS; I(3) [§S183]
					Sp Gr: 7.28 Noncombustible Solid, but powdered form may ignite			
Tin (organic compounds, as Sn)	Synonyms vary depending upon the specific organic tin compound. [Note: Also see specific listing for Cyhexatin.]	NIOSH* 0.1 mg/m ³ (skin) [Note: The REL applies to all organic tin compounds except cyhexatin.] OSHA† 0.1 mg/m ³	25 mg/m ³ (as Sn)	Appearance and odor vary depending upon the specific organic tin compound.	Properties vary depending upon the specific organic tin compound.		Varies	Filter/ XAD-2; HPLC; AAS; IR [§5504]
Tin(II) oxide (as Sn) SnO 21851-19-4	Stannous oxide, Tin protoxide [Note: Also see specific listing for Tin(IV) oxide (as Sn).]	NIOSH 2 mg/m ³ OSHA† none	N.D.	Brownish-black powder.	MW: 134.7 BP: Decomposes Sol: Insoluble FLP: NA IP: NA	VP: 0 mm (approx) MLT (500 mmHg): 1875°F (Decomposes) UEL: NA LEL: NA	None reported	Filter; Acids; ICP; IR [§7300, Benzene]
					Sp.Gr: 6.3			
Tin(IV) oxide (as Sn) SnO ₂ 18282-10-5 XQ4000000	Stannic dioxide, Stannic oxide, White tin oxide [Note: Also see specific listing for Tin(II) oxide (as Sn).]	NIOSH 2 mg/m ³ OSHA† none	N.D.	White or slightly gray powder.	MW: 150.7 BP: Decomposes Sol: Insoluble FLP: NA IP: NA	VP: 0 mm (approx) MLT: 2968°F (Decomposes) UEL: ? LEL: ?	Chlorine trifluoride	Filter; Acids; ICP; IR [§7300, Benzene]
					Sp.Gr: 6.96			

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	Irrit eyes, skin, resp	Eye	Eyes, skin, resp
Eyes:	N.R.	10 mg/m ³ DM*	Con	sys.	Skin	sys
Wash skin:	N.R.	20 mg/m ³ DMXSQ**/SA*		In animals: vomit, diarr,	Immered	
Remove:	N.R.	50 mg/m ³ SA CF*/PAPRDM**		para with musc twitch	Soap wash immered	
Change:	N.R.	100 mg/m ³ HIEF/SCBAF/SAF			Breath	Resp support
		§ SCBAF PD, PP/SAF PD, PP ASCBA			Swallow	Medical attention
		Escape: HIEF/SCBAE				immered
[Tin]						
Recommendations vary depending upon the specific compound.		NIOSH/OSHA	Inh	Irrit eyes, skin; resp sys;	Eye	Eyes, skin, resp sys;
		1 mg/m ³ CCROVDM/SA	Abs	head, vertic, psycho-	Skin	CNS, liver, kidneys,
		2.5 mg/m ³ SA CF/PAPROVDM	ing	neurobiologic dist, sore	Breath	urinary tract, blood
		5 mg/m ³ CCRFOVHIE/GMFOVHIE/	Con	throat, cough, abdom pain,	Swallow	
		PAPRTOVHIE/SAT CF/		vomit, urine retention,		
		SCBAF/SAF		parasis, focal anes, skin		
		25 mg/m ³ SAF; PD, PP		burns, pruritus,		
		§ SCBAF PD, PP/SAF PD, PP ASCBA		In animals: hemolysis,		
		Escape: GMFOVHIE/SCBAE		hepatic nec, kidney damage		
[Tin (organic compounds, as Sn)]						
Skin:	N.R.	TBAL	Inh	Stennois (benign	Eye:	Resp sys
Eyes:	N.R.		Con	pneumoconiosis): dysp,	Breath:	
Wash skin:	N.R.			decr pulm func	Ir immered	
Remove:	N.R.				Fresh air	
Change:	N.R.					
[Tin(II) oxide (as Sn)]						
Skin:	N.R.	TBAL	Inh	Stennois (benign	Eye:	Resp sys
Eyes:	N.R.		Con	pneumoconiosis): dysp,	Breath:	
Wash skin:	N.R.			decr pulm func	Ir immered	
Remove:	N.R.				Fresh air	
Change:	N.R.					
[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 FLP, 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† 16 mg/m ³	Ca [6000 mg/m ³]	White, odorless powder	MW: 79.9 BP: 4532- 5432°F Sol: Insoluble FLP: 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) [§S385]
o-Tolidine C ₁₀ H ₉ N ₃ 119-63-7 DG1226000	4,4'-Diamino-3,3'-dimethyl- biphenyl; Diaminodiphenyl; 3,3'-Dimethylbenzidine; 3,3'-Dimethyl-4,4'-diphenyl- diamine; 3,3'-Tolidine [CH ₃ (NH ₂)C ₆ H ₄ C ₆ H ₄ (NH ₂)CH ₃]	NIOSH Ca See Appendix A See Appendix C C 0.02 mg/m ³ (80-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: 672°F Sol: 0.1% FLP: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 264°F UEL: ? LEL: ?	Strong oxidizers	Filter; water; HPLC/UV; II [§6013, Dyes]
Toluene C ₇ H ₈ 108-88-3 XS5250000	Methyl benzene, Methyl benzol, Phenyl methane, Toluol	NIOSH 100 ppm (375 mg/m ³) ST 150 ppm (560 mg/m ³) 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% FLP: 40°F IP: 6.62 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 21 mm FRZ: -136°F UEL: 7.1% LEL: 1.1%	Strong oxidizers	Char. CS; GC/ID; II [§1500, Hydro- carbons]
1294 27 Toluenediamine CH ₃ C ₆ H ₄ (NH ₂) ₂ 26378-45-8 96-80-7 (2,4-TDA) XS446000 XS9625000 (2,4-TDA) 1706 63	Diaminotoluene, Methylphenylenediamine, TDA, Toluylenediamine	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: 68°F Sol: Soluble FLP: 300°F IP: ? Sp.Gr: 1.06 (Liquid at 212°F) Combustible Solid	VP(234°F): 1 mm MLT: 210°F UEL: ? LEL: ?	None reported	Imp; Pungent; HPLC/UV; II [§6816]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — minimum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 8)	First aid (See Table 6)	Target organs (See Table 5)	
Skln:	N.R.	NIOSH	Inh	Lung fib. [canc]	Breath	Resp support	Resp sys [in animals: lung tumors]
Eyes:	N.R.	W/ SCBAF:PD,PP/SAF:PD,PP/ASCBA					
Wash skln:	N.R.	Escape: HIEF/SCBAE					
Remove:	N.R.						
Change:	Daily						

[Titanium dioxide]

Skln:	Prevent skln contact	NIOSH	Inh	Irrit eyes, nose; In animals: liver, kidney damage; [canc]	Eye:	Irr Irrmed	Eyes, resp sys, liver, kidneys
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP/ASCBA	Abs		Skln:	Soap flush Irrmed	[in animals: liver, bladder & mammary gland tumors]
Wash skln:	When contam/Daily	Escape: GMFOV/H/EF/SCBAE	Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention Irrmed	
Change:	Daily						
Provide:	Eyewash, Quick drench						

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[o-Toluidine]

Skln:	Prevent skln contact	NIOSH	Inh	Irrit eyes, nose; fig. weak, conf. euph, dizz, head, dilated pupils, lac, nar, musc fig, inson, pares, dem, liver, kidney damage	Eye:	Irr Irrmed	Eyes, skln, resp sys, CNS, liver, kidneys
Eyes:	Prevent eye contact	600 ppm: CCROV*/PAPROV*/GMFOV/ SA*/SCBAF	Abs		Skln:	Soap wash prompt	
Wash skln:	When contam	§ SCBAF:PD,PP/SAF:PD,PP/ASCBA	Ing		Breath:	Resp support	
Remove:	When wet (flamnt)	Escape: GMFOV/SCBAE	Con		Swallow:	Medical attention Irrmed	
Change:	N.R.						

[Toluene]

Skln:	Prevent skln contact	NIOSH	Inh	Irrit eyes, skln, nose, throat; dermat; ataxia, tacar, neu, vomit, convuls, resp depress, methemo, cyan, head, fig, dizz, bluish skln; liver inj; [canc]	Eye:	Irr Irrmed	Eyes, skln, resp sys, blood, CVS, liver, CNS
Eyes:	Prevent eye contact	§: SCBAF:PD,PP/SAF:PD,PP/ASCBA	Abs		Skln:	Water flush Irrmed	[in animals: liver, skln & mammary gland tumors]
Wash skln:	When contam/Daily	Escape: GMFOV/SCBAE	Ing		Breath:	Resp support	
Remove:	When wet or contam		Con		Swallow:	Medical attention Irrmed	
Change:	Daily						
Provide:	Eyewash, Quick drench						

[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- dithiocyanate <chem>CH3C6H3(NCS)2</chem> 584-84-9 CZ6300000	TDI 2,4-TDI 2,4-Toluene dithiocyanate	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/UVD, 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	p-Aminotoluene, o-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 base for many dyes.]	MW: 107.2 BP: 387°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: 0.899 Class IIIA Combustible Liquid			
p-Toluidine <chem>CH3C6H4NH2</chem> 106-49-0 XU3180000	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 base for many dyes.]	MW: 107.2 BP: 383°F Sol: 0.7% FLP: 188°F IP: 7.60 eV	VP(108°F): 1 mm MLT: 111°F UEL: ? LEL: ?	Oxidizers, acids	Si gel; Ethanol; GC/FID; III [#2802, Aromatic Amines]
1708 55	1 ppm = 4.46 mg/m³				Sp.Gr: 1.06 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 8)	
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 ing Con	Irrit eyes, skin, nose, throat, choke, paroxysmal cough, chest pain, reticular soreness, nau, vomit, abdom pain, bron, bronchoasperm, pulm edema, dysp, asthma, cong, lac, derm, skin sens, [carc]	Eye: Skin: Breath: Swallow:	Inn med Soap wash inn med Resp support Medical attention inn med	Eyes, skin, resp sys [in animals: pancreas, liver, mammary gland, circulatory sys & skin tumors]
[Toluene-2,4-diisocyanate]							
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; anoxia, head, cyan, weak, dizz, drow, micro hema, eye burns, derm, [carc]	Eye: Skin: Breath: Swallow:	Inn med Soap wash inn med Resp support Medical attention inn med	Eyes, skin, blood kidneys, liver, CVS [in animals: liver, bladder & mammary gland tumors]
[o-Toluidine]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Abs ing Con	Irrit eyes, skin; hema, methemo; cyan, nau, vomit, low BP, convuls; anemia, weak	Eye: Skin: Breath: Swallow:	Inn med Soap wash inn med Resp support Medical attention inn med	Eyes, skin, blood CVS
[m-Toluidine]							
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	Irrit eyes, skin; derm; hema, methemo; cyan, nau, vomit, low BP, convuls; anemia, weak; [carc]	Eye: Skin: Breath: Swallow:	Inn med Soap wash inn med Resp support Medical attention inn med	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 FLP, IP, Sp, Gr, Flammability	VP, FRZ UEL, LEL		
Tributyl phosphate (CH ₃ (CH ₂) ₃) 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% FLP(oc): 295°F IP: ? Sp Gr: 0.98 Class IIIB Combustible Liquid	VP(77°F): 0.004 mm FRZ: -112°F UEL: ? LEL: ?	Alkalies, oxidizers, water, moist air	Filter; Diethyl ether; GC/FPD; ■ [#S208]
Trichloroacetic acid CCl ₃ COOH 78-03-8 AJ7878000	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: 385°F Sol: Miscible FLP: NA IP: ? Sp.Gr: 1.52 Noncombustible Solid	VP(124°F): 1 mm MLT: 138°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
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. 2.6%	MW: 181.4 BP: 416°F Sol: 0.003% FLP: 222°F IP: ? Sp.Gr: 1.45 Class IIB Combustible Liquid Combustible Solid	VP: 1 mm FRZ: 63°F UEL(302°F): 6.6% LEL(302°F):	Acids, acid fumes, oxidizers, steam	Filter/ XAD-2; Hexane; GC/ECG; ■ [#6417, Poly- chloro- benzenes]
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% FLP: ? IP: 11.00 eV Sp. Gr: 1.44 Combustible Liquid, forms dense soot.	VP: 19 mm FRZ: -34°F UEL: 16.6% LEL: 0%	Strong oxidizers & caustics; chemically-active metals (such as aluminum, magnesium powders, sodium & potassium)	Chr; CS; C/FID; ■ [#1003, Halo- nated 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 8)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH 2 ppm: SA 5 ppm: SA, CF 10 ppm: SCBAF/SAF 30 ppm: SAF, PD, PP 5 SCBAF, PD, PP/SAF, PD, PP, ASCBA Escape: GMFOVH/E/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys, head, nau	Eye: Skin: Breath: Swallow	Irr: Irrimed Soap wash prompt Resp support Medical attention Irrimed	Eyes, skin, resp sys
[Tributyl phosphate]							
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	Irrit eyes, skin, nose, throat, resp sys; cough, dysp, delayed pulm edema; eye, skin burns, derm; salv, vomit, diarr	Eye: Skin: Breath: Swallow:	Irr: Irrimed Water flush Irrimed Resp support Medical attention Irrimed	Eyes, skin, resp sys, GI tract
[Trichloroacetic acid]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; in animals: liver, kidney damage; possible terato effects	Eye: Skin: Breath: Swallow:	Irr: Irrimed Soap wash Resp support Medical attention Irrimed	Eyes, skin, resp sys, liver, repro sys
[1,2,4-Trichlorobenzene]							
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, nose, CNS depress liver, kidney damage, derm; [carc]	Eye: Skin: Breath: Swallow	Irr: Irrimed Soap wash prompt Resp support Medical attention Irrimed	Eyes, resp sys, CNS, liver, kidneys [in animals: liver cancer]
[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>ClC(Cl)(Cl)C</chem> 79-01-6 KX4550000	Ethylene trichloride, TCE, Trichloroethene, Triene	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; II [#1022]
1710 74	1 ppm = 5.46 mg/m ³				Sp Gr 1.46 Combustible Liquid, but burns with difficulty			
Trichloronaphthalene <chem>ClC(Cl)(Cl)c1ccc2ccccc2c1</chem>	Kalowax®, 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; III(2) [#S128]
					Sp Gr 1.58 Combustible Solid			
1,2,3-Trichloropropane <chem>ClC(Cl)(Cl)CC</chem>	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 180°F IP ?	VP: 3 mm FRZ 6°F UEL(302°F): 12.8% LEL(348°F): 3.2%	Chemically-active metals, strong caustics & oxidizers	Char; CS; GC/FID; II [#1003, Halogenated Hydro- carbons]
	1 ppm = 6.13 mg/m ³				Sp Gr 1.39 Class IIIA Combustible Liquid			
1,1,2-Trichloro-1,2,2- difluoroethane <chem>ClC(Cl)(F)C(F)Cl</chem>	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 11.90 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; II [#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.			

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: 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; head, vert, vis dist, fig, gidd, tremor, som, nau, vomit, derm, card arrhy, pares, liver lnj; [canc]	Eyes: Skin: Breath: Swallow: Irrimed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, heart, liver, CNS [in animals: liver & kidney cancer]
[Trichloroethylene]						
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 SCBAF/SAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anor, nau, vert, jaun, liver ry	Eyes: Skin: Breath: Swallow: Irrimed Soap wash Resp support Medical attention immed	Liver
[Trichloronaphthalene]						
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, nose, throat, CNS depres, in animals: liver, kidney ry, [canc]	Eyes: Skin: Breath: Swallow: Irrimed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: forestomach, liver & mammary gland cancer]
[1,2,3-Trichloropropane]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 2000 ppm: SA/SCBAF § SCBAF PD, PP/SAF PD, PP ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit skin, throat, drow, derm, CNS depres; in animals: card arrhy, narc	Eyes: Skin: Breath: Swallow: Irrimed Soap wash prompt Resp support Medical attention immed	Skin, heart, CNS, CVS
[1,1,2-Trichloro-1,2,2-trifluoroethane]						

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		
Triethylamine ($C_2H_5)_3N$ 121-44-8 YE0175000	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: 183°F Sol: 2% FLP: 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	Sub. NaOH; GC/FID; II(3) [§S152]
1296 68	1 ppm = 4.21 mg/m ³				Sp.Gr: 0.73 Class IB 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 (8100 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% FLP: 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; II [§I017]
1009 12	1 ppm = 6.19 mg/m ³				RGasD: 5.14 Nonflammable Gas			
Trimellitic anhydride C ₁₀ H ₄ O ₆ 852-30-7 DC2060000	1,2,4-Benzenetricarboxylic anhydride; 4-Carboxyphthalic anhydride; TMA; TBAA; Trimellitic acid anhydride [Note: TMA is also a synonym for Triethylamine.]	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: 182.1 BP: ? Sol: ? FLP: NA IP: ?	VP: 0.000004 mm MLT: 322°F UEL: NA LEL: NA	None reported	Fiber; spectro; GC/FID; II [§SCAS §322]
1 ppm = 7.88 mg/m ³					Sp.Gr: ? Combustible Solid			
Triethylamine ($C_2H_5)_3N$ 76-60-3 PA0360000	N,N-Dimethylmethanamine; TMA [Note: May be used in an aqueous solution (typically 20%, 30%, or 40% TMA.)]	NIOSH 10 ppm (34 mg/m ³) ST16 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: 89.1 BP: 37°F Sol(86°F): 48% FLP: NA (Gas) 20°F (Liq) IP: 7.82 eV	VP(70°F): 1464 mm FRZ: -179°F UEL: 11.6% 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 = 2.48 mg/m ³				RGasD: 2.09 Flammable Gas 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	Irrit eyes, skin, resp sys.	Eye:	Eyes, skin, resp sys.
Eyes:	Prevent eye contact	200 ppm: SA:CF/SCBAF/SAF	Abs	in animals: myocardial,	Skin:	CVS, liver, kidneys
Wash skin:	When contam	§ SCBAF PD,PP/SAF PD,PP ASCBA	Inh	kidney, liver damage	Breath:	
Remove:	When wet (flam)	Escape: GMFS/SCBAE	Con		Swallow:	
Change:	N.R.					
Provide:	Eyewash (>1%), Quick drench (>1%)					
[Triethylamine]						
Skin:	Frostbite	NIOSH/OSHA	Inh	L-head, card arrhy,	Eye:	CNS, heart
Eyes:	Frostbite	10,000 ppm: SA	Con	liq: frostbite	Skin:	
Wash skin:	N.R.	25,000 ppm: SA,CF	(liq)		Breath:	
Remove:	N.R.	40,000 ppm: SAT:CF/SCBAF/SAF				
Change:	N.R.	§ SCBAF PD,PP/SAF PD,PP ASCBA				
Provide:	Frostbite	Escape: GMFOV/SCBAE				
[Trifluorobromomethane]						
Skin:	Prevent skin contact	TBAL	Inh	Irrit eyes, skin, nose, resp	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact		ing	sys; pulm edema, resp sens;	Skin:	
Wash skin:	When contam		Con	rhinitis, asthma, cough,	Breath:	
Remove:	When wet or contam			wheez, dysp, mal, fever,	Swallow:	
Change:	Daily			musc aches, sneez		
[Trimellitic anhydride]						
Skin:	Prevent skin contact (liq/soln)/Frostbite	TBAL	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys
Eyes:	Prevent eye contact (liq/soln)/Frostbite		ing	throat, resp sys; cough,	Skin:	
Wash skin:	When contam (soln)		(soln)	dysp, delayed pulm edema;		
Remove:	When wet (flam)		Con	blurred vision, corn nec;	Breath:	
Change:	N.R.			skin burns; liq: frostbite	Swallow:	
Provide:	Eyewash (liq/soln), Quick drench (liq/soln), Frostbite					
[Triethylamine]						

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 $C_9H_{12}(CH_3)_3$ 528-73-8 DC1300000	Hemellitol [Note: Hemellitene 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: 348°F Sol: Low FLP: ? IP: 8.48 eV	VP(52°F): 1 mm FRZ: -14°F UEL: 6.8% LEL: 0.8%	Oxidizers, nitric acid	None available
2325 28	1 ppm = 5.00 mg/m ³				Sp. Gr: 0.88 Flammable Liquid			
1,2,4-Trimethylbenzene $C_9H_{12}(CH_3)_3$ 85-83-8 DC3325000	Asymmetrical trimethyl- benzene, pai-Cumene, Pseudocumene [Note: Hemellitene 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: 0.008% FLP: 112°F IP: 8.27 eV	VP(58°F): 1 mm FRZ: -77°F UEL: 6.4% LEL: 0.9%	Oxidizers, nitric acid	None available
2326 28	1 ppm = 5.00 mg/m ³				Sp. Gr: 0.86 Class II Flammable Liquid			
1,3,5-Trimethylbenzene $C_9H_{12}(CH_3)_3$ 108-87-8 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: 6.38 eV	VP: 2 mm FRZ: -48°F UEL: ? LEL: ?	Oxidizers, nitric acid	None available
2325 28	1 ppm = 5.00 mg/m ³				Sp. Gr: 0.86 Class II Flammable Liquid			
Trimethyl phosphite $(CH_3O)_3P$ 121-48-9 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 28	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	Irrit eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, cont; chemical pneu (aspir lig)	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Resp support Medical attention Irrmed	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	Irrit eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, cont; chemical pneu (aspir lig)	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Resp support Medical attention Irrmed	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	Irrit eyes, skin, nose, throat, resp sys; bron; hypochromic anemia, head, drow, ftg, dizz, nau, inco; vomit, cont; chemical pneu (aspir lig)	Eye: Skin: Breath: Swallow: Irr Irrmed Soap wash Resp support Medical attention Irrmed	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	Irrit eyes, skin, upper resp sys; dam; in animals: tarato effects	Eye: Skin: Breath: Swallow: Irr Irrmed Soap flush Irrmed Resp support Medical attention Irrmed	Eyes, skin, resp sys, repro sys
[Trimethyl phosphite]						

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		
2,4,6-Trinitrotoluene <chem>CH3C6H2(NO2)3</chem> 118-96-7 XU0175000	1-Methyl-2,4,6- trinitrobenzene; TNT; Trinitrotoluene; sym-Trinitrotoluene; Trinitrotoluol	NIOSH 0.5 mg/m ³ [skin] OSHA† 1.5 mg/m ³ [skin]	800 mg/m ³	Colorless to pale- yellow, odorless solid or crushed flakes.	MW: 227.1 BP: 464°F (Explodes) Sol(77°F): 0.01% F.P.: ? (Explodes) IP: 10.59 eV Sp Gr: 1.85 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.]	Tenax GC, Acetone, GC/TEA, OSHA [§ 4.4]
1356 33 (wet)								
Trorthocresyl phosphate <chem>(CH3C6H4O)3PO</chem> 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 F.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; ■ [§S209]
2574 55	1 ppm = 15.31 mg/m ³							
Triphenylamine <chem>(C6H5)3N</chem> 683-34-9 YK2680000	N,N-Diphenylaniline; N,N-Diphenylbenzenamine	NIOSH 6 mg/m ³ OSHA† none	N.D.	Colorless solid.	MW: 245.3 BP: 689°F Sol: Insoluble F.P.: ? IP: 7.80 eV Sp.Gr: 0.77	VP: ? MLT: 261°F UEL: ? LEL: ?	None reported	None available
Triphenyl phosphate <chem>(C6H5O)3PO</chem> 115-86-6 TC8400000	Phenyl phosphate, TPP, Triphenyl 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: 778°F Sol(129°F): 0.002% F.P.: 426°F IP: ? Sp Gr: 1.29 Combustible Solid	VP(380°F): 1mm MLT: 120°F UEL: ? LEL: ?	None reported	Filter, Diethyl ether, GC/FPD, ■ [§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 6)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	NIOSH 5 mg/m ³ SA* 12.5 mg/m ³ SA CF* 25 mg/m ³ SCBAF/SAF 500 mg/m ³ SAF:PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: GMFOVH/SCBAE	Inh Abs Ing Con	Irrit skin, muc memb; liver damage, jaun, cyan, anes; cough, sore throat, peri neur, musc pain, kidney damage, cataract, sens derm, leucyt, anemia, card irreg	Eye: Skin: Breath: Swallow: Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, blood, liver, CVS, CNS, kidneys
[2,4,6-Trinitrotoluene]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact N.R. When contam When wet or contam N.R.	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 H:EF/SAT CF/PAPRTH:EF/ SCBAF/SAF 40 mg/m ³ SA PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: H:EF/SCBAE	Inh Abs Ing Con	GI dist, peric neur, cramps in calves, pares in feet or hands, weak feet, wrist drop, para	Eye: Skin: Breath: Swallow: Irr immed Soap wash immed Resp support Medical attention immed	PNS, CNS
[Thionochlorophosphate]						
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	TBAL	Inh Ing Con	In animals; irrit skin	Eye: Skin: Breath: Swallow: Irr immed Soap wash Resp support Medical attention immed	Skin
[Triphenylamine]						
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 15 mg/m ³ D 30 mg/m ³ H:EF/DXSO/SA 75 mg/m ³ SA CF/PAPRDM 150 mg/m ³ H:EF/SAT CF/PAPRTH:EF/ SCBAF/SAF 1000 mg/m ³ SA:PD,PP § SCBAF PD,PP/SAF PD,PP ASCBA Escape: H:EF/SCBAE	Inh Ing	Minor changes in blood enzymes, in animals, musc weak, para	Breath: Swallow: Resp support Medical attention immed	Blood, PNS
[Triphenyl phosphite]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide No.	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 Y07178000	Tungsten metal, Wolfram	NIOSH† 5 mg/m³ ST 10 mg/m³ [†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: 183.8 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: 8170°F UEL: NA LEL: NA	Bromine trifluoride, chlorine trifluoride, fluorine, iodine pentafluoride	Filter; Acid; AA; B [§7074]
Tungsten (soluble compounds, as W)	Synonyms vary depending upon the specific soluble tungsten compound.	NIOSH 1 mg/m³ ST 3 mg/m³ 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; B [§7074]
Tungsten carbide (cemented) WC/Co/Ni/Ti 1: 11107-01-0 2: 12718-48-3 3: 37328-48-0 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 5-10%.] [1: 85% WC, 15% Co 2: 82% 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; B [§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	NIOSH/OSHA 100 ppm (560 mg/m³)	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 -76°F UEL: ? LEL: 0.8%	Strong oxidizers, chlorine, chromic anhydride, stannic chloride, chromyl chloride	Char, CS, GCFID, B [§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 6)
Skin:	N.R.	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	N.R.	50 mg/m ³ : HE/SA/SCBAF	Ing	diffuse pulm fib; loss of	Skin:	blood
Wash skin:	N.R.	5: SCBAF; PD, PP/SAF; PD, PP/ASCBA	Con	appetite, nau, cough;	Breath:	
Remove:	N.R.	Escape: HIEF/SCBAE		blood changes	Swallow:	
Change:	N.R.				Innmed	
					Soap wash	
					Fresh air	
					Medical attention	
					Innmed	
[Tungsten]						
Recommendations vary depending upon the specific compound.		NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
		10 mg/m ³ : HE/SA	Ing	In animals: CNS disturbances;	Skin:	CNS, GI tract
		25 mg/m ³ : SA; CF	Con	diarr; resp failure;	Breath:	
		50 mg/m ³ : HIEF/SCBAF/SAF		behavior, body weight,	Swallow:	
		5: SCBAF; PD, PP/SAF; PD, PP/ASCBA		blood changes		
		Escape: HIEF/SCBAE				
[Tungsten (soluble compounds, as W)]						
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	0.25 mg Co/m ³ : DM*	Ing	possible skin sens to	Skin:	blood
Wash skin:	When contact/Daily (H)	0.5 mg Co/m ³ : DM/SCF*/YDMFu*/SA*	Con	cobalt, nickel; diffuse	Breath:	
Remove:	When wet or contam	1.25 mg Co/m ³ : SA; CF*/PAPRDM*/PAPRDMFu*		pulm fib, loss of appetite,	Swallow:	
Change:	Daily	2.5 mg Co/m ³ : HIEF/SCBAF/SAF		nau, cough, blood changes		
		20 mg Co/m ³ : SAF; PD, PP				
		5: SCBAF; PD, PP/SAF; PD, PP/ASCBA				
		Escape: HIEF/SCBAE				
[Tungsten carbide (cemented)]			Tungsten carbide (cemented) containing NICKEL			
			NIOSH			
			5: SCBAF; PD, PP/SAF; PD, PP/ASCBA			
			Escape: HIEF/SCBAE			
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	800 ppm: SA; CF*/PAPROV*/GCRFOV/	Abs	throat, head, vert,	Skin:	CNS, kidneys
Wash skin:	When contam	GMFOV/SCBAF/SAF	Ing	convuls; skin sens, hema,	Breath:	
Remove:	When wet (flammi)	5: SCBAF; PD, PP/SAF; PD, PP/ASCBA	Con	album, kidney damage;	Swallow:	
Change:	N.R.	Escape: GMFOV/SCBAE		abdom pain, nau, vomit,		
				diarr, chemical pneu		
				(aspr lq)		
[Turpentine]						

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-Undecanethiol <chem>CH3(CH2)9SH</chem> 8332-82-8	Undecyl mercaptan	NIOSH C 0.6 ppm (3.9 mg/m ³) (15-min) OSHA none	N.D.	Liquid.	MW: 188.4 BP: 498°F Sol: Insoluble FLP: 7 IP: 7 Sp.Gr: 0.84 Combustible Liquid	VP: 7 FRZ: 27°F UEL: 7 LEL: 7	Oxidizant, reducing agents, strong acids & bases, alkali metals	None available
1 ppm = 7.83 mg/m ³								
Uranium (insoluble compounds, as U) U (Metal) 7440-81-1 (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† 0.28 mg/m ³	Ca [10 mg/m ³ (as U)]	Metal: Silver-white, malleable, ductile, lustrous solid. [Note: Weakly radioactive.]	MW: 238.0 BP: 6995°F Sol: Insoluble FLP: NA IP: NA Sp.Gr: 19.05 (Metal) Metal: Combustible Solid, especially turnings and powder.	VP: 0 mm (approx) MLT: 2067°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
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> 110-82-3 YV3800000	Amyl aldehyde, Pentanal, Valeral, Valeraldehyde, Valeric aldehyde	NIOSH 60 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: 64°F IP: 9.82 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 26 mm FRZ: -133°F UEL: 7 LEL: 7	None reported	XAD-2; Toluene; GC/FID; IR [#2536]
2068 26	1 ppm = 3.88 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 (flammi) N.R.	NIOSH 8 ppm: CCROV/SA 12.8 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF S: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; conf, dizz, head, drow, naus, vomit, weak, convuls	Eyes: Skin: Breath: Swallow:	Irr Irrmed Soap wash Resp support Medical attention Irrmed	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 S: 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).	Eyes: Skin: Breath: Swallow:	Irr Irrmed Soap wash prompt Resp support Medical attention Irrmed	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 S: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape(Halides): GMFAGH/E/SCBAE Escape(Non-halides): HIEF/SCBAE	Inh Ing Con	Lac, conj, short breath, cough, chest rales, nau, vomit, skin burns, RBC, casts in urine, album, high BUN, [calc] Potential for cancer is a result of alpha- emitting properties & radioactive decay products (e.g., radon).	Eyes: Skin: Breath: Swallow:	Irr Irrmed Water flush Irrmed Resp support Medical attention Irrmed	Resp sys, blood, liver, kidneys, lymphatic 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 (flammi) N.R. Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat	Eyes: Skin: Breath: Swallow:	Irr Irrmed Soap flush Irrmed Resp support Medical attention Irrmed	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 YVW2450000	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 Ferrovandium dust).] OSHA† C 0.5 mg V ₂ O ₅ /m ³ (reap)	35 mg/m ³ (as V)	Yellow-orange powder or dark gray, odorless fumes 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; II [#7504]
2862 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 YVW2460000	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 ₂ O 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; II [#7504]
2862 53					Sp Gr 3.36 Noncombustible Solid			
Vegetable oil mist 88956-58-3 YX1850000	Vegetable mist	NIOSH 10 mg/m ³ (total) 5 mg/m ³ (reap) OSHA 15 mg/m ³ (total) 5 mg/m ³ (reap)	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: ? Sp.Gr: 0.91-0.95 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	None reported	Filter; none; Grav; II [Reference Dust: #0500 (total), #0800 (reap)]
Vinyl acetate $CH_3-CH=OOCCH_3$ 106-68-4 AK0675000	1-Acetoxyethylene, Ethenyl acetate, Ethenyl ethanoate, 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: 162°F Sol: 2% Fl.P: 18°F IP: 9.19 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; II [P&CAM #278]
1301 26	1 ppm = 3.68 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:	Prevent skin contact	NIOSH (as V) 0.5 mg/m ³ H ₂ E ⁺ /SA*	Inh	Irrit eyes, skin, throat,	Eye	Irr. Immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	0.5 mg/m ³ H ₂ E ⁺ /SA*	Ing	green tongue, metallic	Skin	Soap wash prompt	
Wash skin:	When contam	1.25 mg/m ³ SA CF*/PAPRHE*	Con	taste, eczema, cough, fine	Breath:	Resp support	
Remove:	When wet or contam	2.5 mg/m ³ H ₂ E ⁺ /PAPRTH ⁺ / SCBAF/SAF		rales, wheez, bron. dysp	Swallow:	Medical attention Immed	
Change:	N.R.	35 mg/m ³ : SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: H ₂ E ⁺ /SCBAE					
[Vanadium dust]							
Skin:	N.R.	NIOSH (as V) 0.5 mg/m ³ H ₂ E ⁺ /SA*	Inh	Irrit eyes, throat, green	Breath	Resp support	Eyes, skin, resp sys
Eyes:	N.R.	0.5 mg/m ³ H ₂ E ⁺ /SA*	Con	tongue, metallic taste,			
Wash skin:	N.R.	1.25 mg/m ³ SA CF*/PAPRHE*		cough, fine rales, wheez,			
Remove:	N.R.	2.5 mg/m ³ H ₂ E ⁺ /PAPRTH ⁺ / SCBAF/SAF		bron. dysp, eczema			
Change:	N.R.	35 mg/m ³ : SAF:PD,PP § SCBAF:PD,PP/SAF:PD,PP ASCBA Escape: H ₂ E ⁺ /SCBAE					
[Vanadium fume]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, resp sys; lac	Eye:	Irr. Immed	Eyes, skin, resp sys
Eyes:	N.R.		Con		Breath:	Fresh air	
Wash skin:	N.R.						
Remove:	N.R.						
Change:	N.R.						
[Vegetable oil mist]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Irr. Immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	40 ppm: CCRGV/SA*	Ing	throat; hoarseness, cough;	Skin:	Soap flush Immed	
Wash skin:	When contam	100 ppm: SA:CF*/PAPROV*	Con	loss of smell; eye burns,	Breath:	Resp support	
Remove:	When wet or contam	200 ppm: CCRFOV/GMFOV/PAPRTOV*/ SCBAF/SAF		skin blisters	Swallow:	Medical attention Immed	
Change:	N.R.	4000 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE					
Provide:	Eyewash, Quick drench						
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Vinyl bromide $\text{CH}_2=\text{CHBr}$ 593-80-2 K08400000	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 FLP: 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: 19% LEL: 9%	Strong oxidizers [Note: May polymerize in sunlight.]	Char; Ethanol; GC/FID; II [§1006]
1088 60	1 ppm = 4.48 mg/m ³							
Vinyl chloride $\text{CH}_2=\text{CHCl}$ 75-01-4 K09625000	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% FLP: 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; II [§1007]
1086 17	1 ppm = 2.60 mg/m ³							
Vinyl cyclohexene dioxide $\text{C}_8\text{H}_{12}\text{O}_2$ 108-87-8 R08640000	1-Epoxyethyl-3,4-epoxy- cyclohexane; 4-Vinylcyclohexene dioxide; 4-Vinyl-1-cyclohexene dioxide	NIOSH Ca Appendix A 10 ppm (60 mg/m ³) [skin] OSHA† none	Ca [N.D.]	Colorless liquid.	MW: 140.2 BP: 441°F Sol: High FLP(oc): 230°F IP: 7 Sp.Gr: 1.10 Class IIB Combustible Liquid	VP: 0.1 mm FRZ: -184°F UEL: ? LEL: ?	Alcohols, amines, water [Note: Slowly hydrolyzes in water.]	None available
1086 17	1 ppm = 6.83 mg/m ³							
Vinyl fluoride $\text{CH}_2=\text{CHF}$ 75-02-6 Y27361000	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: 66.1 BP: -86°F Sol: Insoluble FLP: NA (Gas) IP: 10.37 eV RGasD: 1.60 Flammable Gas	VP: 25.2 atm FRZ: -257°F UEL: 21.7% LEL: 2.8%	None reported [Note: Inhibited with 0.2% terpenes to prevent polymeriza- tion.]	None available
1880 17	1 ppm = 1.91 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 (liq) Prevent eye contact (liq) When contam (liq) When wet (flamm) N.R.	NIOSH §: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Ing (liq) Con (liq)	Irrit eyes, skin; dizz, conf, inco, narco, nau, vomit; liq: frostbite; [carc]	Eye: Skin: Breath: Swallow: Irr. Immed (liq) Water flush Immed (liq) Resp support Medical attention Immed (liq)	Eyes, skin, CNS, liver [In animals: liver & lymph node tumors]
[Vinyl bromide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	NIOSH §: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Weak, abdom pain, GI bleeding, enlarged liver; pallor or cyan of extremities, liq: frostbite; [carc]	Eye: Skin: Breath: Frostbite Frostbite Resp support	Liver, CNS, blood, resp sys, lymphatic sys [liver cancer]
[Vinyl 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 §: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	In animals: Irrit eyes, skin, resp sys; testicular atrophy; leupen; nec thymus; skin sore; [carc]	Eye: Skin: Breath: Swallow: Irr. Immed Water wash Immed Resp support Medical attention Immed	Eyes, skin, resp sys, blood, thymus, repro sys [In animals: skin tumors]
[Vinyl cyclohexane dioxide]						
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	NIOSH 10 ppm: CCROV/SA 25 ppm: SA:CF/PAPROV 50 ppm: CCRFOV/GMFOV/PAPROV/ SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP-ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Head, dizz, conf, inco, narco, nau, vomit; liq: frostbite	Eye: Skin: Breath: Frostbite Frostbite Resp support	CNS
[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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
Vinylidene chloride $\text{CH}_2=\text{CCl}_2$ 75-35-4 KV8275000	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% FLP: -7°F IP: 10.00 eV	VP: 800 mm FRZ: -189°F UEL: 16.5% 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.]	Cher; CS; GC/FID; II [P1616]
1303 26	1 ppm = 4.03 mg/m ³				Sp.Gr: 1.21 Class IA Flammable Liquid			
Vinylidene fluoride $\text{CH}_2=\text{CF}_2$ 75-35-7 KW0540000	Difluoro-1,1-ethylene; 1,1-Difluoroethene; 1,1-Difluoroethylene; Halocarbon 1122A; VDF; Vinylidene difluoride	NIOSH 1 ppm C 6 ppm [see P10, P107] 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 FLP: NA (Gas) IP: 10.29 eV	VP: 35.2 atm FRZ: -227°F UEL: 21.3% LEL: 5.9%	Oxidizers, aluminum chloride [Note: Violent reaction with hydrogen chloride when heated under pressure.]	None available
1889 22	1 ppm = 2.86 mg/m ³				RGasD: 2.21 Flammable Gas			
Vinyl toluene $\text{CH}_2=\text{CHC}_6\text{H}_4\text{CH}_3$ 25013-15-4 WL5075000	Ethynylmethylbenzene, Methylestyrene, Tolylethylene	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% FLP: 127°F IP: 8.20 eV	VP: 1 mm FRZ: -106°F UEL: 11.0% LEL: 0.6%	Oxidizers, peroxides, strong acids, iron or aluminum salts [Note: Usually inhibited with tert-butyl catechol to prevent polymerization.]	Cher; CS; GC/FID; II [P1501, Aromatic Hydro- carbons]
2618 27	1 ppm = 4.91 mg/m ³				Sp.Gr: 0.89 Class II Combustible Liquid			
Vinyl & P Naphtha 8032-32-4 OH1800000	Ligroin, Painters naphtha, Petroleum ether, Petroleum spirit, Refined solvent naphtha, Varnish makers' & painters' naphtha	NIOSH 360 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: 203-329°F Sol: Insoluble FLP: 20-66°F IP: 7	VP: 2-20 mm FRZ: 7 UEL: 6.0% LEL: 1.2%	None reported [Note: VM&P Naphtha is CS; a refined petroleum solvent predominantly C ₆ -C ₁₀ , which is typically 55% paraffins, 30% mono- cycloparaffins, 2% dicyclo- paraffins & 12% alkylbenzenes.]	Cher; CS; GC/FID; II [P1560, Naphthas]
1271 28	1 ppm 3.81-4.74 mg/m ³ (approx)				Sp.Gr(60°F): 0.73-0.78 Class III 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 6)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, throat;	Eye:	Irr Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	dizz, head, nau; dysp;	Skin:	Water flush Irrimed	CNS, liver, kidneys
Wash skin:	When contam	Escape: GMFOV/SCBAE	Inh	liver, kidney dysfunc;	Breath:	Resp support	(In animals:
Remove:	When wet (flam)		Ing	pneum; [canc]	Swallow:	Medical attention	liver &
Change:	N.R.		Con			Irrimed	kidney tumors]
Provide:	Eyewash, Quick drench						
[Vinylidene chloride]							
Skin:	Frostbite	NIOSH	Inh	Dizz, head, nau;	Eye:	Frostbite	CNS
Eyes:	Frostbite	10 ppm: CCROV/SA	Con	liq; frostbite	Skin:	Frostbite	
Wash skin:	N.R.	25 ppm: SA:CF/PAPROV	(liq)		Breath:	Resp support	
Remove:	When wet (flam)	50 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF					
Change:	N.R.	200 ppm: SAF:PD,PP					
Provide:	Frostbite	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFOV/SCBAE					
[Vinylidene fluoride]							
Skin:	Prevent skin contact	NIOSH/SHA	Inh	Irrit eyes, skin, upper	Eye:	Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	400 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF	Ing	resp sys, drow,	Skin:	Soap flush prompt	CNS
Wash skin:	When contam	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Con	In animals: necro	Breath:	Resp support	
Remove:	When wet or contam	Escape: GMFOV/SCBAE			Swallow:	Medical attention	
Change:	N.R.					Irrimed	
[Vinyl toluene]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, upper resp	Eye:	Irr Irrimed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	3500 mg/m ³ : CCROV/SA	Ing	sys; derm, CNS depress;	Skin:	Soap wash prompt	CNS
Wash skin:	When contam	8750 mg/m ³ : SA:CF/PAPROV	Con	chemical pneu (aspir liq)	Breath:	Resp support	
Remove:	When wet (flam)	17,500 mg/m ³ : CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF			Swallow:	Medical attention	
Change:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				Irrimed	
		Escape: GMFOV/SCBAE					
[VM & P naphtha]							

Chemical name, structural formula, CAS and RTECS Nos., and DOT ID and guide No.	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		
Warfarin $C_{19}H_{14}O_4$ 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: 306.3 BP: Decomposes Sol: 0.002% Fl.P: ? IP: ? Sp Gr: ? Combustible Solid	VP(71°F): 0.09 mm MLT: 322°F UEL: ? LEL: ?	Strong oxidizers	Filter, Methanol, HPLC/UV/D, IR [#5002]
Welding fumes ZC2850000	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; IR [#7200]
Wood dust ZC8850000	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: ? Fl.P: NA IP: NA Sp.Gr: ? Combustible Solid	VP: 0 mm (approx) MLT: NA UEL: NA LEL: NA	None reported	Filter; none; Grav; IR [#0500, Reference Dust (total)]
o-Xylene $C_8H_{10}(CH_3)_2$ 98-47-6 ZE2480000 1307 27	1,2-Dimethylbenzene, ortho-Xylene, o-Xyloil 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% Fl.P: 90°F IP: 8.56 eV Sp.Gr: 0.88 Class IC Flammable Liquid	VP: 7 mm FRZ: -13°F UEL: 8.7% LEL: 0.9%	Strong oxidizers, strong acids	Char. CS, GC/FID, IR [#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 DMX/SQ/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 § SCBAF PD PP/SAF PD PP/ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Heme, 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 § SCBAF PD PP/SAF PD PP/ASCBA Escape: GMFOVHE/SCBAE	Inh Con	Symptoms vary depending upon the specific component of the welding fumes; metal fume fever; flu-like symptoms, dysp, cough, muscle pain, fever, chills; interstitial pneum; [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 § SCBAF PD PP/SAF PD PP/ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit 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 (flamm) N.R.	NIOSH/OSHA 900 ppm: CCROV*/PAPROV*/SA*/SCBAF § SCBAF PD PP/SAF PD PP/ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, dizz, excitement, drow, inco, staggering gait, com vasculization; anor, 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 FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL		
m-Xylene $C_8H_{10}(CH_3)_2$ 108-38-3 ZE2276000	1,3-Dimethylbenzene, meta-Xylene, m-Xylol	NIOSH 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA† 100 ppm (436 mg/m ³)	900 ppm	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 282°F Sol: Slight FLP: 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; II [#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 ZE2626000	1,4-Dimethylbenzene, para-Xylene, p-Xylol	NIOSH 100 ppm (435 mg/m ³) ST 150 ppm (655 mg/m ³) OSHA† 100 ppm (436 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% FLP: 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; II [#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 $C_8H_8CH_2NH_2$ 1477-66-0 PF8970000	1,3-bis(Aminomethyl)benzene; 1,3-Benzenedimethanamine; MXDA; m-Phenylenediamine(methylamine); m-Xylylenediamine	NIOSH C 0.1 mg/m ³ [skin] OSHA† none	N.D.	Colorless liquid.	MW: 136.2 BP: 477°F Sol: Insoluble FLP: 243°F IP: 7	VP(77°F): 0.03 mm FRZ: 58°F UEL: 7 LEL: 7	None reported	None available
	1 ppm = 6.88 mg/m ³				Sp.Gr: 1.032 Class III B Combustible Liquid			
Xylidine $(CH_3)_2C_8H_8NH_2$ 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: 415-438°F Sol: Slight FLP: 206°F (2,3-) IP: 7.65 eV (2,4-) 7.30 eV (2,6-)	VP: <1 mm FRZ: -33°F UEL: 7 LEL: 1.0% (2,3-)	Strong oxidizers, hypochlorite salts	Si gel; Ethanol; GC/FID; II [#2002]
1711 55	1 ppm = 5.04 mg/m ³				Sp Gr: 0.98 Class IIIB Combustible Liquid (2,3-)			

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 (flam)	NIOSH/OSHA 900 ppm: CCROV/PAPROV/SA*/SCBAF § SCBAF PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, dizz, excitement, drow, inco, staggering gait, com vacuolization, anor, nau, vomit, abdom pain, derm	Eye: Skin: Breath: Swallow:	Irrimed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys
[m-Xylene]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flam)	NIOSH/OSHA 900 ppm: CCROV/PAPROV/SA*/SCBAF § SCBAF PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, dizz, excitement, drow, inco, staggering gait, com vacuolization, anor, nau, vomit, abdom pain, derm	Eye: Skin: Breath: Swallow:	Irrimed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys
[p-Xylene]							
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	In animals: Irrit eyes, skin; liver, kidney, lung damage	Eye: Skin: Breath: Swallow:	Irrimed Water/flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
[m-Xylene o, o'-diamine]							
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 20 ppm: CCROV/SA 50 ppm: SA: CF/CCRFOV/GMFOV/ PAPROV/SCBAF/SAF § SCBAF PD, PP/SAF, PD, PP, ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Anoxia, cyan, methemo; lung, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irrimed Soap wash immed Resp support Medical attention immed	Resp sys, blood, liver, kidneys, CVS

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		
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 FLP: NA IP: NA Sp Gr: 4.47 Noncombustible Solid in bulk form.	VP: 0 mm (approx) MLT: 2732°F UEL: NA LEL: NA	Oxidizers	Filter; Acid; ICP; III [#7300 Elements]
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): 43% FLP: NA IP: NA Sp Gr: 2.91 Noncombustible Solid	VP: 0 mm (approx) MLT: 554°F UEL: NA LEL: NA	Potassium	Filter; Water; AAS; OSHA [PD121]
Zinc oxide ZnO 1314-13-2 ZH4810000 1616 47	Zinc peroxide	NIOSH 5 mg/m ³ (fume/dust) ST 10 mg/m ³ (fume) C 16 mg/m ³ (dust) OSHA† 5 mg/m ³ (fume) 16 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% FLP: NA IP: NA Sp Gr: 5.61 Noncombustible Solid	VP: 0 mm (approx) MLT: 3587°F UEL: NA LEL: NA	Chlorinated rubber (at 419°F), water [Note: Slowly decomposed by water.]	Filter; none; XRD; II [#7502] Filter; none; Grav; III [#0600]
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 FLP(oc): 630°F IP: NA Sp.Gr: 1.16 Combustible Solid	VP: 0 mm (approx) MLT: 296°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), #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.	NIOSH/OSHA	Inh	Irrit eyes;	Eye	Eyes, resp sys,
Eyes:	N.R.	5 mg/m ³ DM	Inh	in animals: pulm irrit;	Skin	liver
Wash skin:	N.R.	10 mg/m ³ DMXSQ/SA	Inh	eye rx; possible liver	Breath:	
Remove:	N.R.	25 mg/m ³ SA CF/PAPRDM	Con	damage	Swallow	
Change:	N.R.	50 mg/m ³ H/EF/SAT CF/PAPRTHIE/ SCBAF/SAF				
		500 mg/m ³ SA PD PP				
		§ SCBAF PD PP/SAF PD,PP ASCBA				
		Escape: H/EF/SCBAE				
[Titanium]						
Skin:	N.R.	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Breath	Eyes, skin, resp sys,
Eyes:	N.R.	10 mg/m ³ DMFu*/SA*	Con	throat, cony cough,	Resp support	CVS
Wash skin:	N.R.	25 mg/m ³ SA CF*/PAPRDMFu*		copious sputum, dysp,		
Remove:	N.R.	50 mg/m ³ H/EF/PAPRTHIE*/		chest pain, pulm edema,		
Change:	N.R.	SCBAF/SAF		bronchosp, pulm fib, cor		
		§ SCBAF PD PP/SAF PD,PP ASCBA		pulmonary fever, cyan,		
		Escape: H/EF/SCBAE		tachypnea, skin burns		
[Zinc chloride fume]						
Skin:	N.R.	NIOSH/OSHA	Inh	Metal fume fever, chills,	Breath	Resp sys
Eyes:	N.R.	50 mg/m ³ DMFu/SA		muscle aches, nau, fever,	Resp support	
Wash skin:	N.R.	125 mg/m ³ SA CF/PAPRDMFu		dry throat, cough, weak,		
Remove:	N.R.	250 mg/m ³ H/EF/SAT CF/PAPRTHIE		less, metallic taste,		
Change:	N.R.	SCBAF/SAF		head, blurred vision,		
		500 mg/m ³ SA:PD,PP		low back pain, vomit, rig;		
		§ SCBAF PD PP/SAF PD,PP ASCBA		mal, tight chest, dysp,		
		Escape: H/EF/SCBAE		rales, decr pulm func		
[Zinc oxide]						
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, upper	Eye:	Eyes, skin, resp sys
Eyes:	N.R.		Inh	resp sys; cough	Skin:	
Wash skin:	N.R.		Con		Breath:	lrr immed
Remove:	N.R.				Swallow:	Soap wash
Change:	N.R.					Fresh air
						Medical attention
						Immed
[Zinc stearate]						

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		
Zirconium compounds (as Zr) Zr (Metal) 7440-67-7 (Metal) ZH7070000 (Metal) 1358 32 (powder, wet) 1932 32 (scrap) 2008 37 (powder, dry)	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.] OSHA† 8 mg/m ³	80 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 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	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, IR [#7300, Elements]

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 6)	First aid (See Table 6)	Target organs (See Table 6)
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 25 mg/m ³ : DM 50 mg/m ³ : DMIXSO/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: Irritated 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/cm^3), 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/ cm^3 (excursion limit) as averaged over a sampling period of 30 minutes.

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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 mg Cr(VI)/m³ 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 mg Cr/m³ for chromium metal and chromium(II) and chromium(III) compounds.

The OSHA PEL is 0.1 mg CrO_3 /m³ (ceiling) for chromic acid and chromates (including tert-butyl chromate with a "skin" designation and zinc chromate); 0.5 mg Cr/m³ (8-hour TWA) for chromium(II) and chromium(III) compounds; and 1 mg Cr/m³ (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 mg/m³ (cyclohexane-extractable fraction).

The OSHA PEL (8-hour TWA) for coal tar pitch volatiles is 0.2 mg/m³ (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 [PNAHs]), 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 ginning. 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 of 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 0.1 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
Captafol:	TWA 0.1 mg/m ³	Chlorinated camphene:	TWA 0.5 mg/m ³ ST 1 mg/m ³ [skin]
Captan:	TWA 5 mg/m ³	Chlorine:	TWA 0.5 ppm (1.5 mg/m ³) ST 1 ppm (3 mg/m ³)
Carbofuran:	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 dioxide:	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 disulfide:	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 monoxide:	TWA 35 ppm (40 mg/m ³) C 200 ppm (229 mg/m ³)	Chlorodifluoromethane:	TWA 1000 ppm (3500 mg/m ³)
Carbon tetrabromide:	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)
Carbon tetrachloride:	TWA 2 ppm (12.6 mg/m ³)	1-Chloro-1-nitropropane:	TWA 2 ppm (10 mg/m ³)
Carbonyl fluoride:	TWA 2 ppm (5 mg/m ³) ST 5 ppm (15 mg/m ³)	Chloropentafluoroethane:	TWA 1000 ppm (6320 mg/m ³)
Catechol:	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) (respquartz)	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)	Fensulfthion:	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)	Ferrovandium 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)

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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)

4,4'-Methylenebis(2-chloroaniline): TWA 0.02 ppm (0.22 mg/m³) [skin]

Methylene bis(4-cyclohexylisocyanate): C 0.01 ppm (0.11 mg/m³) [skin]

Methyl ethyl ketone peroxide: C 0.7 ppm (5 mg/m³)

Methyl formate: TWA 100 ppm (250 mg/m³)
ST 150 ppm (375 mg/m³)

Methyl iodide: TWA 2 ppm (10 mg/m³) [skin]

Methyl isoamyl ketone: TWA 50 ppm (240 mg/m³)

Methyl isobutyl carbinol: TWA 25 ppm (100 mg/m³)
ST 40 ppm (165 mg/m³) [skin]

Methyl isopropyl ketone: TWA 200 ppm (705 mg/m³)

Methyl mercaptan: TWA 0.5 ppm (1 mg/m³)

Methyl parathion: TWA 0.2 mg/m³ [skin]

Methyl silicate: TWA 1 ppm (6 mg/m³)

α-Methyl styrene: TWA 50 ppm (240 mg/m³)
ST 100 ppm (485 mg/m³)

Metribuzin: TWA 5 mg/m³

Mica: TWA 3 mg/m³ (resp)

Molybdenum (insoluble compounds, as Mo): TWA 10 mg/m³

Monocrotophos: TWA 0.25 mg/m³

Monomethyl aniline: TWA 0.5 ppm (2 mg/m³) [skin]

Morpholine: TWA 20 ppm (70 mg/m³)
ST 30 ppm (105 mg/m³) [skin]

Naphthalene: TWA 10 ppm (50 mg/m³)
ST 15 ppm (75 mg/m³)

Nickel metal & other compounds (as Ni): Metal & insoluble compounds: TWA 1 mg/m³
Soluble compounds: TWA 0.1 mg/m³

Nitric acid: TWA 2 ppm (5 mg/m³)
ST 4 ppm (10 mg/m³)

p-Nitroaniline: TWA 3 mg/m³ [skin]

Nitrogen dioxide: ST 1 ppm (1.8 mg/m³)

Nitroglycerine: ST 0.1 mg/m³ [skin]

2-Nitropropane: TWA 10 ppm (35 mg/m³)

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

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

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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