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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June 1997

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Printing Office, Washington, D.C. 20402

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DHHS (NIOSH) Publication No. 97-140

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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 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, revised conversion factors, current exposure limits, guidelines for selecting "Part 84" respirators in Table 4, the new NIOSH carcinogen policy in Appendix A, an expanded synomyn and trade name index, and minor technical changes since the June 1994 Edition.

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ACKNOWLEDGMENTS

The Education and Information Division (EID), National Institute for Occupational Safety and Health (NIOSH), had primary responsibility for the development of the *Pocket Guide*. I would like to express my appreciation to the following people within EID for their assistance in preparing the *Pocket Guide*: Howard Ludwig (former Technical Editor) for general guidance; David Case and Rolland Rogers for reformatting and computerization; Richard Niemeier, John Whalen, Ralph Zumwalde, Barb Dames, Laurence Reed, and Heinz Ahlers for policy review; Susan Cairelli and Kent Hatfield for consultation on toxicology issues; David Votaw, Joann Wess, Crystal Ellison, Faye Rice, John Palassis, Charles Bryant, Walter Ruch, Leela Murthy, Henryka Nagy, Clayton Doak, Sherry Medley, and Eileen Kuempel for assistance in updating and adding new information; Ronald Schuler, Vicki Reuss, Lucy Schoolfield, and Lawrence Foster for data acquisition; Sharon Cheesman for administrative support; Anne Hamilton and Vanessa Becks for editorial review; Vivian Morgan for electronic database negotiations; Charlene Maloney for publication dissemination; Shirley Carr for printing procurement; Pauline Elliott for graphic design; and Midwest Publications Consultants (Sherri Diana, Gary Litfin, Rob Schattauer, and Carla Brooks) for answering requests and mailing thousands of copies of the *Pocket Guide*.

In addition, the following people from other Divisions in NIOSH also contributed greatly to the *Pocket Guide*: Mary Ellen Cassinelli, Donald Dollberg, and Peter Eller from the Division of Physical Sciences and Engineering (DPSE) for the development of the measurement methods section; Shiro Tanaka from the Division of Surveillance, Hazard Evaluations, and Field Studies (DSHEFS) for medical terminology; and Donald Campbell, Chris Coffey, and John Dower, from the Division of Safety Research (DSR) for the development of the respirator recommendations.

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

Henry Chan (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.

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

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

DOT ID and GUIDE Number. — Under the RTECS number are the U.S. Department of Transportation (DOT) identification number and the corresponding guide number. Their format is xxxx xxx. The Identification number (xxxx) indicates that the chemical is regulated by DOT. The Guide number (xxx) refers to actions to be taken to stabilize an emergency situation; this information can be found in the 1996 *North American Emergency Response Guidebook*, (Office of Hazardous Materials Transportation [DHM-51], 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 sub-

*Code of Federal Regulations.

stance; 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/m^3 (milligrams of vapor or gas per cubic meter of contaminated air) at 25°C and 1 atmosphere are listed for chemicals with exposure limits expressed in ppm.

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 Appeals 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 workshift 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/m^3, mppcf (millions of particles per cubic foot of air as determined from counting an impinger sample), or fibers/cm^3 (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 the June 1994 Edition of the *Pocket Guide*, immediately dangerous to life or health concentrations (IDLHs) were reviewed and, in many cases, were revised and made more protective. As a consequence of the IDLH changes, many of the respirator recommendations for these substances were also 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, 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 revising 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 ef-

fects 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. However, IDLH values that were originally determined in the Standards Completion Program or were recently revised are shown in brackets following the "Ca" designations. "10%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	Fl.P. below 73°F and BP below 100°F.
Class IB flammable liquid	Fl.P. below 73°F and BP at or above 100°F.
Class IC flammable liquid	Fl.P. at or above 73°F and below 100°F.
Class II combustible liquid	Fl.P. at or above 100°F and below 140°F.
Class IIIA combustible liquid	Fl.P. at or above 140°F and below 200°F.
Class IIIB combustible liquid	Fl.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 4th edition of the *NIOSH Manual of Analytical Methods* (DHHS [NIOSH] Publication No. 94-113) and is indicated by "IV" following the sample work-up. If a different edition of the *NIOSH Manual of Analytical Methods* is cited, the appropriate edition (and, for the 2nd edition only, the volume number) would be noted [e.g., II(4)]. In a number of instances, the table cites the *OSHA Analytical Methods Manual* (or the OSHA web site, http://www.osha-slc.gov/) 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 or at the OSHA web site, "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. NIOSH is currently reevaluating the IDLH values, and as new or revised IDLH values are developed, respirator selection recommendations will be incorporated into subsequent editions of the *Pocket Guide*. In the interim no respirator recommendations will be made for substances without IDLH values (these will be noted by "TBAL" -- to be added later).

NIOSH has developed a new set of regulations in 42 CFR 84 (also referred to as "Part 84") for testing and certifying nonpowered, air-purifying, particulate-filter respirators. The new Part 84 respirators have passed a more demanding certification test than the old respirators (e.g.; dust [D]; dust and mist [DM]; dust, mist, and fume [DMFu]; spray paint; pesticide; etc.) certified under 30 CFR 11 (also referred to as "Part 11"). Under Part 84, NIOSH is allowing manufacturers to continue selling and shipping Part 11 particulate filters as NIOSH-certified until July 10, 1998. It is important to see Table 4 (pages xxxi-xxxii) for substitution of Part 84 respirators for Part 11 respirators. Also see the *NIOSH Guide to the Selection and Use of Particulate Respirators* (DHHS [NIOSH] publication 96-101).

The first line in the column indicates whether the "NIOSH" or the "OSHA" exposure limit is used on which to base the respirator recommendations. The more protective limit between the NIOSH REL or the OSHA PEL is always used. "NIOSH/OSHA" indicates that the limits are equivalent.

Each subsequent line lists a maximum use concentration (MUC) followed by a series of codes representing classes of respirators that are acceptable for use below the MUC. Individual respirator class codes are separated by diagonal lines (/). More protective respirators may be worn. Emergency or planned entry into unknown concentrations or entry into IDLH conditions are designated by the symbol § and followed by the codes for classes of respirators acceptable for these conditions. "Escape" indicates that the respirators are to be used only for escape purposes. For each MUC or condition the table lists only those respirators with the required protection factor and other use restrictions based on the *NIOSH Respirator Decision Logic*.

All respirators selected must be approved by NIOSH and MSHA under the provisions of 30 CFR 11 or by NIOSH under 42 CFR 84. The current listing of NIOSH/MSHA certified respira-

tors can be found in the *NIOSH Certified Equipment List* (DHHS [NIOSH] Publication No. 94-104). A list of Part 84 respirators can be found on the NIOSH Home Page (http://www.cdc.gov/niosh/homepage.html) or obtained by calling 1-800-35-NIOSH.

A complete respiratory protection program must be implemented and must fulfill all requirements of 29 CFR 1910.134. A respiratory protection program must include a written standard operating procedure covering regular training, fit-testing, fit-checking, periodic environmental monitoring, maintenance, medical monitoring, inspection, cleaning, storage, and periodic program evaluation. 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
Collection method:*	
Ambersorb	Ambersorb® XE-347 tube
Anasorb	Anasorb tube
Bag	Gas collection bag
Bub	Bubbler
Carbo-B	Carbosieve® B tube
Char	Charcoal tube
Char (low-Ni)	Charcoal tube (low nickel content)
Char (pet)	Charcoal tube (petroleum-based)
Chrom	Chromosorb tube
Dry tube	Drying tube
Filter	Particulate filter
Florisil	Florisil® tube
G-chrom P	Gas-chrom P® tube
Hydrar	Hydrar® sorbent tube
Imp	Impinger
Mol-sieve	Molecular sieve tube
OVS	OSHA versatile sampler
Pad/Pre-filter	Treated pad with a pre-filter
Porapak	Porapak® tube
Si gel	Silica gel tube
Soda lime	Soda lime sorbent tube
TD	Thermal desorption tube
Tenax GC	Tenax® GC tube
T-Sorb	Thermosorb® tube
Vertical elut	Vertical elutriator
XAD	XAD® tube
Sample work-up	
CCl_4	Carbon tetrachloride
$CHCl_3$	Chloroform
CH_2Cl_2	Methylene chloride
CH_3CN	Acetonitrile
CH_3COOH	Acetic acid
CS_2	Carbon disulfide
DCE	1,2-Dichloroethane
DMF	Dimethylformamide
DMSO	Dimethyl sulfoxide
EDTA	Ethylenedinitrilo-tetraacetic acid
$FeCl_3$	Ferric chloride
HCl	Hydrochloric acid
HCOOH	Formic acid
HNO_3	Nitric acid
H_2O_2	Hydrogen peroxide
HPLC	High-pressure liquid chromatography
H_3PO_4	Phosphoric acid
HSA	Hexanesulfonic acid

(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
H_2SO_4	Sulfuric acid
KI	Potassium iodide
KOH	Potassium hydroxide
LTA	Low-temperature ashing
Na_2CO_3	Sodium carbonate
$NaHCO_3$	Sodium bicarbonate
NaOH	Sodium hydroxide
$Na_2S_2O_3$	Sodium thiosulfate
NH_4OH	Ammonium hydroxide
Pho-acid	Phosphomolybdic acid
Thermal desorp	Thermal desorption apparatus
THF	Tetrahydrofuran
Analytical method:	
DPCSP	Differential pulse cathodic stripping polarography
ECA	Electrochemical analysis
EGA	Evolved gas analysis
FAAS	Flame atomic absorption spectrometry
GC	Gas chromatography
GC/AlkFID	GC with alkaline flame ionization detection
GC/ECD	GC with electron capture detection
GC/EConD	GC with electrolytic conductivity detection
GC/FID	GC with flame ionization detection
GC/FPD	GC with flame photometric detection for sulfur, nitrogen, or phosphorus
GC/NPD	GC with nitrogen/phosphorus detection
GC/PID	GC with photoionization detection
GC/TCD	GC with thermal conductivity detection
GC/TEA	GC with thermal energy analyzer detection
GC/TEA-EAP	GC/TEA with explosives package
GFAAS	Graphite furnace atomic absorption spectrometry
Grav	Gravimetric
HPLC/GFAAS	High-pressure liquid chromatography with GFAAS
HPLC/FLD	High-pressure liquid chromatography with fluorescence detection

(Continued)

Table 1. — Codes for measurement methods (Continued)

Code	Method/reagent	Code	Method/reagent
HPLC/UVD	High-pressure liquid chromatography with ultraviolet detection	IR	Infrared spectrometry
HPLC/UV/ECD	High-pressure liquid chromatography with ultraviolet and electrochemical detection	ISE	Ion-specific electrode
HPLC/UV/FLD	High-pressure liquid chromatography with ultraviolet and fluorescence detection	PCM	Phase contrast microscopy
HYAAS	Hydride generation atomic absorption spectrometry	PES	Plasma emission spectroscopy
IC	Ion chromatography	PLR	Polarography
ICP	Inductively coupled plasma	TEM	Transmission electron microscopy
		TOA	Thermal optical analyzer
		Titrate	Titration
		UV-vis	Ultraviolet-visible spectrophotometry
		Vis	Visible spectrophotometry
		XRF	X-ray fluorescence spectrometry
		XRD	X-ray diffraction spectrometry

Table 2. — Ordering information for measurement methods

Manual	Publication No.	Ordering No.
NIOSH Manual of Analytical Methods, 2nd edition (II):		
Vol. 1	NIOSH 77-157-A	PB-274-845
Vol. 2	NIOSH 77-157-B	PB-276-624
Vol. 3	NIOSH 77-157-C	PB-276-838
Vol. 4	NIOSH 78-175	PB-83-105-437
Vol. 5	NIOSH 79-141	PB-83-105-445
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
1st supplement to 3rd edition	NIOSH 85-117	PB-86-116-266
2nd supplement to 3rd edition	NIOSH 87-117	PB-88-204-722
3rd supplement to 3rd edition	NIOSH 89-127	PB-90-162-470
4th supplement to 3rd edition	NIOSH 90-121	PB-91-152-660
OSHA Analytical Methods Manual, 1990 & 1993	---	4542*
NIOSH Manual of Analytical Methods (NMAM), 4th edition (IV)	NIOSH 94-113	017-011-00007-9**

*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

Table 3. — Personal protection and sanitation codes

Code	Definition
SKIN	
Prevent skin contact	Wear appropriate personal protective clothing to prevent skin contact.
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.
N.R	No recommendation is made specifying the need for personal protective equipment for the body.
EYES	
Prevent eye contact	Wear appropriate eye protection to prevent eye contact.
Frostbite	Wear appropriate eye protection to prevent eye contact with the liquid that could result in burns or tissue damage from frostbite.
N.R	No recommendation is made specifying the need for eye protection.
WASH SKIN	
When contam	The worker should immediately wash the skin when it becomes contaminated.
Daily	The worker should wash daily at the end of each work shift.
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).
REMOVE	
When wet or contam	Work clothing that becomes wet or significantly contaminated should be removed and replaced.
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 removing clothing that becomes wet or contaminated.

(Continued)

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

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

(Continued)

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

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

(Continued)

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

Item	Definition
Code (continued)	
DMF (APF = 10)	Any dust and mist respirator with a full facepiece
DMFu (APF = 10)	Any dust, mist, and fume respirator
DMXSQ (APF = 10)	Any dust and mist respirator except single-use and quarter-mask respirators
DXSQ (APF = 10)	Any dust respirator except single-use and quarter-mask respirators
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
GMFOV (APF = 50)	Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister
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
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
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

(Continued)

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

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

(Continued)

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

Item	Definition
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
SA:PD,PP (APF = 1000)	Any supplied-air respirator operated in a 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
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

(Continued)

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

SUBSTITUTION OF PART 84 RESPIRATORS FOR PART 11 RESPIRATORS ALREADY IN USE

The following selection guidelines are intended for those who are currently using a Part 11 respirator that has been properly selected (see the "Recommendations for Respirator Selection" section on page xvi). In this context, a properly selected respirator means one that has been selected based on knowledge of the contaminant and its concentration in a particular work setting, the exposure limit of the contaminant, and the general principles of respirator selection.

Following these recommendations is the simplest approach to making the transition from Part 11 filters to Part 84 filters.

1. If you are currently using a D, DM or DMFu filter:

In a work setting free of oil aerosols, the minimally protective filter would be an N95.

In a work setting that may contain or does contain oil aerosols, the minimally protective filter would be an R95 or P95.

2. If you are currently using a HiE filter:

In a work setting free of oil aerosols, an N100 filter would be protective.

In a work setting that contains or may contain oil aerosols, an R100 or P100 filter would be protective.

3. If you are currently using a paint-lacquer-enamel combination cartridge:

In a work setting free of oil aerosols, a combination respirator consisting of an organic vapor cartridge and an N95 particulate filter with an optional prefilter (to prevent rapid clogging by paint aerosols) would be minimally protective.

In a work setting that may contain or does contain oil aerosols, a combination respirator consisting of an organic vapor cartridge and an R95 or P95 particulate filter with a prefilter (to prevent rapid clogging by paint aerosols) would be minimally protective.

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

4. **If you are currently using a pesticide respirator for protection against a particulate and an organic vapor:** A combination respirator consisting of an organic vapor cartridge and an N95 (non-oil aerosols) or an R95 or P95 particulate filter would be minimally protective. As another example, a particular pesticide may have such low vapor pressure that only a particulate filter may be needed. Thus in certain situations, there may be no need for a combination particulate filter and organic vapor cartridge as recommended above.	

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	Decrease(d)
appre	Apprehension	depres	Depressant/Depression
arrhy	Arrhythmias	derm	Dermatitis
aspir	Aspiration	diarr	Diarrhea
asphy	Asphyxia	dist	Disturbance
BP	Blood pressure	dizz	Dizziness
breath	Breathing	drow	Drowsiness
bron	Bronchitis	dysfunc	Dysfunction
broncopneu	Bronchopneumonia	dysp	Dyspnea (breathing difficulty)
bronspas	Bronchospasm	emphy	Emphysema
BUN	Blood urea nitrogen	eosin	Eosinophilia
[carc]	Potential occupational carcinogen	epilep	Epileptiform
card	Cardiac	epis	Epistaxis (nosebleed)
chol	Cholinesterase	equi	Equilibrium
cirr	Cirrhosis	eryt	Erythema (skin redness)
CNS	Central nervous system	euph	Euphoria
conc	Concentration	fail	Failure
conf	Confusion	fasc	Fasiculation
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)
fibrl	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
nec	Necrosis
neph	Nephritis
ner	Nervousness
numb	Numbness
opac	Opacity
palp	Palpitations
para	Paralysis
pares	Paresthesia
perf	Perforation
peri neur	Peripheral neuropathy
periorb	Periorbital (situated around the eye)
phar	Pharyngeal
photo	Photophobia (abnormal visual intolerance to light)
pneu	Pneumonia
pneuitis	Pneumonitis
PNS	Peripheral nervous system
polyneur	Polyneuropathy
prot	Proteinuria
pulm	Pulmonary
RBC	Red blood cell
repro	Reproductive
resp	Respiratory
restless	Restlessness
retster	Retrosternal (occurring behind the sternum)
rhin	Rhinorrhea (discharge of thin nasal mucus)
salv	Salivation
sens	Sensitization
sez	Seizure
short	Shortness
sneez	Sneezing
sol	Solid
soln	Solution
som	Somnolence (sleepiness, unnatural drowsiness)
subs	Substernal (occurring beneath the sternum)
sweat	Sweating
swell	Swelling
sys	System
tacar	Tachycardia
tend	Tenderness
terato	Teratogenic
throb	Throbbing
tight	Tightness

(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
Eye:	
Irr immed.	If this chemical contacts the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.
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.
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 soon as possible.
Medical attention	Self-explanatory
Skin:	
Blot/brush away	If irritation occurs, gently blot or brush away excess.
Dust off solid; water flush.	If this solid chemical contacts the skin, dust it off immediately and then flush the contaminated skin with water. If this chemical or liquids containing this chemical penetrate the clothing, promptly remove the clothing and flush the skin with water. Get medical attention immediately.
Frostbite	If 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
Skin (continued)	
	has NOT occurred, immediately and thoroughly wash contaminated skin with soap and water.
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 immed ..	If this chemical contacts the skin, immediately flush the contaminated skin with soap and water. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with 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 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
Skin (continued)	
Soap wash	If this chemical contacts the skin, wash the contaminated skin with soap and water.
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.
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 flush	If this chemical contacts the skin, flush the contaminated skin with water. Where there is evidence of skin irritation, get medical attention.
Water flush immed	If this chemical contacts the skin, 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.
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.
Water wash	If this chemical contacts the skin, wash the contaminated skin with water.
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

(Continued)

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

Code	Definition
Skin (continued)	
	after washing, get medical attention immediately.
Water wash prompt	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.
Breath:	
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.
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.
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.
Swallow:	
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 (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Acetaldehyde CH_3CHO 75-07-0 AB1925000 1089 129	Acetic aldehyde, Ethanal, Ethyl aldehyde 1 ppm = 1.80 mg/m³	NIOSH Ca See Appendix A See Appendix C (Aldehydes) OSHA† 200 ppm (360 mg/m³)	Ca [2000 ppm]	Colorless liquid or gas (above 69°F) with a pungent, fruity odor.	MW: 44.1 BP: 69°F Sol: Miscible FI.P: -36°F IP: 10.22 eV Sp.Gr: 0.79 Class IA Flammable Liquid	VP: 740 mm FRZ: -190°F UEL: 60% LEL: 4.0%	Strong oxidizers, acids, bases, alcohols, ammonia & amines, phenols, ketones, HCN, H_2S [Note: Prolonged contact with air may cause formation of peroxides that may explode and burst containers; easily undergoes polymerization.]	XAD-2*; Toluene; GC/FID; IV [#2538]
Acetic acid CH_3COOH 64-19-7 AF1225000 2790 153 (10-80% acid) 2789 132 (>80% acid)	Acetic acid (aqueous), Ethanoic acid, Glacial acetic acid (pure compound), Methanecarboxylic acid [Note: Can be found in concentrations of 5-8% in vinegar.] 1 ppm = 2.46 mg/m³	NIOSH 10 ppm (25 mg/m³) ST 15 ppm (37 mg/m³) OSHA 10 ppm (25 mg/m³)	50 ppm	Colorless liquid or crystals with a sour, vinegar-like odor. [Note: Pure compound is a solid below 62°F. Often used in an aqueous solution.]	MW: 60.1 BP: 244°F Sol: Miscible FI.P: 103°F IP: 10.66 eV Sp.Gr: 1.05 Class II Combustible Liquid	VP: 11 mm FRZ: 62°F UEL(200°F): 19.9% LEL: 4.0%	Strong oxidizers (especially chromic acid, sodium peroxide & nitric acid), strong caustics [Note: Corrosive to metals.]	Char; HCOOH; GC/FID; IV [#1603]
Acetic anhydride $(CH_3CO)_2O$ 108-24-7 AK1925000 1715 137	Acetic acid anhydride, Acetic oxide, Acetyl oxide, Ethanoic anhydride 1 ppm = 4.18 mg/m³	NIOSH C 5 ppm (20 mg/m³) OSHA† 5 ppm (20 mg/m³)	200 ppm	Colorless liquid with a strong, pungent, vinegar-like odor.	MW: 102.1 BP: 282°F Sol: 12% FI.P: 120°F IP: 10.00 eV Sp.Gr: 1.08 Class II Combustible Liquid	VP: 4 mm FRZ: -99°F UEL: 10.3% LEL: 2.7%	Water, alcohols, strong oxidizers (especially chromic acid), amines, strong caustics [Note: Corrosive to iron, steel & other metals. Reacts with water to form acetic acid.]	Bub; Reagent; Vis; IV [#3506]
Acetone $(CH_3)_2CO$ 67-64-1 AL3150000 1090 127	Dimethyl ketone, Ketone propane, 2-Propanone 1 ppm = 2.38 mg/m³	NIOSH 250 ppm (590 mg/m³) OSHA† 1000 ppm (2400 mg/m³)	2500 ppm [10%LEL]	Colorless liquid with a fragrant, mint-like odor.	MW: 58.1 BP: 133°F Sol: Miscible FI.P: 0°F IP: 9.69 eV Sp.Gr: 0.79 Class IB Flammable Liquid	VP: 180 mm FRZ: -140°F UEL: 12.8% LEL: 2.5%	Oxidizers, acids	Char; CS_2; GC/FID; IV [#1300, Ketones I]

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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 6)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench [Acetaldehyde]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; eye, skin burns; derm; conj, cough; CNS depres; delayed pulm edema; in animals: kidney, repro, terato effects; [carc]	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, kidneys, CNS, repro sys [in animals: nasal cancer]
Skin: Prevent skin contact (>10%) **Eyes: Prevent eye contact** **Wash skin: When contam (>10%)** **Remove: When wet or contam (>10%** **Change: N.R.** **Provide: Eyewash (>5%),** **Quick drench (>50%)** **[Acetic acid]**	NIOSH/OSHA 50 ppm: SA:CF[f]/PAPROV[f]/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: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		**Eyes, skin, resp sys, teeth**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Acetic anhydride]	NIOSH/OSHA 125 ppm: SA:CF[f]/PAPROV[f] 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: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet (flamm)** **Change: N.R.** **[Acetone]**	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 depres; derm**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**

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Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Acetone cyanohydrin $CH_3C(OH)CNCH_3$ 75-86-5 OD9275000 1541 155 (stabilized)	Cyanohydrin-2-propanone, 2-Cyano-2-propanol, α -Hydroxyisobutyronitrile, 2-Hydroxy-2-methyl-propionitrile, 2-Methyllactonitrile 1 ppm = 3.48 mg/m³	NIOSH C 1 ppm (4 mg/m³) [15-min] OSHA none	N.D.	Colorless liquid with a faint odor of bitter almond. [Note: Forms cyanide in the body.]	MW: 85.1 BP: 203°F Sol: Miscible Fl.P: 165°F IP: ? Sp.Gr(77°F): 0.93 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 temperatures; rate is accelerated by an increase in pH, water content, or temperature.]	Porapak; Ethyl acetate; GC/NPD; IV [#2506]
Acetonitrile CH_3CN 75-05-8 AL7700000 1648 131	Cyanomethane, Ethyl nitrile, Methyl cyanide 1 ppm = 1.68 mg/m³	NIOSH 20 ppm (34 mg/m³) OSHA† 40 ppm (70 mg/m³)	500 ppm	Colorless liquid with an aromatic odor. [Note: Forms cyanide in the body.]	MW: 41.1 BP: 179°F Sol: Miscible Fl.P(oc): 42°F IP: 12.20 eV Sp.Gr: 0.78 Class IB Flammable Liquid	VP: 73 mm FRZ: -49°F UEL: 16.0% LEL: 3.0%	Strong oxidizers	Char; Benzene; GC/FID; IV [#1606]
2-Acetylaminofluorene $C_{15}H_{13}NO$ 53-96-3 AB9450000	AAF, 2-AAF, 2-Acetaminofluorene, N-Acetyl-2-aminofluorene, FAA, 2-FAA, 2-Fluorenylacetamide	NIOSH Ca See Appendix A OSHA[1910.1014] See Appendix B	Ca [N.D.]	Tan, crystalline powder.	MW: 223.3 BP: ? Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 381°F UEL: ? LEL: ?	None reported	None available
Acetylene HC≡CH 74-86-2 AO9600000 1001 116	Ethine, Ethyne [Note: A compressed gas used in the welding & cutting of metals.] 1 ppm = 1.06 mg/m³	NIOSH C 2500 ppm (2662 mg/m³) OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Commercial grade has a garlic-like odor. Shipped under pressure dissolved in acetone.]	MW: 26.0 BP: Sublimes Sol: 2% Fl.P: NA (Gas) IP: 11.40 eV 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 Crit. Doc.

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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 10 ppm: SA 25 ppm: SA:CF 50 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; dizz, weak, head, conf, convuls; liver, kidney inj; pulm edema, asphy	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, liver, kidneys, GI tract
[Acetone cyanohydrin]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Quick drench	NIOSH 200 ppm: CCROV/SA 500 ppm: SA:CF/PAPROV/CCRFOV/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit nose, throat; asphy; nau, vomit; chest pain; weak; stupor, convuls; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Resp sys, CVS, CNS, liver, kidneys
[Acetonitrile]							
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	Reduced function of liver, kidneys, bladder, pancreas; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Liver, bladder, kidneys, lungs, pancreas, skin [in animals: tumors of the liver, bladder, lungs, skin & pancreas]
[2-Acetylaminofluorene]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	TBAL	Inh Con (liq)	Head, dizz; asphy; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Fresh air	CNS, resp sys
[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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Acetylene tetrabromide $CHBr_2CHBr_2$ 79-27-6 KI8225000 2504 159	Symmetrical tetrabromoethane; TBE; Tetrabromoacetylene; Tetrabromoethane; 1,1,2,2-Tetrabromoethane 1 ppm = 14.14 mg/m³	NIOSH See Appendix D OSHA 1 ppm (14 mg/m³)	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; IV [#2003]
Acetylsalicyclic acid $CH_3COOC_6H_4COOH$ 50-78-2 VO0700000	Acetal, o-Acetoxybenzoic acid, 2-Acetoxybenzoic acid, Aspirin	NIOSH 5 mg/m³ OSHA† none	N.D.	Odorless, colorless to white, crystalline powder. [aspirin] [Note: Develops the vinegar-like odor of acetic acid on contact with moisture.]	MW: 180.2 BP: 284°F (Decomposes) Sol(77°F): 0.3% Fl.P: NA IP: NA Sp.Gr: 1.35 Combustible Powder; explosion hazard if dispersed in air.	VP: 0 mm (approx) MLT: 275°F UEL: NA LEL: NA MEC: 40 g/m³	Solutions of alkali hydroxides or carbonates, strong oxidizers, moisture [Note: Slowly hydrolyzes in moist air to salicyclic & acetic acids.]	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Acrolein CH_2=CHCHO 107-02-8 AS1050000 1092 131P (inhibited)	Acraldehyde, Acrylaldehyde, Acrylic aldehyde, Allyl aldehyde, Propenal, 2-Propenal 1 ppm = 2.29 mg/m³	NIOSH 0.1 ppm (0.25 mg/m³) ST 0.3 ppm (0.8 mg/m³) See Appendix C (Aldehydes) OSHA† 0.1 ppm (0.25 mg/m³)	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; IV [#2501]
Acrylamide CH_2=CHCONH$_2$ 79-06-1 AS3325000 2074 153P	Acrylamide monomer, Acrylic amide, Propenamide, 2-Propenamide	NIOSH Ca 0.03 mg/m³ [skin] See Appendix A OSHA† 0.3 mg/m³ [skin]	Ca [60 mg/m³]	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]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Acrylic acid CH_2=CHCOOH 79-10-7 AS4375000 2218 132P (inhibited)	Acroleic acid, Aqueous acrylic acid (technical grade is 94%), Ethylenecarboxylic acid, Glacial acrylic acid (98% in aqueous solution), 2-Propenoic acid 1 ppm = 2.95 mg/m³	NIOSH 2 ppm (6 mg/m³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 55°F) with a distinctive, acrid odor. [Note: Shipped with an inhibitor (e.g., hydroquinone) since it readily polymerizes.]	MW: 72.1 BP: 286°F Sol: Miscible Fl.P: 121°F IP: ? Sp.Gr: 1.05 Class II Combustible Liquid	VP: 3 mm FRZ: 55°F UEL: 8.02% LEL: 2.4%	Oxidizers, amines, alkalis, ammonium hydroxide, chlorosulfonic acid, oleum, ethylene diamine, ethyleneimine, 2-aminoethanol [Note: Corrosive to many metals.]	XAD(2); Methanol/Water; HPLC/UVD; OSHA [#28]
Acrylonitrile CH_2=CHCN 107-13-1 AT5250000 1093 131P (inhibited)	Acrylonitrile monomer, AN, Cyanoethylene, Propenenitrile, 2-Propenenitrile, VCN, Vinyl cyanide 1 ppm = 2.17 mg/m³	NIOSH Ca 1 ppm C 10 ppm [15-min] [skin] See Appendix A OSHA [1910.1045] 2 ppm C 10 ppm [15-min] [skin]	Ca [85 ppm]	Colorless to pale-yellow liquid with an unpleasant odor. [Note: Odor can only be detected above the PEL.]	MW: 53.1 BP: 171°F Sol: 7% Fl.P: 30°F IP: 10.91 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 83 mm FRZ: -116°F UEL: 17% LEL: 3.0%	Strong oxidizers, acids & alkalis; bromine; amines [Note: Unless inhibited (usually with methylhydroquinone), may polymerize spontaneously or when heated or in presence of strong alkali. Attacks copper.]	Char; Acetone/CS_2; GC/FID; IV [#1604]
Adiponitrile $NC(CH_2)_4CN$ 111-69-3 AV2625000 2205 153	1,4-Dicyanobutane; Hexanedinitrile; Tetramethylene cyanide 1 ppm = 4.43 mg/m³	NIOSH 4 ppm (18 mg/m³) OSHA none	N.D.	Water-white, practically odorless, oily liquid. [Note: A solid below 34°F. Forms cyanide in the body.]	MW: 108.2 BP: 563°F Sol: 4.5% Fl.P(o.c.): 199°F IP: ? Sp.Gr: 0.97 Class IIIA Combustible Liquid	VP: 0.002 mm FRZ: 34°F UEL: 5.0% LEL: 1.7%	Oxidizers (e.g., perchlorates, nitrates), strong acids (e.g., sulfuric acid) [Note: Decomposes above 194°F, forming hydrogen cyanide.]	Char; Toluene; GC/FID; NIOSH Nitriles Crit. Doc.
Aldrin $C_{12}H_8Cl_6$ 309-00-2 IO2100000 2761 151	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo-1,4-exo-5,8-dimethanonaphthalene; HHDN; Octalene	NIOSH Ca 0.25 mg/m³ [skin] See Appendix A OSHA 0.25 mg/m³ [skin]	Ca [25 mg/m³]	Colorless to dark-brown crystalline solid with a mild chemical odor. [Note: Formerly used as an insecticide.]	MW: 364.9 BP: Decomposes Sol: 0.003% Fl.P: NA IP: ? Sp.Gr: 1.60 Noncombustible Solid, but may be dissolved in flammable liquids.	VP: 0.00008 mm MLT: 219°F UEL: NA LEL: NA	Concentrated mineral acids, active metals, acid catalysts, acid oxidizing agents, phenol	Filter/Bub; Isooctane; GC/EConD; III [#5502]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	Firstaid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; skin sens; in animals: lung, liver, kidney inj	Eye: Skin: Breath: Swallow:	Ir immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Acrylic acid]							
Skin: Eyes: Wash skin: **Remove:** **Change:** **Provide:**	Prevent skin contact Prevent eye contact When contam **When wet (flamm)** **N.R.** **Eyewash, Quick drench**	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing **Con**	Irrit eyes, skin; asphy; head sneez; nau, vomit; weak, li-head; skin vesic; **scaling derm; [carc]**	Eye: Skin: Breath: **Swallow:**	Ir immed Water wash immed Resp support **Medical attention immed**	Eyes, skin, CVS, liver, kidneys, CNS [brain tumors, **lung & bowel cancer]**
[Acrylonitrile]							
Skin: Eyes: Wash skin: Remove: Change:	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:	Ir immed Soap wash immed Resp support Medical attention immed	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: GMFOVHIE/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:**	**Ir immed** **Soap wash immed** **Resp support** **Medical attention immed**	**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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Allyl alcohol $CH_2=CHCH_2OH$ 107-18-6 BA5075000 1098 131	AA, Allylic alcohol, Propenol, 1-Propen-3-ol, 2-Propenol, Vinyl carbinol 1 ppm = 2.38 mg/m³	NIOSH 2 ppm (5 mg/m³) ST 4 ppm (10 mg/m³) [skin] OSHA† 2 ppm (5 mg/m³)	20 ppm	Colorless liquid with a pungent, mustard-like odor.	MW: 58.1 BP: 200°F Sol: Miscible FLP: 70°F IP: 9.63 eV Sp Gr: 0.85 Class IB Flammable Liquid	VP: 17 mm FRZ: -200°F UEL: 18.0% LEL: 2.5%	Strong oxidizers, acids, carbon tetrachloride [Note: Polymerization may be caused by elevated temperatures, oxidizers, or peroxides.]	Char; 2-Propanol/CS₂, GC/FID; IV [#1402, Alcohols III]
Allyl chloride $CH_2=CHCH_2Cl$ 107-05-1 UC7350000 1100 131	3-Chloropropene, 1-Chloro-2-propene, 3-Chloropropylene 1 ppm = 3.13 mg/m³	NIOSH 1 ppm (3 mg/m³) ST 2 ppm (6 mg/m³) OSHA† 1 ppm (3 mg/m³)	250 ppm	Colorless, brown, yellow, or purple liquid with a pungent unpleasant odor.	MW: 76.5 BP: 113°F Sol: 0.4% FLP: -25°F IP: 10.05 eV Sp Gr: 0.94 Class IB Flammable Liquid	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; IV [#1000]
Allyl glycidyl ether $C_6H_{10}O_2$ 106-92-3 RR0875000 2219 129	AGE; 1-Allyloxy-2,3-epoxypropane; Glycidyl allyl ether; [(2-Propenyloxy)methyl] oxirane 1 ppm = 4.67 mg/m³	NIOSH 5 ppm (22 mg/m³) ST 10 ppm (44 mg/m³) [skin] OSHA† C 10 ppm (45 mg/m³)	50 ppm	Colorless liquid with a pleasant odor.	MW: 114.2 BP: 309°F Sol: 14% FLP: 135°F IP: ? Sp Gr: 0.97 Class II Combustible Liquid	VP: 2 mm FRZ: -148°F [forms glass] UEL: ? LEL: ?	Strong oxidizers	Tenax GC; Diethyl ether; GC/FID; IV [#2545]
Allyl propyl disulfide $H_2C=CHCH_2S_2CH_2CH_2CH_3$ 2179-59-1 JO0350000	4,5-Dithia-1-octene; Onion oil; 2-Propenyl propyl disulfide; Propyl allyl disulfide 1 ppm = 6.07 mg/m³	NIOSH 2 ppm (12 mg/m³) ST 3 ppm (18 mg/m³) OSHA† 2 ppm (12 mg/m³)	N.D.	Pale-yellow liquid with a strong & irritating onion-like odor. [Note: The chief volatile component of onion oil.]	MW: 146.3 BP: ? Sol: Insoluble FLP: ? IP: ? Sp Gr(59°F): 0.93 Combustible Liquid	VP: ? FRZ: 5°F UEL: ? LEL: ?	Oxidizers	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
α-Alumina Al_2O_3 1344-28-1 BD1200000	Alumina, Aluminium 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/m³ (total) 5 mg/m³ (resp)	N.D.	White, odorless, crystalline powder.	MW: 101.9 BP: 5396°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.0 Noncombustible solid, but dusts may form explosive mixtures in air.	VP: 0 mm (approx) MLT: 3632°F UEL: NA LEL: NA	Chlorine trifluoride, hot chlorinated rubber, acids, oxidizers [Note: Hydrogen gas may be formed when finely divided iron contacts moisture during crushing & milling operations.]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Aluminum Al 7429-90-5 BD0330000 1309 170 (powder, coated) 1396 138 (powder, uncoated) 9260 169 (molten)	Aluminium, Aluminum metal, Aluminum powder, Elemental aluminum	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Silvery-white, malleable, ductile, odorless metal.	MW: 27.0 BP: 4221°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 2.70 Combustible Solid, finely divided dust is easily ignited; may cause explosions.	VP: 0 mm (approx) MLT: 1220°F UEL: NA LEL: NA	Strong oxidizers & acids, halogenated hydrocarbons [Note: Corrodes in contact with acids & other metals. Ignition may occur if powders are mixed with halogens, carbon disulfide, or methyl chloride.]	Filter; HNO_3; FAAS; IV [#7013] [Also #7300, Elements]
Aluminum (pyro powders and welding fumes, as Al) 1383 135 (powder, pyrophoric)	Synonyms vary depending upon the specific aluminum compound.	NIOSH 5 mg/m³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific aluminum compound.	Properties vary depending upon the specific aluminum compound.		Varies	Filter; HNO_3; ICP; IV [#7300, Elements]
Aluminum (soluble salts and alkyls, as Al) 3051 135 (alkyls)	Synonyms vary depending upon the specific aluminum compound.	NIOSH 2 mg/m³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific aluminum compound.	Properties vary depending upon the specific aluminum compound.		Varies	Filter; HNO_3; FAAS; IV [#7013, Aluminum] [Also #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 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [α-Alumina]	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys	Eye: Irr immed Skin: Blot/brush away Breath: Fresh air Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: N.R. **Eyes: N.R.** **Wash skin: N.R.** **Remove: N.R.** **Change: N.R.** **[Aluminum]**	**TBAL**	**Inh** **Con**	**Irrit eyes, skin, resp sys**	**Eye: Irr immed** **Breath: Fresh air**		**Eyes, skin, resp sys**
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Aluminum (pyro powders and welding fumes, as Al]	TBAL	Inh Ing Con	Irrit skin, resp sys; pulm fib	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Skin, resp sys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **[Aluminum (soluble salts and alkyls, as Al)]**	**TBAL**	**Inh** **Ing** **Con**	**Irrit skin, resp sys; skin burns**	**Eye: Irr immed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Skin, resp sys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
4-Aminodiphenyl $C_6H_5C_6H_4NH_2$ 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: 570°F Sol: Slight FLP: ? IP: ? Sp.Gr: 1.18 Combustible Solid, but must be preheated before ignition possible.	VP(227°F): 1 mm MLT: 127°F UEL: ? LEL: ?	Oxidized by air	Filter/ Sigel; 2-Propanol; GC/FID; II(4) [P&CAM #269]
2-Aminopyridine $NH_2C_5H_4N$ 504-29-0 US1575000 2671 153	α-Aminopyridine, α-Pyridylamine 1 ppm = 3.85 mg/m³	NIOSH/OSHA 0.5 ppm (2 mg/m³)	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): 3.8 mm MLT: 137°F UEL: ? LEL: ?	Strong oxidizers	Tenax GC(2); Thermal desorp; GC/FID; III(4) [#S158]
Amitrole $C_2H_4N_4$ 61-82-5 XZ3850000	Aminotriazole; 3-Aminotriazole; 2-Amino-1,3,4-triazole; 3-Amino-1,2,4-triazole	NIOSH Ca 0.2 mg/m³ 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; Grav; IV [#5500, Particulates NOR (total)]
Ammonia NH_3 7664-41-7 BO0875000 1005 125 (anhydrous) 2672 154 (10-35% soln.) 2073 125 (>35-50% soln.) 1005 125 (>50% soln.)	Anhydrous ammonia, Aqua ammonia, Aqueous ammonia [Note: Often used in an aqueous solution.] 1 ppm = 0.70 mg/m³	NIOSH 25 ppm (18 mg/m³) ST 35 ppm (27 mg/m³) OSHA† 50 ppm (35 mg/m³)	300 ppm	Colorless gas with a pungent, suffocating 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 RGasD: 0.60 [Note: Although NH_3 does not meet the DOT definition of a Flammable Gas (for labeling purposes), it should be treated as one.]	VP: 5.5 atm FRZ: -108°F UEL: 28% LEL: 15%	Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces.]	Silica gel; Water; Vis; IV [#6015] [Also #6016]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Head, dizz; leth, dysp; ataxia; weak; methemo; urinary burning; acute hemorrhagic cystitis; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Bladder, skin [bladder cancer]
[4-Aminodiphenyl]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Quick drench	NIOSH/OSHA 5 ppm: SAT/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/HIE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, dizz; excitement; nau; high BP; resp distress; weak; convuls; stupor	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		CNS, resp sys
[2-Aminopyridine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/HIE/SCBAE	Inh Ing Con	Irrit eyes, skin; dysp, musc spasms, ataxia anor, saliv, incr body temperature; lass, skin dryness, depres (thyroid func suppression)	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, thyroid [in animals: liver thyroid & pituitary gland tumors]
[Amitrole]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam (soln) Remove: When wet or contam (soln) Change: N.R. Provide: Eyewash (>10%), Quick drench (>10%)	NIOSH 250 ppm: CCRS*/SA* 300 ppm: SAcCF*/PAPRS*/CCRFS/GMFS/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing (soln) Con (soln/liq)	Irrit eyes, nose, throat; dysp, bronspas, chest pain; pulm edema; pink frothy sputum; skin burns, vesic; liq: frostbite	Eye: Irr immed (soln/liq) Skin: Water flush immed (soln/liq) Breath: Resp support Swallow: Medical attention immed (soln)		Eyes, skin, resp sys
[Ammonia]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ammonium chloride fume NH_4Cl 12125-02-9 BP4550000	Ammonium chloride, Ammonium muriate fume, Sal ammoniac fume	NIOSH 10 mg/m³ ST 20 mg/m³ 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 [#ID188]
Ammonium sulfamate $NH_4OSO_2NH_2$ 7773-06-0 WO6125000 9089 171	Ammate® herbicide, Ammonium amidosulfonate, AMS, Monoammonium salt of sulfamic acid, Sulfamate	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	1500 mg/m³	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 $CH_3COO[CH_2]_4CH_3$ 628-63-7 AJ1925000 1104 129	Amyl acetic ester, Amyl acetic ether, 1-Pentanol acetate, Pentyl ester of acetic acid, Primary amyl acetate 1 ppm = 5.33 mg/m³	NIOSH/OSHA 100 ppm (525 mg/m³)	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; CS₂; GC/FID; IV [#1450, Esters I] [Also #2549, VOCs (screening)]
sec-Amyl acetate $CH_3COOCH(CH_3)C_3H_7$ 626-38-0 AJ2100000 1104 129	1-Methylbutyl acetate, 2-Pentanol acetate, 2-Pentyl ester of acetic acid 1 ppm = 5.33 mg/m³	NIOSH/OSHA 125 ppm (650 mg/m³)	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: -109°F UEL: 7.5% LEL: 1%	Nitrates; strong oxidizers, alkalis & acids	Char; CS₂; GC/FID; IV [#1450, Esters I] [Also #2549, VOCs (screening)]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Ammonium chloride fume]	TBAL	Inh Con	Irrit eyes, skin, resp sys; cough, dysp, pulm sens	Eye: Irr immed Skin: Soap wash immed Breath: Resp support		Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Ammonium sulfamate]	NIOSH 50 mg/m^3: DM 100 mg/m^3: DMXSQ/SA 250 mg/m^3: SA:CF/PAPRDM 500 mg/m^3: SAT:CF/PAPRTHiE/HiEF/SCBAF/SAF 1500 mg/m^3: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, nose, throat; cough, dysp	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [n-Amyl acetate]	NIOSH/OSHA 1000 ppm: CCROV*/GMFOV/PAPROV*/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; derm; possible CNS depres, narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [sec-Amyl acetate]	NIOSH/OSHA 1000 ppm: CCROV*/GMFOV/PAPROV*/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose; narco; derm; possible kidney, liver inj; possible CNS depres	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, kidneys, liver, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Aniline (and homologs) $C_6H_5NH_2$ 62-53-3 BW6650000 1547 153	Aminobenzene, Aniline oil, Benzenamine, Phenylamine 1 ppm = 3.81 mg/m^3	NIOSH Ca See Appendix A OSHA† 5 ppm (19 mg/m^3) [skin]	Ca [100 ppm]	Colorless to brown, oily liquid with an aromatic amine-like odor [Note: A solid below 21°F.]	MW: 93.1 BP: 363°F Sol: 4% FLP: 158°F IP: 7.70 eV Sp.Gr: 1.02 Class IIIA Combustible Liquid	VP: 0.6 mm FRZ: 21°F UEL: 11% LEL: 1.3%	Strong oxidizers, strong acids, toluene diisocyanate, alkalis	Si gel; Ethanol; GC/FID; IV [#2002, Aromatic Amines]
o-Anisidine $NH_2C_6H_4OCH_3$ 90-04-0 BZ5410000 2431 153	ortho-Aminoanisole, 2-Anisidine, o-Methoxyaniline [Note: o-Anisidine has been used as a basis for many dyes.]	NIOSH Ca 0.5 mg/m^3 [skin] See Appendix A OSHA 0.5 mg/m^3 [skin]	Ca [50 mg/m^3]	Red or yellow, oily liquid with an amine-like odor. [Note: A solid below 41°F.]	MW: 123.2 BP: 437°F Sol: 1% FLP: 244°F IP: 7.44 eV Sp.Gr: 1.10 Class IIIB Combustible Liquid	VP: <0.1 mm FRZ: 41°F UEL: ? LEL: ?	Strong oxidizers	XAD-2; Methanol; HPLC/UV; IV [#2514]
p-Anisidine $NH_2C_6H_4OCH_3$ 104-94-9 BZ5450000 2431 153	para-Aminoanisole, 4-Anisidine, p-Methoxyaniline	NIOSH/OSHA 0.5 mg/m^3 [skin]	50 mg/m^3	Yellow to brown, crystalline solid with an amine-like odor.	MW: 123.2 BP: 475°F Sol: Moderate FLP: ? IP: 7.44 eV Sp.Gr: 1.07 Combustible Solid	VP: (77°F): 0.006 mm MLT: 135°F UEL: ? LEL: ?	Strong oxidizers	XAD-2; Methanol; HPLC/UV; IV [#2514]
Antimony Sb 7440-36-0 CC4025000 1549 157 (inorganic, n.o.s.) 2871 170 (powder) 3141 157 (inorganic liquid compounds, n.o.s.)	Antimony metal, Antimony powder, Stibium	NIOSH*/OSHA* 0.5 mg/m^3 [*Note: The REL and PEL also apply to other Antimony compounds (as Sb).]	50 mg/m^3 (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 Sp.Gr: 6.69 Noncombustible Solid in bulk form, but a moderate explosion hazard in the form of dust when exposed to flame.	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; FAAS; II(4) [P&CAM #261]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench [Aniline (and homologs)]	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OV/SCBAE	Inh Abs Ing Con	Head,weak, dizz; cyan; ataxia; dysp on effort; tacar; irrit eyes; methemo: cirr; [carc]	Eye: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Blood, CVS, eyes, liver, kidneys, resp sys [bladder cancer]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [o-Anisidine]	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OV/SCBAE	Inh Abs Ing Con	Head,dizz; cyan; RBC Heinz bodies; [carc]	Eye: Irrimmed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, kidneys, liver, CVS, CNS [In animals: tumors of the thyroid gland, bladder & kidneys]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Quick drench [p-Anisidine]	NIOSH/OSHA 5 mg/m³: DM:SQ/SA 12.5 mg/m³: SA:CF/PAPRDM 25 mg/m³: HiEF/PAPRTHIE*/SCBAF/SAF 50 mg/m³: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Head,dizz; cyan; RBC Heinz bodies; [carc]	Eye: Irrimmed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, kidneys, liver, CVS, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Antimony]	NIOSH/OSHA 5 mg/m³: DM:SQ^/SA 12.5 mg/m³: SA:CF/PAPRDM^ 25 mg/m³: HiEF/SAT:CF/PAPRTHIE/SCBAF/SAF 50 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, mouth, cough; dizz; head; nau, vomit, diarr; stomach cramps; insom; anor; unable to smell properly	Eye: Irrimmed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, 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 MW, BP, SOL FLP, IP, Sp, Gr, flammability	VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
ANTU $C_{10}H_7NHC(NH_2)S$ 86-88-4 YT9275000 1651 153	α-Naphthyl thiocarbamide, 1-Naphthyl thiourea, α-Naphthyl thiourea	NIOSH/OSHA 0.3 mg/m³	100 mg/m³	White crystalline or gray, odorless powder. [rodenticide]	MW: 202.3 BP: Decomposes Sol: 0.06% FLP: NA IP: ? Sp Gr: ? Noncombustible Solid	VP: Low MLT: 388°F UEL: NA LEL: NA	Strong oxidizers, silver nitrate	Filter; Methanol; HPLC/UVD; II(5) [#5276]
Arsenic (inorganic compounds, as As) As (Metal) 7440-38-2 (Metal) CG0525000 (Metal) 1558 152 (metal) 1562 152 (dust)	Arsenic metal; Arsenia Other synonyms vary depending upon the specific As compound. [Note: OSHA considers "inorganic Arsenic" to mean copper acetoarsenite & all inorganic compounds containing arsenic except Arsine.]	NIOSH Ca C 0.002 mg/m³ [15-min] See Appendix A OSHA [1910.1018] 0.010 mg/m³	Ca [5 mg/m³ (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; HYAAS; IV [#7900] [Also #7300, Elements]
Arsenic (organic compounds, as As)	Synonyms vary depending upon the specific organic arsenic compound.	NIOSH none OSHA 0.5 mg/m³	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/HYAAS; IV [#5022, Arsenic, Organo-]
Arsine AsH_3 7784-42-1 CG6475000 2188 119	Arsenic hydride, Arsenic trihydride, Arseniuretted hydrogen, Arsenous hydride, Hydrogen arsenide 1 ppm = 3.19 mg/m³	NIOSH Ca C 0.002 mg/m³ [15-min] See Appendix A OSHA 0.05 ppm (0.2 mg/m³)	Ca [3 ppm]	Colorless gas with a mild, garlic-like odor. [Note: Shipped as a liquefied compressed gas.]	MW: 78.0 BP: -81°F Sol: 20% FLP: NA (Gas) IP: 9.89 eV RGasD: 2.69 Flammable Gas	VP(70°F): 14.9 atm FRZ: -179°F UEL:78% LEL:5.1%	Strong oxidizers, chlorine, nitric acid [Note: Decomposes above 446°F. There is a high potential for the generation of arsine gas when inorganic arsenic is exposed to nascent (freshly formed) hydrogen.]	Char; HNO_3; GFAAS; IV [#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. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: Daily [ANTU]	NIOSH/OSHA 3 mg/m³: CCROVDMFu/SA 7.5 mg/m³: SA:CF/PAPROVDMFu 15 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF 100 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing	After ingestion of large doses: vomit, dysp, cyan, coarse pulm rales; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Resp sys, blood, liver
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Arsenic (inorganic compounds, as As)]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAGHiE/SCBAE	Inh Abs Con Ing	Ulceration of nasal septum, derm, GI disturbances, peri neur, resp irrit, hyperpig of skin, [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Liver, kidneys, skin, lungs, lymphatic sys [lung & lymphatic cancer]
Recommendations vary depending upon the specific compound. [Arsenic (organic compounds, as As]	TBAL	Inh Ing Con	In animals: irrit skin, possible derm; resp distress; diarr; kidney damage; musc tremor, sez; possible GI tract, terato, repro effects; possible liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, resp sys, kidneys, CNS, liver, GI tract, repro sys
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite [Arsine]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Head, mal, weak, dizz; dysp; abdom, back pain; nau, vomit; bronze skin; hema; jaun; peri neur; liq: frostbite; [carc]	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Blood, kidneys, liver [lung & lymphatic cancer]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Asbestos Hydrated mineral silicates 1332-21-4 CI6475000 2212 171 (blue, brown) 2590 171 (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 FI.P: 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; IV [#7400, Fibers] [Also #7402 (TEM)]
Asphalt fumes 8052-42-4 CI9900000 1999 130 (Asphalt)	Asphalt: Asphaltum, Bitumen (European term), Petroleum asphalt, Petroleum bitumen, Road asphalt, Roofing asphalt	NIOSH Ca C 5 mg/m^3 [15-min] See Appendix A OSHA none	Ca [N.D.]	Fumes generated during the 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; Grav; NIOSH Asphalt Fumes Crit. Doc.
Atrazine $C_8H_{14}ClN_5$ 1912-24-9 XY5600000 2763 151 (triazine pesticide)	2-Chloro-4-ethylamino-6-isopropylamino-s-triazine; 6-Chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine	NIOSH 5 mg/m^3 OSHA† none	N.D.	Colorless or white, odorless, crystalline powder. [herbicide]	MW: 215.7 BP: Decomposes Sol: 0.003% FI.P: NA IP: NA Sp.Gr: 1.19 Noncombustible Solid, but may be mixed with flammable liquids.	VP: 0.0000003 mm MLT: 340°F UEL: NA LEL: NA	Strong acids, strong bases	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Azinphos-methyl $C_{10}H_{12}O_3PS_2N_3$ 86-50-0 TE1925000 2783 152	O,O-Dimethyl-S-4-oxo-1,2,3-benzotriazin-3(4H)-ylmethyl phosphorodithioate; Guthion®; Methyl azinphos $[(CH_3O)_2P(S)SCH_2(N_3C_7H_4O)]$	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% FI.P: NA IP: ? Sp.Gr: 1.44 Noncombustible Solid	VP: 8 x 10^{-9} mm MLT: 163°F UEL: NA LEL: NA	Strong oxidizers, acids	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organic Pesticides]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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: [Asbestos]	Prevent skin contact Prevent eye contact Daily N.R. Daily	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Asbestosis (chronic exposure): dysp, interstitial fib, restricted pulm function, finger clubbing; irrit eyes; [carc]	Eye: Breath:	Irr immed Fresh air	Resp sys, eyes [lung cancer]
Skin: Eyes: Wash skin: Remove: Change: [Asphalt fumes]	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; [carc]	Eye: Breath:	Irr immed Resp support	Eyes, resp sys [in animals: skin tumors]
Skin: Eyes: Wash skin: Remove: Change: Provide: [Atrazine]	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, salv; hypothermia; liver inj	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver
Skin: Eyes: Wash skin: Remove: Change: Provide: [Azinphos-methyl]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Quick drench	NIOSH/OSHA 2 mg/m³: CCROVDMFu/SA 5 mg/m³: SA:CF/PAPROVDMFu 10 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Miosis; ache eyes; blurred vision, lac, rhin; head; tight chest, wheez, lar spas; salv; cyan; anor; nau, vomit, diarr; sweat; twitch, para, convuls; low BP, card irreg	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Resp sys, CNS, CVS, blood chol

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Barium chloride (as Ba) $BaCl_2$ 10361-37-2 CQ8750000 1564 154 (barium compound, n.o.s.)	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; FAAS; IV [#7056, Barium, soluble cmpds]
Barium nitrate (as Ba) $Ba(NO_3)_2$ 10022-31-8 CQ9625000 1446 141	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: 1094°F UEL: NA LEL: NA	Acids, oxidizers, aluminum-magnesium alloys, (barium dioxide + zinc) [Note: Contact with combustible material may cause fire.]	Filter; Water; FAAS; IV [#7056, Barium, soluble cmpds]
Barium sulfate $BaSO_4$ 7727-43-7 CR0600000 1564 154 (barium compound, n.o.s.)	Artificial barite, Barite, Barium salt of sulfuric acid, Barytes (natural)	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	White or yellowish, odorless powder.	MW: 233.4 BP: 2912°F (Decomposes) Sol(64°F): 0.0002% Fl.P: NA IP: NA Sp.Gr: 4.25-4.5 Noncombustible Solid	VP: 0 mm (approx) MLT: 2876°F UEL: NA LEL: NA	Phosphorus, aluminum [Note: Aluminum in the presence of heat can cause an explosion.]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Benomyl $C_{14}H_{18}N_4O_3$ 17804-35-2 DD6475000 2757 151 (carbamate pesticide, solid)	Methyl 1- (butylcarbamoyl)-2-benzimidazolecarbamate	NIOSH See Appendix D OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	White crystalline solid with a faint, acrid 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; IV [Particulates NOR: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Barium chloride (as Ba)]	NIOSH/OSHA 5 mg/m³: DMXSQ/SA 12.5 mg/m³: SA:CF/PAPRDM 25 mg/m³: HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF 50 mg/m³: 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; musc spasm; slow pulse, extrasystoles; hypokalemia	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, heart, CNS
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **[Barium nitrate (as Ba)]**	NIOSH/OSHA 5 mg/m³: DMXSQ/SA 12.5 mg/m³: SA:CF/PAPRDM 25 mg/m³: HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF 50 mg/m³: 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; musc spasm; slow pulse, extrasystoles, hypokalemia**	**Eye: Irr immed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, heart, CNS**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: N.R. Provide: Eyewash, Quick drench [Barium sulfate]	TBAL	Inh Con	Irrit eyes, nose, upper resp sys; benign pneumoconiosis (baritosis)	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **Provide: Eyewash, Quick drench** **[Benomyl]**	**TBAL**	**Inh** **Ing** **Con**	**Irrit eyes, skin, upper resp sys; skin sens; possible repro, terato effects**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, repro sys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Benzene C_6H_6 71-43-2 CY1400000 1114 130	Benzol, Phenyl hydride 1 ppm = 3.19 mg/m^3	NIOSH Ca 0.1 ppm ST 1 ppm See Appendix A OSHA [1910.1028] 1 ppm ST 5 ppm See Appendix F	Ca [500 ppm]	Colorless to light-yellow liquid with an aromatic odor. [Note: A solid below 42°F.]	MW: 78.1 BP: 176°F Sol: 0.07% Fl.P: 12°F IP: 9.24 eV Sp.Gr: 0.88 Class IB Flammable Liquid	VP: 75 mm FRZ: 42°F UEL: 7.8% LEL: 1.2%	Strong oxidizers, many fluorides & perchlorates, nitric acid	Char; CS_2; GC/FID; IV [#1500, Hydro-carbons] [Also #3700, #1501]
Benzenethiol C_6H_5SH 108-98-5 DC0525000 2337 131	Mercaptobenzene, Phenyl mercaptan, Thiophenol 1 ppm = 4.51 mg/m^3	NIOSH C 0.1 ppm (0.5 mg/m^3) [15-min] OSHA† none	N.D.	Water-white liquid with an offensive, garlic-like odor. [Note: A solid below 5°F.]	MW: 110.2 BP: 336°F Sol(77°F): 0.08% Fl.P: 132°F IP: 8.33 eV Sp.Gr: 1.08 Class II Combustible Liquid	VP(65°F): 1 mm FRZ: 5°F UEL: ? LEL: ?	Strong acids & bases, calcium hypochlorite, alkali metals [Note: Oxidizes on exposure to air.]	None available
Benzidine $NH_2C_6H_4C_6H_4NH_2$ 92-87-5 DC9625000 1885 153	Benzidine-based dyes; 4,4'-Bianiline; 4,4'-Biphenyldiamine; 1,1'-Biphenyl-4,4'-diamine; 4,4'-Diaminobiphenyl; p-Diaminodiphenyl [Note: Benzidine has been used as a basis for many dyes.]	NIOSH Ca See Appendix A See Appendix C OSHA [1910.1010] See Appendix B See Appendix C	Ca [N.D.]	Grayish-yellow, reddish-gray, or white crystalline powder. [Note: Darkens on exposure to air and light.]	MW: 184.3 BP: 752°F Sol(54°F): 0.04% Fl.P: ? IP: ? Sp.Gr: 1.25 Combustible Solid, but difficult to burn.	VP: Low MLT: 239°F UEL: ? LEL: ?	Red fuming nitric acid	Filter; Reagent; HPLC/UVD; IV [#5509]
Benzoyl peroxide $(C_6H_5CO)_2O_2$ 94-36-0 DM8575000 2085/2087 146 2088/2090 146 2089 145	Benzoperoxide, Dibenzoyl peroxide	NIOSH/OSHA 5 mg/m^3	1500 mg/m^3	Colorless to white crystals or a granular powder with a faint, benzaldehyde-like odor.	MW: 242.2 BP: Decomposes explosively Sol: <1% Fl.P: 176°F IP: ? Sp.Gr: 1.33 Combustible Solid (easily ignited and burns very rapidly).	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; IV [#5009]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Benzene]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, resp sys; gidd; head, nau, staggered gait; ftg, anor, lass; derm; bone marrow depres; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, blood, CNS, bone marrow [leukemia]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Benzenethiol]	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	Irrit eyes, skin, resp sys; derm; cyan; cough, wheez, dysp, pulm edema, pneuitis; head, dizz, CNS depres; nau, vomit; kidney, liver, spleen damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, kidneys, liver, spleen
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Benzidine]	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; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Bladder, skin, kidneys, liver, blood [liver, kidney & bladder cancer]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Benzoyl peroxide]	NIOSH/OSHA 50 mg/m³: DMXSQ*/SA* 125 mg/m³: SA:CF*/PAPRDM* 250 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 1500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; sens derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Benzyl chloride $C_6H_5CH_2Cl$ 100-44-7 XS8925000 1738 156	Chloromethylbenzene, α-Chlorotoluene 1 ppm = 5.18 mg/m³	NIOSH C 1 ppm (5 mg/m³) [15-min] OSHA 1 ppm (5 mg/m³)	10 ppm	Colorless to slightly yellow liquid with a pungent, aromatic odor.	MW: 126.6 BP: 354°F Sol: 0.05% FI.P: 153°F IP: ? Sp.Gr: 1.10 Class IIIA Combustible Liquid	VP: 1 mm FRZ: -38°F UEL: ? LEL: 1.1%	Oxidizers, acids, copper, aluminum, magnesium, iron, zinc, tin [Note: Can polymerize when in contact with all common metals except nickel & lead. Hydrolyzes in H_2O to benzyl alcohol.]	Char; CS; GC/FID; IV [#1003, Halogenated Hydrocarbons]
Beryllium & beryllium compounds (as Be) Be (Metal) 7440-41-7 (Metal) DS1750000 (Metal) 1566 154 (compounds) 1567 134 (powder)	Beryllium metal: Beryllium Other synonyms vary depending upon the specific beryllium compound.	NIOSH Ca Not to exceed 0.0005 mg/m³ See Appendix A OSHA 0.002 mg/m³ C 0.005 mg/m³ 0.025 mg/m³ [30-min maximum peak]	Ca [4 mg/m³ (as Be)]	Metal: A hard, brittle, gray-white solid.	MW: 9.0 BP: 4532°F Sol: Insoluble FI.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 hydrocarbons, oxidizers, molten lithium	Filter; Acid; GFAAS; IV [#7102] [Also #7300, Elements]
Bismuth telluride, doped with Selenium sulfide (as Bi_2Te_3)	Doped bismuth sesquitelluride, Doped bismuth telluride, Doped bismuth tritelluride, Doped tellurobismuthite [Note: Doped with selenium sulfide. Commercial mix may contain 80% Bi_2Te_3, 20% stannous telluride, plus some tellurium.]	NIOSH 5 mg/m³ OSHA† none	N.D.	Gray, crystalline solid that has been enhanced (doped) with a small amount of selenium sulfide (SeS). [Note: Doping alters the conductivity of a semiconductor.]	Properties are unavailable but should be similar to Bismuth telluride, undoped. Sp.Gr: ? Noncombustible Solid		Strong oxidizers, moisture	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Bismuth telluride, undoped Bi_2Te_3 1304-82-1 EB3110000	Bismuth sesquitelluride, Bismuth telluride, Bismuth tritelluride, Tellurobismuthite	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Gray, crystalline solid.	MW: 800.8 BP: ? Sol: Insoluble FI.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; IV [Particulates NOR: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: 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; irrity; head; skin eruption; pulm edema	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
[Benzyl chloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contam Change: Daily Provide: Eyewash	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Berylliosis (chronic exposure): anor, low-wgt, weak, chest pain, cough, clubbing of fingers, cyan, pulm insufficiency; irrit eyes; derm; [carc]	Eye: Irr immed Breath: Fresh air		Eyes, skin, resp sys [lung cancer]
[Beryllium & beryllium compounds (as Be)]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Con	Irrit eyes, skin, upper resp sys; garlic breath; in animals: pulm lesions (nonfibrotic)	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
[Bismuth telluride, doped with Selenium sulfide (as Bi_2Te_3)]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Con	Irrit eyes, skin, upper resp sys; garlic breath	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Borates, tetra, sodium salts (Anhydrous) $Na_2B_4O_7$ 1330-43-4 ED4588000	Anhydrous borax, Borax dehydrated, Disodium salt of boric acid, Disodium tetraborate, Fused borax, Sodium borate (anhydrous), Sodium tetraborate	NIOSH 1 mg/m^3 OSHA† none	N.D.	White to gray, odorless powder. [herbicide] [Note: Becomes opaque on exposure to air.]	MW: 201.2 BP: 2867°F (Decomposes) Sol: 3% FLP: 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; IV [#0500, Particulates NOR (total)]
Borates, tetra, sodium salts (Decahydrate) $Na_2B_4O_7 \cdot 10H_2O$ 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% FLP: 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; IV [#0500, Particulates NOR (total)]
Borates, tetra, sodium salts (Pentahydrate) $Na_2B_4O_7 \cdot 5H_2O$ 12179-04-3	Borax pentahydrate, Sodium borate pentahydrate, Sodium tetraborate pentahydrate	NIOSH 1 mg/m^3 OSHA† none	N.D.	Colorless or white, odorless crystals or free-flowing powder. [herbicide] [Note: Begins to lose water of hydration at 252°F.]	MW: 291.4 BP: ? Sol: 4% FLP: 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; IV [#0500, Particulates NOR (total)]
Boron oxide B_2O_3 1303-86-2 ED7900000	Boric anhydride, Boric oxide, Boron trioxide	NIOSH 10 mg/m^3 OSHA† 15 mg/m^3	2000 mg/m^3	Colorless, semi-transparent lumps or hard, white, odorless crystals.	MW: 69.6 BP: 3380°F Sol: 3% FLP: 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; IV [#0500, Particulates NOR (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 5)
Skin: N.R. Eyes: N.R. Wash skin: Daily Remove: N.R. Change: Daily [Borates, tetra sodium salts (Anhydrous)]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: Daily Remove: N.R. Change: Daily [Borates, tetra sodium salts (Decahydrate)]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: Daily Remove: N.R. Change: Daily [Borates, tetra sodium salts (Pentahydrate)]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; derm; epis; cough, dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Boron oxide]	NIOSH 50 mg/m³: DM* 100 mg/m³: DMXSQ^*/SA* 250 mg/m³: SA:CF*/PAPRDM^* 500 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 2000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; cough; conj; skin eryt	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Fresh air Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Boron tribromide BBr_3 10294-33-4 ED7400000 2692 157	Boron bromide, Tribromoborane 1 ppm = 10.25 mg/m³	NIOSH C 1 ppm (10 mg/m³) OSHA† none	N.D.	Colorless, fuming liquid with a sharp, irritating odor.	MW: 250.5 BP: 194°F Sol: Decomposes Fl.P: NA IP: 9.70 eV Sp.Gr(65°F): 2.64 Noncombustible Liquid	VP(57°F): 40 mm FRZ: -51°F UEL: NA LEL: NA	Moisture, water, heat, potassium, sodium, alcohols [Note: Attacks metals, wood & rubber. Reacts with water to form boric acid and hydrogen bromide.]	None available
Boron trifluoride BF_3 7637-07-2 ED2275000 1008 125	Boron fluoride, Trifluoroborane 1 ppm = 2.77 mg/m³	NIOSH/OSHA C 1 ppm (3 mg/m³)	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_2O) Fl.P: NA IP: 15.50 eV RGasD: 2.38 Nonflammable Gas	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
Bromacil $C_9H_{13}BrN_2O_2$ 314-40-9 YQ9100000 1 ppm = 10.68 mg/m³	5-Bromo-3-sec-butyl-6-methyluracil, 5-Bromo-6-methyl-3-(1-methylpropyl)uracil	NIOSH 1 ppm (10 mg/m³) OSHA† none	N.D.	Odorless, colorless to white, crystalline solid. [herbicide] [Note: Commercially available as a wettable powder or in liquid formulations.]	MW: 261.2 BP: Sublimes Sol(77°F): 0.08% Fl.P: NA IP: ? Sp.Gr: 1.55 Noncombustible Solid, but may be dissolved in flammable liquids.	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; IV [#0500, Particulates NOR (total)]
Bromine Br_2 7726-95-6 EF9100000 1744 154	Molecular bromine 1 ppm = 6.54 mg/m³	NIOSH 0.1 ppm (0.7 mg/m³) ST 0.3 ppm (2 mg/m³) OSHA† 0.1 ppm (0.7 mg/m³)	3 ppm	Dark reddish-brown, fuming liquid with suffocating, irritating fumes.	MW: 159.8 BP: 139°F Sol: 4% Fl.P: NA IP: 10.55 eV Sp.Gr: 3.12 Noncombustible Liquid, but accelerates the burning of combustibles.	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; $Na_2S_2O_3$; IC; IV [#6011]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; skin, eye burns; dysp, pulm edema	Eye: Skin: Breath: Swallow	Irr 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:	Irr 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	Eye: Skin: Breath: Swallow	Irr 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/[illegible] 3 ppm: CCRFS/GMFS/PAPRTS/[illegible] 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	Irr 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 (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Bromine pentafluoride BrF_5 7789-30-2 EF9350000 1745 144	Bromine fluoride 1 ppm = 7.15 mg/m³	NIOSH 0.1 ppm (0.7 mg/m³) OSHA† none	N.D.	Colorless to pale-yellow, fuming liquid with a pungent odor. [Note: A colorless gas above 105°F. Shipped as a compressed gas.]	MW: 174.9 BP: 105°F Sol: Reacts violently FI.P: NA IP: ? 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
Bromoform $CHBr_3$ 75-25-2 PB5600000 2515 159	Methyl tribromide, Tribromomethane 1 ppm = 10.34 mg/m³	NIOSH/OSHA 0.5 ppm (5 mg/m³) [skin]	850 ppm	Colorless to yellow liquid with a chloroform-like odor. [Note: A solid below 47°F.]	MW: 252.8 BP: 301°F Sol: 0.1% FI.P: NA IP: 10.48 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, acquiring yellow color; air & light accelerate decomposition.]	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
1,3-Butadiene CH_2=CHCH=CH_2 106-99-0 EI9275000 1010 116P (inhibited)	Biethylene, Divinyl, Butadiene, Divinyl, Erythrene, Vinylethylene 1 ppm = 2.21 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1051] 1 ppm ST 5 ppm	Ca [2000 ppm] [10%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 FI.P: NA (Gas) -105°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.]	Char(2); CH_2Cl_2; GC/FID; IV [#1024]
n-Butane $CH_3CH_2CH_2CH_3$ 106-97-8 EJ4200000 1011 115 1075 115	normal-Butane, Butyl hydride, Diethyl, Methylethylmethane [Note: Also see specific listing for Isobutane.] 1 ppm = 2.38 mg/m³	NIOSH 800 ppm (1900 mg/m³) OSHA† none	N.D.	Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 31°F.]	MW: 58.1 BP: 31°F Sol: Slight FI.P: NA (Gas) IP: 10.63 eV RGasD: 2.11 Sp.Gr: 0.6 (Liquid at 31°F) Flammable Gas Class IA Flammable Liquid	VP: 2.05 atm FRZ: -217°F UEL: 8.4% LEL: 1.6%	Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, (nickel carbonyl + oxygen)	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (NUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys, corn nec, skin burns; cough, dysp, pulm edema; liver, kidney inj	Eye: Irrimmed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
[Bromine pentafluoride]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **N.R.**	NIOSH/OSHA 12.5 ppm: SA:CF[f]/PAPROV[f] 25 ppm: CCRFOV/GMFOV/PAPRTOV[f]/SCBAF/SAF 850 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: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, liver, kidneys
[Bromoform]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit eyes, nose, throat; drow, ll-head; liq: frostbite; terato, repro effects; [carc]	Eye: Frostbite Skin: Frostbite Breath: Resp support		Eyes, resp sys, CNS, repro sys [hemato cancer]
[1,3-Butadiene]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	TBAL	Inh Con (liq)	Drow, narco, asphy; liq: frostbite	Eye: Skin: Frostbite Breath 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: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2-Butanone $CH_3COCH_2CH_3$ 78-93-3 EL6475000 1193 127 1232 127	Ethyl methyl ketone, MEK, Methyl acetone, Methyl ethyl ketone 1 ppm = 2.95 mg/m³	NIOSH 200 ppm (590 mg/m³) ST 300 ppm (885 mg/m³) OSHA† 200 ppm (590 mg/m³)	3000 ppm	Colorless liquid with a moderately sharp, fragrant, mint- or acetone-like odor.	MW: 72.1 BP: 175°F Sol: 28% FI.P: 16°F IP: 9.54 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 78 mm FRZ: -122°F UEL(200°F): 11.4% LEL(200°F): 1.4%	Strong oxidizers, amines, ammonia, inorganic acids, caustics, isocyanates, pyridines	Carbon beads; CS_2; GC/FID; IV [#2500]
2-Butoxyetherol $C_4H_9OCH_2CH_2OH$ 111-76-2 KJ8575000 2369 152	Butyl Cellosolve®, Butyl oxitol, Dowanol EB, EGBE, Extasolve EB, Ethylene glycol monobutyl ether, Jeffersol EB 1 ppm = 4.83 mg/m³	NIOSH 5 ppm (24 mg/m³) [skin] OSHA† 50 ppm (240 mg/m³) [skin]	700 ppm	Colorless liquid with a mild, ether-like odor.	MW: 118.2 BP: 339°F Sol: Miscible FI.P: 143°F IP: 10.00 eV Sp.Gr: 0.90 Class IIIA Combustible Liquid	VP: 0.8 mm FRZ: -107°F UEL(275°F): 12.7% LEL(200°F): 1.1%	Strong oxidizers, strong caustics	Char; Methanol/ CH_2Cl_2; GC/FID; IV [#1403, Alcohols IV]
2-Butoxyethanol acetate $C_4H_9O(CH_2)_2OCOCH_3$ 112-07-2 KJ8925000	2-Butoxyethyl acetate, Butyl Cellosolve® acetate, Butyl glycol acetate, EGBEA, Extasolve EB® acetate, Ethylene glycol monobutyl ether acetate 1 ppm = 6.55 mg/m³	NIOSH 5 ppm (33 mg/m³) OSHA none	N.D.	Colorless liquid with a pleasant, sweet, fruity odor.	MW: 160.2 BP: 378°F Sol: 1.5% FI.P: 71°F IP: ? Sp.Gr: 0.94 Class IB Flammable Liquid	VP: 0.3 mm FRZ: -82°F UEL(275°F): 0.88% LEL(200°F): 8.04%	Oxidizers	Char; CH_2Cl_2/ Methanol; GC/FID; OSHA [#93]
n-Butyl acetate $CH_3COO(CH_2)_3CH_3$ 123-86-4 AF7350000 1123 129	Butyl acetate, n-Butyl ester of acetic acid, Butyl ethanoate 1 ppm = 4.75 mg/m³	NIOSH 150 ppm (710 mg/m³) ST 200 ppm (950 mg/m³) OSHA† 150 ppm (710 mg/m³)	1700 ppm [10%LEL]	Colorless liquid with a fruity odor.	MW: 116.2 BP: 258°F Sol: 1% FI.P: 72°F IP: 10.00 eV Sp.Gr: 0.88 Class IB Flammable Liquid	VP: 10 mm FRZ: -107°F UEL: 7.6% LEL: 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash [2-Butanone]	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: Irr immed Skin: Water wash immed Breath: Fresh air Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench [2-Butoxyethanol]	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: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, hemato sys, blood, kidneys, liver, lymphoid sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [2-Butoxyethanol acetate]	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: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, hemato sys, blood, kidneys, liver, lymphoid sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [n-Butyl acetate]	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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
sec-Butyl acetate $CH_3COOCH(CH_3)CH_2CH_3$ 105-46-4 AF7380000 1123 129	sec-Butyl ester of acetic acid, 1-Methylpropyl acetate 1 ppm = 4.75 mg/m³	NIOSH/OSHA 200 ppm (950 mg/m³)	1700 ppm [10%LEL]	Colorless liquid with a pleasant, fruity odor.	MW: 116.2 BP: 234°F Sol: 0.8% FLP: 62°F IP: 9.91 eV Sp.Gr: 0.86 Class IB Flammable Liquid	VP: 10 mm FRZ: -100°F UEL: 9.8% LEL: 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]
tert-Butyl acetate $CH_3COOC(CH_3)_3$ 540-88-5 AF7400000 1123 129	tert-Butyl ester of acetic acid 1 ppm = 4.75 mg/m³	NIOSH/OSHA 200 ppm (950 mg/m³)	1500 ppm [10%LEL]	Colorless liquid with a fruity odor.	MW: 116.2 BP: 208°F Sol: Insoluble FLP: 72°F IP: ? Sp.Gr: 0.87 Class IB Flammable Liquid	VP: ? FRZ: ? UEL: ? LEL: 1.5%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]
Butyl acrylate $CH_2=CHCOOC_4H_9$ 141-32-2 UD3150000 2348 129P	n-Butyl acrylate, Butyl ester of acrylic acid, Butyl 2-propenoate 1 ppm = 5.24 mg/m³	NIOSH 10 ppm (55 mg/m³) OSHA† none	N.D.	Clear, colorless liquid with a strong, fruity odor. [Note: Highly reactive; may contain an inhibitor to prevent spontaneous polymerization.]	MW: 128.2 BP: 293°F Sol: 0.1% FLP: 103°F IP: ? Sp.Gr: 0.89 Class II Combustible Liquid	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
n-Butyl alcohol $CH_3CH_2CH_2CH_2OH$ 71-36-3 EO1400000 1120 129	1-Butanol, n-Butanol, Butyl alcohol, 1-Hydroxybutane, n-Propyl carbinol 1 ppm = 3.03 mg/m³	NIOSH C 50 ppm (150 mg/m³) [skin] OSHA† 100 ppm (300 mg/m³)	1400 ppm [10%LEL]	Colorless liquid with a strong, characteristic, mildly alcoholic odor.	MW: 74.1 BP: 243°F Sol: 9% FLP: 84°F IP: 10.04 eV Sp.Gr: 0.81 Class IC Flammable Liquid	VP: 6 mm FRZ: -129°F UEL: 11.2% LEL: 1.4%	Strong oxidizers, strong mineral acids, alkali metals, halogens	Char; 2-Propanol/ CS_2; GC/FID; IV [#1401, Alcohols II]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Health hazards: Symptoms (See Table 5)	Health hazards: First aid (See Table 6)	Health hazards: Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [sec-Butyl acetate]	NIOSH/OSHA 1700 ppm: SA:CF[f]/PAPROV[f]/CCRFOV/GMFOV/SCBAF/SAF [f]: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes; head; drow; dryness upper resp sys, skin; narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: N.R. [tert-Butyl acetate]	NIOSH/OSHA 1600 ppm: SA:CF[f]/PAPROV[f]/CCRFOV/GMFOV/SCBAF/SAF [f]: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Itch, inflamm eyes; irrit upper resp tract; head; narco; derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, eyes, skin, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Butyl acrylate]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; sens derm; dysp	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **N.R.** [n-Butyl alcohol]	NIOSH 1250 ppm: SA:CF[f]/PAPROV[f] 1400 ppm: CCRFOV/GMFOV/PAPRTOV[f]/SCBAF/SAF [f]: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; head, verti, drow; corn inflamm, blurred vision; lac, photo; derm; possible auditory nerve damage, hearing loss; CNS depres	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
sec-Butyl alcohol $CH_3CH(OH)CH_2CH_3$ 78-92-2 EO1750000 1120 129	2-Butanol, Butylene hydrate, 2-Hydroxybutane, Methyl ethyl carbinol 1 ppm = 3.03 mg/m³	NIOSH 100 ppm (305 mg/m³) ST 150 ppm (455 mg/m³) OSHA† 150 ppm (450 mg/m³)	2000 ppm	Colorless liquid with a strong, pleasant odor.	MW: 74.1 BP: 211°F Sol: 16% Fl.P: 75°F IP: 10.10 eV Sp.Gr: 0.81 Class IC Flammable Liquid	VP: 12 mm FRZ: -175°F UEL(212°F): 9.8% LEL(212°F): 1.7%	Strong oxidizers, organic peroxides, perchloric & permono-sulfuric acids	Char; 2-Propanol/ CS_2; GC/FID; IV [#1401, Alcohols II]
tert-Butyl alcohol $(CH_3)_3COH$ 75-65-0 EO1925000 1120 129	2-Methyl-2-propanol, Trimethyl carbinol 1 ppm = 3.03 mg/m³	NIOSH 100 ppm (300 mg/m³) ST 150 ppm (450 mg/m³) OSHA† 100 ppm (300 mg/m³)	1600 ppm	Colorless solid or liquid (above 78°F) with a camphor-like odor. [Note: Often used in aqueous solutions.]	MW: 74.1 BP: 180°F Sol: Miscible Fl.P: 52°F IP: 9.70 eV Sp.Gr: 0.79 (Solid) Combustible Solid Class IB Flammable Liquid	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_2; GC/FID; IV [#1400, Alcohols I]
n-Butylamine $CH_3CH_2CH_2CH_2NH_2$ 109-73-9 EO2975000 1125 132	1-Aminobutane, Butylamine 1 ppm = 2.99 mg/m³	NIOSH/OSHA C 5 ppm (15 mg/m³) [skin]	300 ppm	Colorless liquid with a fishy, ammonia-like odor.	MW: 73.2 BP: 172°F Sol: Miscible Fl.P: 10°F IP: 8.71 eV Sp.Gr: 0.74 Class IB Flammable Liquid	VP: 82 mm FRZ: -58°F UEL: 9.8% LEL: 1.7%	Strong oxidizers, strong acids [Note: May corrode some metals in presence of water.]	Si gel*; Methanol; GC/FID; IV [#2012]
tert-Butyl chromate $[(CH_3)_3CO]_2CrO_2$ 1189-85-1 GB2900000	di-tert-Butyl ester of chromic acid	NIOSH Ca 0.001 mg Cr(VI)/m³ See Appendix A See Appendix C OSHA C 0.1 mg CrO_3/m³ [skin] See Appendix C	Ca [15 mg/m³ as Cr(VI)]	Liquid. [Note: Solidifies at 32-23°F.]	MW: 230.3 BP: ? Sol: ? Fl.P: ? IP: ? Sp.Gr: ?	VP: ? FRZ: 32-23°F UEL: ? LEL: ?	Reducing agents, moisture, acids, alcohols, hydrazine, combustible materials	Filter; NaOH/Na_2CO_3; IC; IV [#7604, Hexavalent Chromium]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1000 ppm: CCROV*/SA*	Ing	throat; narco	Skin:	Water flush prompt	CNS
Wash skin:	When contam	2000 ppm: SA:CF*/PAPROV*/CCRFOV/	Con		Breath:	Resp support	
Remove:	When wet (flamm)	GMFOV/SCBAF/SAF			Swallow:	Medical attention	
Change:	N.R.	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA				immed	
		Escape: GMFOV/SCBAE					
sec-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	1500 ppm: SA:CF*/PAPROV*/CCRFOV/	Ing	throat; drow, narco	Skin:	Water flush prompt	CNS
Wash skin:	When contam	GMFOV/SCBAF/SAF	Con		Breath:	Resp support	
Remove:	When wet (flamm)	§ SCBAF:PD,PP/SAF:PD,PP:ASCBA			Swallow:	Medical attention	
Change:	N.R.	Escape: GMFOV/SCBAE				immed	
tert-Butyl alcohol]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Irr immed	Eyes, skin, resp sys
Eyes:	Prevent eye contact	50 ppm: CCRS*/SA*	Abs	throat; head; skin flush,	Skin:	Water flush immed	
Wash skin:	When contam	125 ppm: SA:CF*/PAPRS*	Ing	burns	Breath:	Resp support	
Remove:	When wet (flamm)	250 ppm: CCRFS/GMFS/PAPRTS*/	Con		Swallow:	Medical attention	
Change:	N.R.	SCBAF/SAF				immed	
Provide:	Eyewash, Quick drench	300 ppm: SAF:PD,PP					
		§ SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFS/SCBAE					
Butylamine]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact	¥ SCBAF:PD,PP/SAF:PD,PP:ASCBA	Abs	sys; eye, skin burns;	Skin:	Soap wash immed	CNS
Wash skin:	When contam/Daily	Escape: GMFOV/HiE/SCBAE	Ing	drow, musc weak; skin	Breath:	Resp support	[lung cancer]
Remove:	When wet or contam		Con	ulcers; lung changes;	Swallow:	Medical attention	
Change:	N.R.			[carc]		immed	
Provide:	Eyewash, Quick drench						
tert-Butyl chromate]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
n-Butyl glycidyl ether $C_7H_{14}O_2$ 2426-08-6 TX4200000	BGE; 1,2-Epoxy-3-butoxypropane 1 ppm = 5.33 mg/m³	NIOSH C 5.6 ppm (30 mg/m³) [15-min] OSHA† 50 ppm (270 mg/m³)	250 ppm	Colorless liquid with an irritating odor.	MW: 130.2 BP: 327°F Sol: 2% Fl.P: 130°F IP: ? Sp.Gr: 0.91 Class II Combustible Liquid	VP(77°F): 3 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics	Char; CS_2; GC/FID; IV [#1616]
n-Butyl lactate $CH_3CH(OH)COOC_4H_9$ 138-22-7 OD4025000 1993 128 (combustible liquid, n.o.s.)	Butyl ester of 2-hydroxy-propanoic acid, Butyl ester of lactic acid, Butyl lactate 1 ppm = 5.98 mg/m³	NIOSH 5 ppm (25 mg/m³) OSHA† none	N.D.	Clear, colorless to white liquid with a mild, transient odor.	MW: 146.2 BP: 370°F Sol: Slight Fl.P: 160°F IP: ? Sp.Gr: 0.98 Class IIIA Combustible Liquid	VP: 0.4 mm FRZ: -45°F UEL: ? LEL: 1.15%	Strong acids & bases, strong oxidizers, heat, sparks, open flames	None available
n-Butyl mercaptan $CH_3CH_2CH_2CH_2SH$ 109-79-5 EK6300000 2347 130	Butanethiol, 1-Butanethiol, n-Butanethiol, 1-Mercaptobutane 1 ppm = 3.69 mg/m³	NIOSH C 0.5 ppm (1.8 mg/m³) [15-min] OSHA† 10 ppm (35 mg/m³)	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 Sp.Gr: 0.83 Class IB Flammable Liquid	VP: 35 mm FRZ: -176°F UEL: ? LEL: ?	Strong oxidizers (such as dry bleaches), acids	Filter*; HCl/DCE; GC/FPD (S mode); IV [#2542, Mercaptans][a [Also #2525] [
o-sec-Butylphenol $CH_3CH_2CH(CH_3)C_6H_4OH$ 89-72-5 SJ8920000 2228 153 (liquid) 2229 153 (solid)	2-sec-Butylphenol, 2-(1-Methylpropyl)phenol 1 ppm = 6.14 mg/m³	NIOSH 5 ppm (30 mg/m³) [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: ? Sp.Gr: 0.89 Class IIIB Combustible Liquid Combustible Solid	VP: Low FRZ: 61°F UEL: ? LEL: ?	None reported	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [n-Butyl glycidyl ether]	NIOSH 55 ppm CCROV*/SA* 140 ppm: SA:CF*/PAPROV* 250 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 depres	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, blood
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [n-Butyl lactate]	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; drow, head, CNS depres; nau, vomit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [n-Butyl mercaptan]	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; musc weak, mal, sweat, nau vomit, head, conf; in animals: narco, inco, weak; cyan, pulm irrit; liver, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [o-sec-Butylphenol]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; skin burns	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
p-tert-Butyltoluene $(CH_3)_3CC_6H_4CH_3$ 98-51-1 XS8400000 2667 131	4-tert-Butyltoluene, 1-Methyl-4-tert-butylbenzene 1 ppm = 6.07 mg/m³	NIOSH 10 ppm (60 mg/m³) ST 20 ppm (120 mg/m³) OSHA† 10 ppm (60 mg/m³)	100 ppm	Colorless liquid with a distinct aromatic odor, somewhat like gasoline.	MW: 148.3 BP: 379°F Sol: Insoluble FLP: 155°F IP: 8.28 eV Sp.Gr: 0.86 Class IIIA Combustible Liquid	VP(77°F): 0.7 mm FRZ: -62°F UEL: ? LEL: ?	Oxidizers	Char; CS₂; GC/FID; IV [#1501, Aromatic Hydro-carbons]
n-Butyronitrile $CH_3CH_2CH_2CN$ 109-74-0 ET8750000 2411 131	Butanenitrile, Butyronitrile, 1-Cyanopropane, Propyl cyanide, n-Propyl cyanide 1 ppm = 2.83 mg/m³	NIOSH 8 ppm (22 mg/m³) 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 Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 14 mm FRZ: -170°F UEL: ? LEL: 1.65%	Strong oxidizers & reducing agents, strong acids & bases	Char; Benzene; GC/FID; IV [Adapt #1606]
Cadmium dust (as Cd) Cd (Metal) 7440-43-9 (Metal) EU9800000 (Metal) 2570 154 (compounds)	Cadmium metal: Cadmium Other synonyms vary depending upon the specific cadmium compound.	NIOSH* Ca See Appendix A OSHA* [1910.1027] 0.005 mg/m³ [*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]	Ca [9 mg/m³ (as Cd)]	Metal: Silver-white, blue-tinged, lustrous, odorless solid.	MW: 112.4 BP: 1409°F Sol: Insoluble FLP: NA IP: NA Sp.Gr: 8.65 (Metal) Metal: Noncombustible Solid in bulk form, but will burn in powder form.	VP: 0 mm (approx) MLT: 610°F UEL: NA LEL: NA	Strong oxidizers; elemental sulfur, selenium & tellurium	Filter; Acid; FAAS; IV [#7048]
Cadmium fume (as Cd) CdO/Cd 1306-19-0 (CdO) EV1930000 (CdO)	CdO: Cadmium monoxide, Cadmium oxide fume Cd: Cadmium	NIOSH* Ca See Appendix A OSHA* [1910.1027] 0.005 mg/m³ [*Note: The REL and PEL apply to all Cadmium compounds (as Cd).]	Ca [9 mg/m³ (as Cd)]	Odorless, yellow-brown, finely divided particulate dispersed in air.	MW: 128.4 BP: Decomposes Sol: Insoluble FLP: NA IP: NA Sp.Gr: 8.15 (crystalline form)/6.95 (amorphous form) Noncombustible Solid	VP: 0 mm (approx) MLT: 2599°F UEL: NA LEL: NA	Not applicable	Filter; Acid; FAAS; IV [#7048]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Calcium arsenate (as As) $Ca_3(AsO_4)_2$ 7778-44-1 CG0830000 1573 151	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/m³ [15-min] See Appendix A OSHA [1910.1018] 0.010 mg/m³	Ca [5 mg/m³ (as As)]	Colorless to white, odorless solid. [insecticide/ herbicide]	MW: 398.1 BP: Decomposes Sol(77°F): 0.01% FI.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; HYAAS; IV [#7900, Arsenic]
Calcium carbonate $CaCO_3$ 1317-65-3 EV9580000	Calcium salt of carbonic acid [Note: Occurs in nature as limestone, chalk, marble, dolomite, aragonite, calcite & oyster shells.]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	White, odorless powder or colorless crystals.	MW: 100.1 BP: Decomposes Sol: 0.001% FI.P: NA IP: NA Sp.Gr: 2.7-2.95 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517-2442°F (Decomposes) UEL: NA LEL: NA	Acids, alum, ammonium salts, mercury & hydrogen, fluorine, magnesium	Filter; Acid; FAAS; IV [#7020, Calcium]
Calcium cyanamide $CaCN_2$ 156-62-7 GS6000000 1403 138 (with >0.1% calcium carbide)	Calcium carbimide, Cyanamide, Lime nitrogen, Nitrogen lime [Note: Cyanamide is also a synonym for Hydrogen cyanamide, NH_2CN.]	NIOSH 0.5 mg/m³ 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 FI.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; IV [#0500, Particulates NOR (total)]
Calcium hydroxide $Ca(OH)_2$ 1305-62-0 EW2800000	Calcium hydrate, Caustic lime, Hydrated lime, Slaked lime	NIOSH 5 mg/m³ OSHA 15 mg/m³ (total) 5 mg/m³ (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% FI.P: NA IP: NA Sp.Gr: 2.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 1076°F (Decomposes) (Loses H_2O) UEL: NA LEL: NA	Maleic anhydride, phosphorus, nitroethane, nitromethane, nitroparaffins, nitropropane [Note: Attacks some metals.]	Filter; Acid; FAAS; IV [#7020, Calcium]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Calcium oxide CaO 1305-78-8 EW3100000 1910 157	Burned lime, Burnt lime, Lime, Pebble lime, Quick lime, Unslaked lime	NIOSH 2 mg/m^3 OSHA 5 mg/m^3	25 mg/m^3	White or gray, odorless lumps or granular powder.	MW: 56.1 BP: 5162°F Sol: Reacts Fl.P: NA IP: NA Sp.Gr: 3.34 Noncombustible Solid, but will support combustion by liberation of oxygen.	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; FAAS; IV [#7020, Calcium]
Calcium silicate $CaSiO_3$ 1344-95-2 VV9150000	Calcium hydrosilicate, Calcium metasilicate, Calcium monosilicate, Calcium salt of silicic acid, Wollastonite (mineral)	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	White or cream-colored, free-flowing powder. [Note: The commercial product is prepared from diatomaceous earth & lime.]	MW: 116.2 BP: ? Sol: 0.01% Fl.P: NA IP: NA Sp.Gr: 2.9 Noncombustible Solid	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; FAAS; IV [#7020, Calcium]
Calcium sulfate $CaSO_4$ 7778-18-9 WS6920000	Anhydrous calcium sulfate, Anhydrous gypsum, Anhydrous sulfate of lime, Calcium salt of sulfuric acid [Note: Gypsum is the dihydrate form & Plaster of Paris is the hemihydrate form.]	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Odorless, white powder or colorless, crystalline solid. [Note: May have blue, gray, or reddish tinge.]	MW: 136.1 BP: Decomposes Sol: 0.3% Fl.P: NA IP: NA Sp.Gr: 2.96 Noncombustible Solid	VP: 0 mm (approx) MLT: 2840°F (Decomposes) UEL: NA LEL: NA	Diazomethane, aluminum,phosphorus, water [Note: Hygroscopic (i.e., absorbs moisture from the air). Reacts with water to form Gypsum & Plaster of Paris.]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Camphor (synthetic) $C_{10}H_{16}O$ 76-22-2 EX1225000 2717 133	2-Camphonone, Gum camphor, Laurel camphor, Synthetic camphor	NIOSH/OSHA 2 mg/m^3	200 mg/m^3	Colorless or white crystals with a penetrating, aromatic odor.	MW: 152.3 BP: 399°F Sol: Insoluble Fl.P: 150°F IP: 8.76 eV Sp.Gr: 0.99 Combustible Solid	VP: 0.2 mm MLT: 345°F UEL: 3.5% LEL: 0.6%	Strong oxidizers (especially chromic anhydride & potassium permanganate)	Char; Methanol/ CS_2; GC/FID; IV [#1301, Ketones II]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH 10 mg/m³: DM 20 mg/m³: DMXSQ/SA 25 mg/m³: SA:CF/PAPRHiE/HiEF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp tract; ulcer, perf nasal septum; pneu; derm	Eye: Skin: Breath: Swallow	Irrimmed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Calcium oxide]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	TBAL	Inh Con	Irrit eyes, skin, upper resp sys	Eye: Skin: Breath:	Irrimmed Soap wash Fresh air	Eyes, skin, resp sys
[Calcium silicate]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	TBAL	Inh Con	Irrit eyes, skin, upper resp sys, conj, rhinitis, epis	Eye: Skin: Breath:	Irrimmed Soap wash Fresh air	Eyes, skin, resp sys
[Calcium sulfate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 50 mg/m³: SA:CF[f]/PAPROVDM[f] 100 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE[f]/SCBAF/SAF 200 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb; nau, vomit, diarr; head, dizz, excitement, epilep convuls	Eye: Skin: Breath: Swallow:	Irrimmed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
[Camphor (synthetic)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Caprolactam $C_6H_{11}NO$ 105-60-2 CM3675000	Aminocaproic lactam, epsilon-Caprolactam, Hexahydro-2H-azepin-2-one, 2-Oxohexamethyleneimine 1 ppm = 4.63 mg/m³	NIOSH Dust: 1 mg/m³ ST 3 mg/m³ Vapor: 0.22 ppm (1 mg/m³) ST 0.66 ppm (3 mg/m³) OSHA† none	N.D.	White, crystalline solid or flakes with an unpleasant odor. [Note: Significant vapor concentrations would be expected only at elevated temperatures.]	MW: 113.2 BP: 515°F Sol: 53% Fl.P: 282°F IP: ? Sp.Gr: 1.01 Combustible Solid	VP: 0.00000008 mm MLT: 156°F UEL: 8.0% LEL: 1.4%	Strong oxidizers, (acetic acid + dinitrogen trioxide)	None available
Captafol $C_{10}H_9Cl_4NO_2S$ 2425-06-1 GS4900000	Captofol; Difolatan®; N-((1,1,2,2-Tetrachloroethyl)thio)-4-cyclohexene-1,2-dicarboximide	NIOSH Ca 0.1 mg/m³ [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: 349.1 BP: Decomposes Sol: 0.0001% Fl.P: NA IP: NA Sp.Gr: ? Noncombustible Solid, but may be dissolved in flammable liquids.	VP: 0.000008 mm MLT: 321°F (Decomposes) UEL: NA LEL: NA	Acids, acid vapors, strong oxidizers	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Captan $C_9H_8Cl_3NO_2S$ 133-06-2 GW5075000 9188 171	Captane; N-Trichloromethylmercapto-4-cyclohexene-1,2-dicarboximide	NIOSH Ca 5 mg/m³ See Appendix A OSHA† none	Ca [N.D.]	Odorless, white, crystalline powder. [fungicide] [Note: Commercial product is a yellow powder with a pungent odor.]	MW: 300.6 BP: Decomposes Sol(77°F): 0.0003% Fl.P: ? IP: NA Sp.Gr: 1.74 Combustible Solid; may be dissolved in flammable liquids.	VP: 0 mm (approx) MLT: 352°F (Decomposes) UEL: ? LEL: ?	Strong alkaline materials (e.g., hydrated lime) [Note: Corrosive to metals.]	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Carbaryl $CH_3NHCOOC_{10}H_7$ 63-25-2 FC5950000 2757 151	α-Naphthyl N-methylcarbamate, 1-Naphthyl N-Methylcarbamate, Sevin®	NIOSH/OSHA 5 mg/m³	100 mg/m³	White or gray, odorless solid. [pesticide]	MW: 201.2 BP: Decomposes Sol: 0.01% Fl.P: NA IP: ? Sp.Gr: 1.23 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(77°F): <0.00004 mm MLT: 293°F UEL: NA LEL: NA	Strong oxidizers, strongly alkaline pesticides	Filter; Reagent; Vis; IV [#5006]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Caprolactam]	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; epis; derm, skin sens; asthma; irrity, conf, dizz, head; abdom cramps, diarr, nau, vomit; liver, kidney inj	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, CVS, liver, kidneys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Captafol]	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; derm, skin sens; conj; bron, wheez; diarr, vomit; liver, kidney inj; high BP; in animals: terato effects; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, CVS [in animals: tumors at many sites]
Skin: Prevent skin contact Eyes: Prevent skin contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Captan]	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; blurred vision; derm, skin sens; dyso, diarr, vomit; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, GI tract, liver, kidneys [in animals: duodenal tumors]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Carbaryl]	NIOSH/OSHA 50 mg/m^3: SA* 100 mg/m^3: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0VH/E/SCBAE	Inh Abs Ing Con	Miosis, blurred vision, tear; rhin, salv; sweat; abdom cramps, nau, vomit, diarr; tremor, cyan; convuls; irrit skin; possible repro effects	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Resp sys, CNS, CVS, skin, blood chol, repro sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Carbofuran $C_{12}H_{15}NO_3$ 1563-66-2 FB9450000 2757 151	2,3-Dihydro-2,2-dimethyl-7-benzofuranyl methyl-carbamate; Furacarb®; Furadan®	NIOSH 0.1 mg/m^3 OSHA† none	N.D.	Odorless, white or grayish, crystalline solid. [insecticide] [Note: May be dissolved in a liquid carrier.]	MW: 221.3 BP: ? Sol(77°F): 0.07% FLP: 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; IV [#0500, Particulates NOR (total)]
Carbon black C 1333-86-4 FF5800000	Acetylene black, Channel black, Furnace black, Lamp black, Thermal black	NIOSH/OSHA 3.5 mg/m^3 NIOSH Ca 0.1 mg PAHs/m^3 [Carbon black in presence of polycyclic aromatic hydrocarbons (PAHs)] See Appendix A See Appendix C	1750 mg/m^3	Black, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble FLP: 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; IV [#5000]
Carbon dioxide CO_2 124-38-9 FF6400000 1013 120 1845 120 (dry ice) 2187 120 (liquid)	Carbonic acid gas, Dry ice [Note: Normal constituent of air (about 300 ppm).] 1 ppm = 1.80 mg/m^3	NIOSH 5000 ppm (9000 mg/m^3) ST 30,000 ppm (54,000 mg/m^3) OSHA† 5000 ppm (9000 mg/m^3)	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% FLP: NA IP: 13.77 eV RGasD: 1.53 Nonflammable Gas	VP: 56.5 atm MLT: -109°F (Sublimes) UEL: NA LEL: NA	Dusts of various metals, such as magnesium, zirconium, titanium, aluminum, chromium & manganese are ignitable and explosive when suspended in carbon dioxide. Forms carbonic acid in water.	Bag; none; GC/TCD; IV [#6603]
Carbon disulfide CS_2 75-15-0 FF6650000 1131 131	Carbon bisulfide 1 ppm = 3.11 mg/m^3	NIOSH 1 ppm (3 mg/m^3) ST 10 ppm (30 mg/m^3) [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% FLP: -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; IV [#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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Carbofuran]	TBAL	Inh Abs Ing Con	Miosis, blurred vision; sweat, salv, abdom cramps, diarr, head, nau, vomit, weak; musc twitch, inco, convuls	Eye: Irr immed Skin: Soap flush immed Breath: Fresh air Swallow: Medical attention immed		CNS, PNS, blood chol
Skin: N.R. Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: N.R. [Carbon black]	NIOSH/OSHA 17.5 mg/m³: DM 35 mg/m³: DM/X/SQ/SA 87.5 mg/m³: SA:CF/PAPRDM 175 mg/m³: HIEF/PAPRTHIE/SCBAF/SAF 1750 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Cough; irrit eyes; in presence of polycyclic aromatic hydrocarbons: [carc] In presence of polycyclic aromatic hydrocarbons: NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Eye: Irr prompt Breath: Fresh air		Resp sys, eyes lymphatic cancer (in presence of PAHs)]
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite [Carbon dioxide]	NIOSH/OSHA 40,000 ppm: SA:SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con (liq/sol)	Head, dizz, restless, pares; dyso; sweat, mal; incr heart rate, card output, BP; coma; asphy; convuls; frostbite (liq, dry ice)	Eye: Frostbite Skin: Frostbite Breath: Resp support		Resp sys, CVS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Carbon disulfide]	NIOSH 10 ppm: CCROV/SA 25 ppm: SA:CF/PAPROV 50 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF 500 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Dizz, head, poor sleep, ftg, ner, anor, low-wgt, psychosis; polyneur; Parkinson-like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver inj; eye, skin burns; derm; repro effects	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, PNS, CVS, eyes, kidneys, liver, skin, repro sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Carbon monoxide CO 630-08-0 FG3500000 1016 119 9202 168 (cryogenic liquid)	Carbon oxide, Flue gas, Monoxide 1 ppm = 1.15 mg/m³	NIOSH 35 ppm (40 mg/m³) C 200 ppm (229 mg/m³) OSHA† 50 ppm (55 mg/m³)	1200 ppm	Colorless, odorless gas. [Note: Shipped as a nonliquefied or liquefied compressed gas.]	MW: 28.0 BP: -313°F Sol: 2% Fl.P: NA (Gas) IP: 14.01 eV RGasD: 0.97 Flammable Gas	VP: >35 atm MLT: -337°F UEL: 74% LEL: 12.5%	Strong oxidizers, bromine trifluoride, chlorine trifluoride, lithium	Bag; none; Sensor; IV [#6604]
Carbon tetrabromide CBr_4 558-13-4 FG4725000 2516 151	Carbon bromide, Methane tetrabromide, Tetrabromomethane 1 ppm = 13.57 mg/m³	NIOSH 0.1 ppm (1.4 mg/m³) ST 0.3 ppm (4 mg/m³) OSHA† none	N.D.	Colorless to yellow-brown crystals with a slight odor.	MW: 331.7 BP: 374°F Sol: 0.02% Fl.P: NA IP: 10.31 eV Sp.Gr: 3.42 Noncombustible Solid	VP(205°F): 40 mm MLT: 194°F UEL: NA LEL: NA	Strong oxidizers, hexacyclohexyldilead, lithium	None available
Carbon tetrachloride CCl_4 56-23-5 FG4900000 1846 151	Carbon chloride, Carbon tet, Freon® 10, Halon® 104, Tetrachloromethane 1 ppm = 6.29 mg/m³	NIOSH Ca ST 2 ppm (12.6 mg/m³) [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 characteristic ether-like odor.	MW: 153.8 BP: 170°F Sol: 0.05% Fl.P: NA IP: 11.47 eV Sp.Gr: 1.59 Noncombustible Liquid	VP: 91 mm FRZ: -9°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium & magnesium; fluorine; aluminum [Note: Forms highly toxic phosgene gas when exposed to flames or welding arcs.]	Char; CS₂; GC/FID; IV [#1003, Halogenated Hydrocarbons]
Carbonyl fluoride COF_2 353-50-4 FG6125000 2417 125	Carbon difluoride oxide, Carbon fluoride oxide, Carbon oxyfluoride, Carbonyl difluoride, Fluoroformyl fluoride, Fluorophosgene 1 ppm = 2.70 mg/m³	NIOSH 2 ppm (5 mg/m³) ST 5 ppm (15 mg/m³) OSHA† none	N.D.	Colorless gas with a pungent and very irritating odor. [Note: Shipped as a liquefied compressed gas.]	MW: 66.0 BP: -118°F Sol: Reacts Fl.P: NA IP: 13.02 eV RGasD: 2.29 Nonflammable Gas	VP: 55.4 atm FRZ: -173°F UEL: NA LEL: NA	Heat, moisture, hexafluoroisopropylideneamino-lithium [Note: Reacts with water to form hydrogen fluoride & carbon dioxide.]	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			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 350 ppm: SA 875 ppm: SA:CF 1000 ppm: GMFS1/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Head, tachypnea, nau, weak, dizz, conf, halu; cyan; depres S-T segment of electrocardiogram, angina, syncope	Eye: Skin: Breath:	Frostbite Frostbite Resp support	CVS, lungs, blood, CNS
Carbon monoxide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	N.R. Prevent eye contact Daily N.R. Daily Eyewash	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; lac; lung, liver, kidney inj; in animals: corn damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
Carbon tetrabromide]							
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; CNS depres: nau, vomit; liver, kidney inj: drow, dizz, inco; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, eyes, lungs, liver, kidneys, skin [in animals: liver cancer]
Carbon tetrachloride]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. N.R. N.R. Frostbite	TBAL	Inh Con	Irrit eyes, skin, muc memb, resp sys; eye, skin burns; lac; cough, pulm edema dysp; chronic exposure: GI pain, musc fib, skeletal fluorosis; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys, bone
Carbonyl fluoride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Catechol $C_6H_4(OH)_2$ 120-80-9 UX1050000	1,2-Benzenediol; o-Benzenediol; 1,2-Dihydroxybenzene; o-Dihydroxybenzene; 2-Hydroxyphenol; Pyrocatechol 1 ppm = 4.50 mg/m^3	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 $(C_6H_{10}O_5)_n$ 9004-34-6 FJ5691460	Hydroxycellulose, Pyrocellulose	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Odorless, white substance. [Note: The principal fiber cell wall material of vegetable tissues (wood, cotton, flax, grass, etc.).]	MW: 160,000-560,000 BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 1.27-1.61 Combustible Solid	VP: 0 mm (approx) MLT: 500-518°F (Decomposes) UEL: NA LEL: NA	Water, bromine pentafluoride, sodium nitrate, fluorine, strong oxidizers	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Cesium hydroxide CsOH 21351-79-1 FK9800000 2682 157 2681 154 (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: 149.9 BP: ? Sol(59°F): 395% 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_2, 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 $C_{10}H_6Cl_8$ 57-74-9 PB9800000 2762 131	Chlordan; Chlordano; 1,2,4,5,6,7,8,8-Octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane	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): 1.6 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; IV [#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: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; skin sens, derm; lac, burns eyes; convuls, incr BP, kidney inj	Eye: Skin: Breath: Swallow:	Irr immed Water wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys
[Catechol]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irrit eyes, skin, muc memb	Eye: Skin: Breath:	Irr immed Soap wash Fresh air	Eyes, skin, resp sys
[Cellulose]							
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 tract; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
[Cesium hydroxide]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OVH/E/SCBAE	Inh Abs Ing Con	Blurred vision; conf; ataxia, delirium; cough; abdom pain, nau, vomit, diarr; irrity, tremor, convuls; anuria; in animals: lung, liver, kidney damage: [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, eyes, lungs, liver, kidneys [in animals: liver cancer]
[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: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chlorinated camphene $C_{10}H_{10}Cl_8$ 8001-35-2 XW5250000 2761 151	Chlorocamphene, Octachlorocamphene, Polychlorocamphene, Toxaphene	NIOSH Ca [skin] See Appendix A OSHA† 0.5 mg/m³ [skin]	Ca [200 mg/m³]	Amber, waxy solid with a mild, piney, chlorine- and camphor-like odor. [insecticide]	MW: 413.8 BP: Decomposes Sol: 0.0003% FI.P: NA IP: ? Sp.Gr: 1.65 Noncombustible Solid, but may be dissolved in flammable liquids.	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; IV [#5039]
Chlorinated diphenyl oxide $C_{12}H_{10-n}Cl_nO$	Synonyms depend on the degree of chlorination of diphenyl oxide [$(C_6H_5)_2O$], ranging from monochlorodiphenyl oxide [$(C_6H_4Cl)O(C_6H_5)$] to decachlorodiphenyl oxide [$(C_6Cl_5)O(C_6Cl_5)$].	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/EConD; IV [#5025]
Chlorine Cl_2 7782-50-5 FO2100000 1017 124	Molecular chlorine 1 ppm = 2.90 mg/m³	NIOSH C 0.5 ppm (1.45 mg/m³) [15-min] OSHA† C 1 ppm (3 mg/m³)	10 ppm	Greenish-yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]	MW: 70.9 BP: -29°F Sol: 0.7% FI.P: NA IP: 11.48 eV RGasD: 2.47 Nonflammable Gas, but a strong oxidizer.	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; $Na_2S_2O_3$; IC; IV [#6011]
Chlorine dioxide ClO_2 10049-04-4 FO3000000	Chlorine oxide, Chlorine peroxide 1 ppm = 2.76 mg/m³	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% FI.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; KI; IC; OSHA [#ID202]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Health hazards: Symptoms (See Table 5)	Health hazards: First aid (See Table 6)	Health hazards: Target organs (See Table 5)
2 Skin: Prevent skin contact 3 Eyes: Prevent eye contact V Wash skin: When contam/Daily R Remove: When wet or contam D Change: Daily R Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Nau, conf, agitation, tremor, convuls, uncon; dry, red skin; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	CNS, skin [in animals: liver cancer]
] [Chlorinated camphene]					
2 Skin: Prevent skin contact 3 Eyes: Prevent eye contact V Wash skin: When contam R Remove: When wet or contam D Change: Daily	NIOSH/OSHA 5 mg/m³: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVAGHiE/SCBAE	Inh Ing Con	Acne-form derm, liver damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, liver
] [Chlorinated diphenyl oxide]					
2 Skin: Frostbite 3 Eyes: Frostbite V Wash skin: N.R. R Remove: N.R. D Change: N.R. R Provide: Frostbite	NIOSH 5 ppm: CCRS*/SA* 10 ppm: SA:CF*/PAPRS*/CCRFS/GMFS/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Burning of eyes, nose, mouth; lac, rhin; cough, choking, subs pain; nau, vomit; head, dizz; syncope; pulm edema; pneu; hypox; derm; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support	Eyes, skin, resp sys
] [Chlorine]					
2 Skin: Prevent skin contact (liq) 3 Eyes: Prevent eye contact (liq) V Wash skin: When contam (liq) R Remove: When wet (flamm) D Change: N.R. R Provide: Eyewash (liq), Quick drench (liq)	NIOSH/OSHA 1 ppm: CCRS[4]/SA 2.5 ppm: SA:CF[5]/PAPRS[5] 5 ppm: CCRFS[4]/GMFS[4]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape GMFS[4]/SCBAE	Inh Ing (liq) Con	Irrit eyes, nose, throat; cough, wheez, bron, pulm edema; chronic bron	Eye: Irr immed (liq) Skin: Soap wash immed (liq) Breath: Resp support Swallow: Medical attention immed (liq)	Eyes, resp sys
] [Chlorine dioxide]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chlorine trifluoride ClF_3 7790-91-2 FO2800000 1749 124	Chlorine fluoride, Chlorotrifluoride 1 ppm = 3.78 mg/m³	NIOSH/OSHA C 0.1 ppm (0.4 mg/m³)	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 RGasD: 3.21 Sp.Gr: 1.77 (Liquid at 53°F) Nonflammable Gas Noncombustible Liquid, but contact with organic materials may result in SPONTANEOUS ignition.	VP: 1.4 atm FRZ: -105°F UEL: NA LEL: NA	Oxidizers, water, acids, combustible materials, sand, glass, metals (corrosive) [Note: Reacts with water to form chlorine & hydrofluoric acid.]	None available
Chloroacetaldehyde $ClCH_2CHO$ 107-20-0 AB2450000 2232 153	Chloroacetaldehyde (40% aqueous solution), 2-Chloroacetaldehyde, 2-Chloroethanal 1 ppm = 3.21 mg/m³	NIOSH/OSHA C 1 ppm (3 mg/m³)	45 ppm	Colorless liquid with an acrid, penetrating odor. [Note: Typically found as a 40% aqueous solution.]	MW: 78.5 BP: 186°F Sol: Miscible Fl.P: 190°F (40% soln.) IP: 10.61 eV Sp.Gr: 1.19 (40% solution) Class IIIA Combustible Liquid	VP: 100 mm FRZ: -3°F (40% soln.) UEL: ? LEL: ?	Oxidizers, acids	Si gel; Methanol; GC/ECD; IV [#2015]
α-Chloroacetophenone $C_6H_5COCH_2Cl$ 532-27-4 AM6300000 1697 153	2-Chloroacetophenone, Chloromethyl phenyl ketone, Mace®, Phenacyl chloride, Phenyl chloromethyl ketone, Tear gas 1 ppm = 6.32 mg/m³	NIOSH/OSHA 0.3 mg/m³ (0.05 ppm)	15 mg/m³	Colorless to gray crystalline solid with a sharp, irritating odor.	MW: 154.6 BP: 472°F Sol: Insoluble Fl.P: 244°F IP: 9.44 eV Sp.Gr: 1.32 Combustible Solid	VP: 0.005 mm MLT: 134°F UEL: ? LEL: ?	Water, steam, strong oxidizers [Note: Slowly corrodes metals.]	Tenax GC (2); Thermal desorp; GC/FID; II(5) [P&CAM #291]
Chloroacetyl chloride $ClCH_2COCl$ 79-04-9 AO6475000 1752 156	Chloroacetic acid chloride, Chloroacetic chloride, Monochloroacetyl chloride 1 ppm = 4.62 mg/m³	NIOSH 0.05 ppm (0.2 mg/m³) OSHA† none	N.D.	Colorless to yellowish liquid with a strong, pungent odor.	MW: 112.9 BP: 223°F Sol: Decomposes Fl.P: NA IP: 10.30 eV Sp.Gr: 1.42 Noncombustible Liquid	VP: 19 mm FRZ: -7°F UEL: NA LEL: NA	Water, alcohols, bases, metals (corrosive), amines [Note: Decomposes in water to form chloroacetic acid & hydrogen chloride gas.]	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 (liq) Remove: When wet or contam (liq) Change: N.R. Provide: Eyewash (liq), Quick drench (liq) [Chlorine trifluoride]	NIOSH/OSHA 2.5 ppm: SA:CF[f] 5 ppm: SCBAF/SAF 20 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing (liq) Con	Eye, skin burns (liq or high vap conc); resp irrit; in animals: lac, corn ulcer; pulm edema	Eye: Irrimmed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed (liq)	Skin, eyes, resp sys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.** **Provide: Eyewash, Quick drench** [Chloroacetaldehyde]	NIOSH/OSHA 10 ppm: CCROV*/SA* 25 ppm: SA:CF*/PAPROV* 45 ppm: CCRFOV/GMFOV/PAPRTOV*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	**Inh** **Abs** **Ing** **Con**	**Irrit skin, eyes, muc mem; skin burns; eye damage; pulm edema; skin, resp sys sens**	**Eye: Irrimmed** **Skin: Water flush immed** **Breath: ssupport** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash [α-Chloroacetophenone]	NIOSH/OSHA 3 mg/m³: CCROVDM/SA 7.5 mg/m³: SA:CF[f]/PAPROVDM[f] 15 mg/m³: CCRFOVHE/GMFSHiE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; pulm edema	Eye: Irrimmed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.** **Provide: Eyewash, Quick drench** [Chloroacetyl chloride]	**TBAL**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, resp sys; eye, skin burns; cough, wheez, dysp; lac**	**Eye: Irrimmed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chlorobenzene C_6H_5Cl 108-90-7 CZ0175000 1134 130	Benzene chloride, Chlorobenzol, MCB, Monochlorobenzene, Phenyl chloride 1 ppm = 4.61 mg/m³	NIOSH See Appendix D OSHA 75 ppm (350 mg/m³)	1000 ppm	Colorless liquid with an almond-like odor.	MW: 112.6 BP: 270°F Sol: 0.05% FI.P: 82°F IP: 9.07 eV Sp.Gr: 1.11 Class IC Flammable Liquid	VP: 9 mm FRZ: -50°F UEL: 9.6% LEL: 1.3%	Strong oxidizers	Char; CS.; GC/FID; IV [#1003, Halogenated Hydrocarbons]
o-Chlorobenzylidene malononitrile $ClC_6H_4CH{=}C(CN)_2$ 2698-41-1 OO3675000	2-Chlorobenzalmalonitrile, CS, OCBM 1 ppm = 7.71 mg/m³	NIOSH C 0.05 ppm (0.4 mg/m³) [skin] OSHA† 0.05 ppm (0.4 mg/m³)	2 mg/m³	White crystalline solid with a pepper-like odor.	MW: 188.6 BP: 590-599°F Sol: Insoluble FI.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: 0.00003 mm MLT: 203-205°F UEL: ? LEL: ? MEC: 25 g/m³	Strong oxidizers	Filter/ Tenax GC; Reagent; HPLC/UVD; II(5) [P&CAM #304]
Chlorobromomethane CH_2BrCl 74-97-5 PA5250000 1887 160	Bromochloromethane, CB, CBM, Fluorocarbon 1011, Halon® 1011, Methyl chlorobromide 1 ppm = 5.29 mg/m³	NIOSH/OSHA 200 ppm (1050 mg/m³)	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 FI.P: NA IP: 10.77 eV Sp.Gr: 1.93 Noncombustible Liquid	VP: 115 mm FRZ: -124°F UEL: NA LEL: NA	Chemically-active metals such as calcium, powdered aluminum, zinc & magnesium	Char; CS.; GC/FID; IV [#1003, Halogenated Hydrocarbons]
Chlorodifluoromethane $CHClF_2$ 75-45-6 PA6390000 1018 126	Difluorochloromethane, Fluorocarbon-22, Freon® 22, Genetron® 22, Monochlorodifluoromethane, Refrigerant 22 1 ppm = 3.54 mg/m³	NIOSH 1000 ppm (3500 mg/m³) ST 1250 ppm (4375 mg/m³) 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% FI.P: NA IP: 12.45 eV RGasD: 3.11 Nonflammable Gas	VP: 9.4 atm FRZ: -231°F UEL: NA LEL: NA	Alkalis, alkaline earth metals (e.g., powdered aluminum, sodium, potassium, zinc)	Char(2); Methylene chloride; GC/FID; IV [#1018]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 Change: N.R. Remove: When wet (flamm)	OSHA 1000 ppm: SA:CF[f]/PAPROV[f]/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: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, liver
[Chlorobenzene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Change: Daily Remove: When wet or contam	NIOSH/OSHA 2 mg/m^3: SA:CF[f]/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; irrit throat, cough, chest tight; head; eryt, vesic skin	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
[o-Chlorobenzylidene malononitrile]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Change: N.R. Remove: When wet or contam	NIOSH/OSHA 2000 ppm: SA:CF[f]/PAPROV[f]/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; pulm edema	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys, CNS
[Chlorobromomethane]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: 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: Frostbite Skin: Frostbite Breath: 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chlorodiphenyl (42% chlorine) $C_6H_4ClC_6H_3Cl_2$ (approx) 53469-21-9 TQ1356000 2315 171	Aroclor® 1242, PCB, Polychlorinated biphenyl	NIOSH* Ca 0.001 mg/m³ See Appendix A [*Note: The NIOSH REL also applies to other PCBs.] OSHA 1 mg/m³ [skin]	Ca [5 mg/m³]	Colorless to light-colored, viscous liquid with a mild, hydrocarbon odor.	MW: 258 (approx) BP: 617-691°F Sol: Insoluble Fl.P: 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; IV [#5503, PCBs]
Chlorodiphenyl (54% chlorine) $C_6H_3Cl_2C_6H_2Cl_3$ (approx) 11097-69-1 TQ1360000 2315 171	Aroclor® 1254, PCB, Polychlorinated biphenyl	NIOSH* Ca See Appendix A 0.001 mg/m³ [Note: The NIOSH REL also applies to other PCBs.] OSHA 0.5 mg/m³ [skin]	Ca [5 mg/m³]	Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor.	MW: 326(approx) BP: 689-734°F Sol: Insoluble Fl.P: 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; IV [#5503, PCBs]
Chloroform $CHCl_3$ 67-66-3 FS9100000 1888 151	Methane trichloride, Trichloromethane 1 ppm = 4.88 mg/m³	NIOSH Ca See Appendix A ST 2 ppm (9.78 mg/m³) [60-min] OSHA† C 50 ppm (240 mg/m³)	Ca [500 ppm]	Colorless liquid with a pleasant odor.	MW: 119.4 BP: 143°F Sol(77°F): 0.5% Fl.P: NA IP: 11.42 eV 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 magnesium powder, sodium & potassium; strong oxidizers [Note: When heated to decomposition, forms phosgene gas.]	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
bis-Chloromethyl ether $(CH_2Cl)_2O$ 542-88-1 KN1575000 2249 153	BCME, bis-CME, Chloromethyl ether, Dichlorodimethyl ether, Dichloromethyl ether, Oxybis(chloromethane)	NIOSH Ca See Appendix A OSHA [1910.1008] See Appendix B	Ca [N.D.]	Colorless liquid with a suffocating odor.	MW: 115.0 BP: 223°F Sol: Reacts Fl.P: <66°F IP: ? 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]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FIP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Chloromethyl methyl ether CH_3OCH_2Cl 107-30-2 KN6650000 1239 131	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 FIP(oc): 32°F IP: 10.25 eV Sp.Gr: 1.06 Class IB Flammable Liquid	VP(70°F): 192 mm FRZ: -154°F UEL: ? LEL: ?	Water [Note: Reacts with water to form hydrochloric acid & formaldehyde.]	Imp: Hexane; GC/ECD; II(1) [P&CAM #220]
1-Chloro-1-nitropropane $CH_3CH_2CHClNO_2$ 600-25-9 TX5075000 1 ppm = 5.06 mg/m³	Korax®, Lanstan®	NIOSH 2 ppm (10 mg/m³) OSHA† 20 ppm (100 mg/m³)	100 ppm	Colorless liquid with an unpleasant odor. [fungicide]	MW: 123.6 BP: 289°F Sol: 0.5% FIP(oc): 144°F IP: 9.90 eV Sp.Gr: 1.21 Class IIIA Combustible Liquid	VP(77°F): 6 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, acids	Chrom-108; Ethyl acetate; GC/FID; II(5) [#S211]
Chloropentafluoroethane $CClF_2CF_3$ 76-15-3 KH7877500 1020 126 1 ppm = 6.32 mg/m³	Fluorocarbon-115, Freon® 115, Genetron® 115, Halocarbon 115, Monochloropentafluoroethane	NIOSH 1000 ppm (6120 mg/m³) 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% FIP: NA IP: 12.96 eV RGasD: 5.55 Nonflammable Gas	VP(70°F): 7.9 atm FRZ: -223°F UEL: NA LEL: NA	Alkalis, alkaline earth metals (e.g., aluminum powder, sodium, potassium, zinc)	None available
Chloropicrin CCl_3NO_2 76-06-2 PB6300000 1580 154 1583 154 (mixture) 2929 131 (flammable mixture) 1 ppm = 6.72 mg/m³	Nitrochloroform, Nitrotrichloromethane, Trichloronitromethane	NIOSH/OSHA 0.1 ppm (0.7 mg/m³)	2 ppm	Colorless to faint-yellow, oily liquid with an intensely irritating odor. [pesticide]	MW: 164.4 BP: 234°F Sol: 0.2% FIP: NA IP: ? Sp.Gr: 1.65 Noncombustible Liquid	VP: 18 mm FRZ: -93°F UEL: NA LEL: NA	Strong oxidizers [Note: The material may explode when heated under confinement.]	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 (flamm) Daily Eyewash, Quick drench	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc membr; pulm edema, pulm congestion, pneu; skin burns, nec; cough, wheez, pulm congestion; blood stained-sputum; low-wgt; bronchial secretions; [carc]	Eye: Skin: Breath: Swallow:	Irrimmed 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: SA* 50 ppm: SA: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:	Irrimmed 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: 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; lac; cough, pulm edema; nau, vomit	Eye: Skin: Breath: Swallow:	Irrimmed 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: MW, BP, SOL FIP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
β-Chloroprene $CH_2=CClCH=CH_2$ 126-99-8 EI9625000 1991 131P (inhibited)	2-Chloro-1,3-butadiene; Chlorobutadiene; Chloroprene 1 ppm = 3.62 mg/m³	NIOSH Ca See Appendix A C 1 ppm (3.5 mg/m³) [15-min] OSHA† 25 ppm (90 mg/m³) [skin]	Ca [300 ppm]	Colorless liquid with a pungent, ether-like odor.	MW: 88.5 BP: 139°F Sol: Slight FIP: -4°F IP: 8.79 eV Sp.Gr: 0.96 Class IB Flammable Liquid	VP: 186 mm FRZ: -153°F UEL: 20.0% LEL: 4.0%	Peroxides & other oxidizers [Note: Polymerizes at room temperature unless inhibited with antioxidants.]	Char; CS.; GC/FID; III [#1002]
o-Chlorostyrene $ClC_6H_4CH=CH_2$ 2039-87-4 WL4180000 1 ppm = 5.67 mg/m³	2-Chlorostyrene, ortho-Chlorostyrene, 1-Chloro-2-ethenylbenzene	NIOSH 50 ppm (285 mg/m³) ST 75 ppm (428 mg/m³) OSHA† none	N.D.	Colorless liquid.	MW: 138.6 BP: 372°F Sol: Insoluble FIP: 138°F IP: ? Sp.Gr: 1.10 Class II Combustible Liquid	VP(77°F): 0.06 mm FRZ: -82°F UEL: ? LEL: ?	None reported	None available
o-Chlorotoluene $ClC_6H_4CH_3$ 95-49-8 XS9000000 2238 130 1 ppm = 5.18 mg/m³	1-Chloro-2-methylbenzene, 2-Chloro-1-methylbenzene, 2-Chlorotoluene, o-Tolyl chloride	NIOSH 50 ppm (265 mg/m³) ST 75 ppm (375 mg/m³) OSHA† none	N.D.	Colorless liquid with an aromatic odor.	MW: 126.6 BP: 320°F Sol(77°F): 0.009% FIP: 96°F IP: 8.83 eV Sp.Gr: 1.08 Class IC Flammable Liquid	VP(77°F): 4 mm FRZ: -31°F UEL: ? LEL: ?	Acids, alkalis, oxidizers, reducing materials, water	None available
2-Chloro-6-trichloromethyl pyridine $ClC_5H_3NCCl_3$ 1929-82-4 US7525000	2-Chloro-6-(trichloromethyl)pyridine; Nitrapyrin; N-serve®; 2,2,2,6-Tetrachloro-2-picoline	NIOSH 10 mg/m³ (total) ST 20 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Colorless or white, crystalline solid with a mild, sweet odor.	MW: 230.9 BP: ? Sol: Insoluble FIP: ? IP: ? Sp.Gr: ? Combustible Solid [Explosive]	VP(73°F): 0.003 mm MLT: 145°F UEL: ? LEL: ?	Aluminum, magnesium [Note: Emits oxides of nitrogen and chloride ion when heated to decomposition.]	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp. Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1) (
Chlorpyrifos $C_9H_{11}Cl_3NO_3PS$ 2921-88-2 TF6300000 2783 55	Chlorpyrifos-ethyl; O,O-Diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate; Dursban®	NIOSH 0.2 mg/m^3 ST 0.6 mg/m^3 [skin] OSHA† none	N.D.	Colorless to white, crystalline solid with a mild, mercaptan-like odor. [pesticide] [Note: Commercial formulations may be combined with combustible liquids.]	MW: 350.6 BP: 320°F (Decomposes) Sol: 0.0002% Fl.P: ? IP: ? Sp.Gr: 1.40 (Liquid at 110°F) Combustible Solid	VP: 0.00002 mm MLT: 108°F UEL: ? LEL: ?	Strong acids, caustics, amines [Note: Corrosive to copper & brass.]	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosporus & Pesticides] [
Chromic acid and chromates CrO_3 (acid) 1333-82-0 (CrO_3) GB6650000 (CrO_3) 1755 60 (acid, soln.) 1463 42 (acid, solid)	Chromic acid (CrO_3); Chromic anhydride; Chromic oxide; Chromium(VI) oxide (1:3); Chromium trioxide Synonyms of chromates (i.e., chromium(VI) compounds) such as zinc chromate vary depending upon the specific compound.	NIOSH (as Cr) Ca See Appendix A 0.001 mg/m^3 See Appendix C OSHA (as CrO_3) C 0.1 mg/m^3 See Appendix C	Ca [15 mg/m^3 as Cr(VI)]	CrO_3: Dark-red, odorless flakes or powder. [Note: Often used in an aqueous solution (H_2CrO_4).]	MW: 100.0 BP: 482°F (Decomposes) Sol: 63% Fl.P: NA IP: NA Sp.Gr: 2.70 (CrO_3) CrO_3: Noncombustible Solid, but will accelerate the burning of combustible materials.	VP: Very low MLT: 387°F UEL: NA LEL: NA	Combustible, organic, or other readily oxidizable materials (paper, wood, sulfur, aluminum, plastics, etc.); corrosive to metals	Filter; Reagent; Vis; IV [#7600, Chromium, Hexavalent] [[Also #7604]#
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; FAAS; IV [#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; FAAS; IV [#7024, Chromium]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	TBAL	Inh Abs Ing Con	Wheez, lar spasms, salv; bluish lips, skin; miosis, blurred vision; nau, vomit, abdom cramps, diarr	Eye: Skin: Breath: Swallow:	Irr 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 ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit resp sys, nasal septum perf; liver, kidney damage; leucyt, leupen, monocy, eosin; eye inj, conj, skin ulcer, sens derm; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Blood, resp sys, liver, kidneys, eyes, skin [lung cancer]
Chromic 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/m³: DM* 5 mg/m³: DMXSQ*/SA* 12.5 mg/m³: SA:CF*/PAPRDM* 25 mg/m³: HIEF/PAPRTHIE*/SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes; sens derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin
Chromium(II) 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/m³: DM* 5 mg/m³: DMXSQ*/SA* 12.5 mg/m³: SA:CF*/PAPRDM* 25 mg/m³: HIEF/PAPRTHIE*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Irrit eyes; sens derm	Eye: Skin: Breath: Swallow:	Irr 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 (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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 FI.P: NA IP: NA Sp.Gr: 7.14 Noncombustible Solid in bulk form, but finely divided dust burns rapidly if heated in a flame.	VP: 0 mm (approx) MLT: 3452°F UEL: NA LEL: NA	Strong oxidizers (such as hydrogen peroxide), alkalis	Filter; Acid; FAAS; IV [#7024]
Chromyl chloride $Cr(OCl)_2$ 14977-61-8 GB5775000 1758 137	Chlorochromic anhydride, Chromic oxychloride, Chromium chloride oxide, Chromium dichloride dioxide, Chromium dioxide dichloride, Chromium dioxychloride, Chromium oxychloride, Dichlorodioxochromium	NIOSH Ca See Appendix A See Appendix C 0.001 mg Cr(VI)/m^3 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 FI.P: NA IP: 12.60 eV Sp.Gr(77°F): 1.91 Noncombustible Liquid, but a powerful oxidizer.	VP: 20 mm FRZ: -142°F UEL: NA LEL: NA	Water, combustible substances, halides, phosphorus, turpentine [Note: Reacts violently in water; forms chromic acid, chromic chloride, hydrochloric acid & chlorine. Corrodes common metals.]	None available
Clopidol $C_7H_7Cl_2NO$ 2971-90-6 UU7711500	Coyden®; 3,5-Dichloro-2,6-dimethyl-4-pyridinol	NIOSH 10 mg/m^3 (total) ST 20 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	White to light-brown, crystalline solid.	MW: 192.1 BP: ? Sol: Insoluble FI.P: NA IP: ? Sp.Gr: ? Noncombustible Solid, but dust may explode in cloud form.	VP: ? MLT: >608°F UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Coal dust GF8281000 1361 133	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; IV [#0600, Particulates a NOR (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 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Chromium metal]	NIOSH 2.5 mg/m³: QM* 5 mg/m³: DMXSQ*/SA* 12.5 mg/m³: SA:CF*/PAPRDM* 25 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin; lung fib (histologic)	Eye: Irrimmed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench Chromyl chloride]	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; eye, skin burns	Eye: Irrimmed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys [lung cancer]
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Clepidol]	TBAL	Inh Con	Irrit eyes, skin, nose, throat; cough	Eye: Irrimmed Skin: Soap wash Breath: Fresh air		Eye, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Coal dust]	TBAL	Inh	Chronic bron, decr pulm func, emphy	Breath: Fresh air		Resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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; OSHA [#58]
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 Fl.P: 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; FAAS; IV [#7027]
Cobalt carbonyl (as Co) $C_8Co_2O_8$ 10210-68-1 GG0300000	di-mu-Carbonylhexa-carbonyldicobalt, 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: 341.9 BP: 126°F (Decomposes) Sol: Insoluble Fl.P: NA IP: ? 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: ? Sol: 0.05% Fl.P: NA (Gas) IP: ? 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

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0VH/E/SCBAE	Inh Con	Derm, bron, [sarc]	Eye: Skin: Irrimmed Breath: Soap wash immed Swallow: Resp support Medical attention immed		Resp sys, skin, bladder, kidneys [lung, kidney & skin cancer]
Coal tar pitch volatiles]						
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH 0.25 mg/m³: DM^ 0.5 mg/m³: DMXSQ**/DMFU*/SA* 1.25 mg/m³: SA:CF*/PAPRDM**/PAPRDMFu* 2.5 mg/m³: HIEF/SCBAF/SAF 20 mg/m³: SAF:PD,PP k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Cough, dysp, wheez, decr pulm func; low-wgt; derm; diffuse nodular fib; resp hypersensitivity; asthma	Eye: Skin: Irrimmed Breath: Soap wash Swallow: Resp support Medical attention immed		Skin, resp sys
Cobalt (dust and fume)]						
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, muc memb; cough, decr pulm func, wheez, dysp; in animals: liver, kidney inj; pulm edema	Eye: Skin: Irrimmed Breath: Soap wash Swallow: Resp support Medical attention immed		Eyes, skin, resp sys, blood, CNS
Cobalt carbonyl (as Co)]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	TBAL	Inh Con	In animals: irrit resp sys; dysp, cough, decr pulm func, pulm edema	Eye: Skin: Irrimmed Breath: 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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 carbonization 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; IV [#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; FAAS; IV [#7029]
Copper fume (as Cu) CuO/Cu 1317-38-0 (CuO) GL7900000 (CuO)	CuO: Black copper oxide, Copper monoxide, Copper(II) oxide, Cupric oxide Cu: Copper fume [Note: Also see specific listing for Copper (dusts and mists).]	NIOSH/OSHA 0.1 mg/m^3	100 mg/m^3 (as Cu)	Finely divided black particulate dispersed in air. [Note: Exposure may occur in copper & brass plants and during the welding of copper alloys.]	MW: 79.5 BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 6.4 (CuO) CuO: Noncombustible Solid	VP: 0 mm (approx) MLT: 1879°F (Decomposes) UEL: NA LEL: NA [Note: See Copper (dusts and mists) for properties of Copper metal.]	CuO: Acetylene, zirconium	Filter; Acid; FAAS; IV [#7029]
Cotton dust (raw) GN2275000	Raw cotton dust	NIOSH <0.200 mg/m^3 See Appendix C OSHA [Z-1-A & 1910.1043] See Appendix C	100 mg/m^3	Colorless, odorless solid.	MW: ? BP: Decomposes Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: ? Combustible Solid	VP: 0 mm (approx) MLT: Decomposes UEL: NA LEL: NA	Strong oxidizers	Vertical elut; none; Grav; OSHA [1910.1043]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact Daily N.R. Daily	NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVH/E/SCBAE	Inh Con	Irrit eyes, resp sys; cough, dysp, wheez; [carc]	Eye: Breath:	Irr immed Resp support	Skin, resp sys, urinary sys [skin, lung, kidney & bladder cancer]
[Coke oven emissions]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily	NIOSH/OSHA 5 mg/m³: DM* 10 mg/m³: DM:SQ**/SA* 25 mg/m³: SA:CF*/PAPRDM* 50 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, nose, pharynx; nasal perf; metallic taste; derm; in animals: lung, liver, kidney damage; anemia	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys (incr risk with Wilson's disease)
[Copper (dusts and mists)]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 1 mg/m³: DMFu/SA 2.5 mg/m³: SA:CF/PAPRDMFu 5 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, upper resp sys; metal fume fever: chills, musc ache, nau, fever, dry throat, cough, weak, lass; metallic or sweet taste; discoloration skin, hair	Breath:	Resp support	Eyes, skin, resp sys (incr risk with Wilson's disease)
[Copper fume (as Cu)]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH 1 mg/m³ D 2 mg/m³: DXSQ/HiE/SA 5 mg/m³: SA:CF/PAPRD 10 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 100 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Dyspinosis: chest tight, cough, wheez; dysp, decr FEV; bron; mal; fever, chills, upper resp symptoms after initial exposure	Breath:	Fresh air	CVS, resp sys
[Cotton dust (raw)]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Crag® herbicide $C_8H_3Cl_2OCH_2CH_2OSO_3Na$ 136-78-7 KK4900000	Crag® herbicide No. 1; 2-(2,4-Dichlorophenoxy)-ethyl sodium sulfate; Sesone	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	500 mg/m³	Colorless to white crystalline, odorless solid. [herbicide]	MW: 309.1 BP: Decomposes Sol(77°F): 26% Fl.P: NA IP: ? Sp.Gr: 1.70 Noncombustible Solid	VP: 0.1 mm MLT: 473°F (Decomposes) UEL: NA LEL: NA	Strong oxidizers, acids	Filter; Water; Vis; II(5) [#S356]
o-Cresol $CH_3C_6H_4OH$ 95-48-7 GO6300000 2076 153	ortho-Cresol, 2-Cresol, o-Cresylic acid, 1-Hydroxy-2-methylbenzene, 2-Hydroxytoluene, 2-Methyl phenol 1 ppm = 4.43 mg/m³	NIOSH 2.3 ppm (10 mg/m³) OSHA 5 ppm (22 mg/m³) [skin]	250 ppm	White crystals with a sweet, tarry odor. [Note: A liquid above 88°F.]	MW: 108.2 BP: 376°F Sol: 2% Fl.P: 178°F IP: 8.93 eV Sp.Gr: 1.05 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.29 mm MLT: 88°F UEL: ? LEL(300°F): 1.4%	Strong oxidizers, acids	XAD-7; Methanol; GC/FID; IV [#2546, Cresols and Phenol]
m-Cresol $CH_3C_6H_4OH$ 108-39-4 GO6125000 2076 153	meta-Cresol, 3-Cresol, m-Cresylic acid, 1-Hydroxy-3-methylbenzene, 3-Hydroxytoluene, 3-Methyl phenol 1 ppm = 4.43 mg/m³	NIOSH 2.3 ppm (10 mg/m³) OSHA 5 ppm (22 mg/m³) [skin]	250 ppm	Colorless to yellowish liquid with a sweet, tarry odor. [Note: A solid below 54°F.]	MW: 108.2 BP: 397°F Sol: 2% Fl.P: 187°F IP: 8.98 eV Sp.Gr: 1.03 Class IIIA Combustible Liquid	VP(77°F): 0.14 mm FRZ: 54°F UEL: ? LEL(302°F): 1.1%	Strong oxidizers, acids	XAD-7; Methanol; GC/FID; IV [#2546, Cresols and Phenol]
p-Cresol $CH_3C_6H_4OH$ 106-44-5 GO6475000 2076 153	para-Cresol, 4-Cresol, p-Cresylic acid, 1-Hydroxy-4-methylbenzene, 4-Hydroxytoluene, 4-Methyl phenol 1 ppm = 4.43 mg/m³	NIOSH 2.3 ppm (10 mg/m³) OSHA 5 ppm (22 mg/m³) [skin]	250 ppm	Crystalline solid with a sweet, tarry odor. [Note: A liquid above 95°F.]	MW: 108.2 BP: 396°F Sol: 2% Fl.P: 187°F IP: 8.97 eV Sp.Gr: 1.04 Combustible Solid Class IIIA Combustible Liquid	VP(77°F): 0.11 mm MLT: 95°F UEL: ? LEL(302°F): 1.1%	Strong oxidizers, acids	XAD-7; Methanol; GC/FID; IV [#2546, Cresols and Phenol]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Health hazards: Symptoms (See Table 5)	Health hazards: First aid (See Table 6)	Health hazards: Target organs (See Table 5)
kin: Prevent skin contact yes: Prevent eye contact Wash skin: When contam emove: When wet or contam hange: Daily Drag® herbicide]	NIOSH 50 mg/m³: DM 100 mg/m³: DMXSQ/SA 250 mg/m³: SA:CF/PAPRDM 500 mg/m³: HiEF/PAPRTHiE*/SAT:CF*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	nh ing Con	irrit eyes, skin; liver, kidney damage n animals: CNS effects, convuls	Eye: Irr immed Skin: Water wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS, liver, kidneys
kin: **Prevent skin contact** yes: **Prevent eye contact** Wash skin: **When contam** emove: **When wet or contam** hange: **Daily** rovide: **Eyewash, Quick drench** o-Cresol]	NIOSH 23 ppm: CCROVDM/SA 51.5 ppm: SA:CF/PAPROVDM 115 ppm: CCRFOVHiE/GMFOVHiE/ PAPRTHiE*/SAT:CF*/ SCBAF/SAF 250 ppm: SAF:FD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	nh Abs ing Con	irrit eyes, skin, muc membr; CNS effects: conf, depres, resp fail; dysp, irreg rapid resp, weak pulse; eye, skin burns; derm; lung, liver, kidney, pancreas damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, CVS
kin: Prevent skin contact yes: Prevent eye contact Wash skin: When contam emove: When wet or contam hange: Daily rovide: Eyewash, Quick drench m-Cresol]	NIOSH 23 ppm: CCROVDM/SA 51.5 ppm: SA:CF/PAPROVDM 115 ppm: CCRFOVHiE/GMFOVHiE/ PAPRTHiE*/SAT:CF*/ SCBAF/SAF 250 ppm: SAF:FD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	nh Abs ing Con	irrit eyes, skin, muc membr; CNS effects: conf, depres, resp fail; dysp, irreg rapid resp, weak pulse; eye, skin burns; derm; lung, liver, kidney, pancreas damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, CVS
kin: **Prevent skin contact** yes: **Prevent eye contact** Wash skin: **When contam** emove: **When wet or contam** hange: **Daily** rovide: **Eyewash, Quick drench** p-Cresol]	NIOSH 23 ppm: CCROVDM/SA 51.5 ppm: SA:CF/PAPROVDM 115 ppm: CCRFOVHiE/GMFOVHiE/ PAPRTHiE*/SAT:CF*/ SCBAF/SAF 250 ppm: SAF:FD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	nh Abs ing Con	irrit eyes, skin, muc membr; CNS effects: conf, depres, resp fail; dysp, irreg rapid resp, weak pulse; eye, skin burns; derm; lung, liver, kidney, pancreas damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, pancreas, 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: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Crotonaldehyde $CH_3CH{=}CHCHO$ 4170-30-3 GP9499000 1143 131P (inhibited)	2-Butenal, ß-Methyl acrolein, Propylene aldehyde 1 ppm = 2.87 mg/m³	NIOSH 2 ppm (6 mg/m³) See Appendix C (Aldehydes) OSHA 2 ppm (6 mg/m³)	50 ppm	Water-white liquid with a suffocating odor. [Note: Turns pale-yellow on contact with air.]	MW: 70.1 BP: 219°F Sol: 18% FI.P: 45°F IP: 9.73 eV Sp.Gr: 0.87 Class IB Flammable Liquid	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; IV [#3516]
Crufomate $C_{12}H_{19}ClNO_3P$ 299-86-5 TB3850000	4-t-Butyl-2-chlorophenyl methyl methylphosphoramidate, Dowco® 132, Ruelene®	NIOSH 5 mg/m³ ST 20 mg/m³ OSHA† none	N.D.	White, crystalline solid in pure form. [pesticide] [Note: Commercial product is a yellow oil.]	MW: 291.7 BP: Decomposes Sol: Insoluble FI.P: ? IP: ? Sp.Gr: 1.16 Combustible Solid	VP(243°F): 0.01 mm MLT: 140°F UEL: ? LEL: ?	Strongly alkaline & strongly acidic media [Note: Unstable over long periods in aqueous preparations or above 140°F.]	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Cumene $C_6H_5CH(CH_3)_2$ 98-82-8 GR8575000 1918 131	Cumol, Isopropyl benzene, 2-Phenyl propane 1 ppm = 4.92 mg/m³	NIOSH/OSHA 50 ppm (245 mg/m³) [skin]	900 ppm [10%LEL]	Colorless liquid with a sharp, penetrating, aromatic odor.	MW: 120.2 BP: 306°F Sol: Insoluble FI.P: 96°F IP: 8.75 eV Sp.Gr: 0.86 Class IC Flammable Liquid	VP: 8 mm FRZ: -141°F UEL: 6.5% LEL: 0.9%	Oxidizers, nitric acid, sulfuric acid [Note: Forms cumene hydroperoxide upon long exposure to air.]	Char; CS_2; GC/FID; IV [#1501, Aromatic Hydrocarbons]
Cyanamide NH_2CN 420-04-2 GS5950000	Amidocyanogen, Carbimide, Carbodiimide, Cyanogen nitride, Hydrogen cyanamide [Note: Cyanamide is also a synonym for Calcium cyanamide.]	NIOSH 2 mg/m³ OSHA† none	N.D.	Crystalline solid.	MW: 42.1 BP: 500°F (Decomposes) Sol(59°F): 78% FI.P: 286°F IP: 10.65 eV Sp.Gr: 1.28 Combustible Solid	VP: ? MLT: 113°F UEL: ? LEL: ?	Above 104°F: Moisture, acids, or alkalis; 1,2-phenylene diamine 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 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 [Crotonaldehyde]	NIOSH/OSHA 20 ppm: CCROV*/SA* 50 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; n animals: dysp, pulm edema, irrit skin	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Crufomate]	TLV	Inh Abs Ing Con	Irrit eyes, skin, resp sys; wheez, dysp; blurred vision, lac; sweat; abdom cramps, diarr, nau, anor	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, blood chol
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Cumene]	NIOSH/OSHA 500 ppm: CCROV*/SA* 900 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, muc memb; derm; head, narco, coma	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Cyanamide]	TLV	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; miosis, salv, lac, twitch; Antabuse-like effects	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Cyanogen NCCN 460-19-5 GT1925000 1026 119	Carbon nitride, Dicyan, Dicyanogen, Ethanedinitrile, Oxalonitrile 1 ppm = 2.13 mg/m³	NIOSH 10 ppm (20 mg/m³) OSHA† none	N.D.	Colorless gas with a pungent, almond-like odor. [Note: Shipped as a liquefied compressed gas. Forms cyanide in the body.]	MW: 52.0 BP: -6°F Sol: 1% FLP: NA (Gas) IP: 13.57 eV RGasD: 1.82 Sp.Gr: 0.95 (Liquid at -6°F) Flammable Gas	VP(70°F): 5.1 atm FRZ: -18°F UEL: 32% LEL: 6.6%	Acids, water, strong oxidizers (e.g., dichlorine oxide, fluorine) [Note: Slowly hydrolyzed in water to form hydrogen cyanide, oxalic acid, or ammonia.]	None available
Cyanogen chloride CICN 506-77-4 GT2275000 1589 125 (inhibited)	Chlorcyan, Chlorine cyanide, Chlorocyanide, Chlorocyanogen 1 ppm = 2.52 mg/m³	NIOSH C 0.3 ppm (0.6 mg/m³) OSHA† none	N.D.	Colorless gas or liquid (below 55°F) with an irritating odor. [Note: Shipped as a liquefied gas. A solid below 20°F. Forms cyanide in the body.]	MW: 61.5 BP: 55°F Sol: 7% FLP: NA IP: 12.49 eV RGasD: 2.16 Sp.Gr: 1.22 (Liquid at 32°F) Nonflammable Gas	VP: 1010 mm FRZ: 20°F UEL: NA LEL: NA	Water, acids, alkalis, ammonia, alcohols [Note: Can react very slowly with water to form hydrogen cyanide. May be stabilized to prevent polymerization.]	None available
Cyclohexane C_6H_{12} 110-82-7 GU6300000 1145 128	Benzene hexahydride, Hexahydrobenzene, Hexamethylene, Hexanaphthene 1 ppm = 3.44 mg/m³	NIOSH/OSHA 300 ppm (1050 mg/m³)	1300 ppm [10%LEL]	Colorless liquid with a sweet, chloroform-like odor. [Note: A solid below 44°F.]	MW: 84.2 BP: 177°F Sol: Insoluble FLP: 0°F IP: 9.88 eV Sp.Gr: 0.78 Class IB Flammable Liquid	VP: 78 mm FRZ: 44°F UEL: 8% LEL: 1.3%	Oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydrocarbons]
Cyclohexanethiol $C_6H_{11}SH$ 1569-69-3 GV7525000 3054 131	Cyclohexylmercaptan, Cyclohexylthiol 1 ppm = 4.75 mg/m³	NIOSH C 0.5 ppm (2.4 mg/m³) [15-min] OSHA none	N.D.	Colorless liquid with a strong, offensive odor.	MW: 116.2 BP: 316°F Sol: Insoluble FLP: 110°F IP: ? Sp.Gr: 0.98 Class II Combustible Liquid	VP: 10 mm FRZ: -181°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids, alkali metals	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: Frostbite Eyes: Prevent eye contact/ Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite [Cyanogen]	TBAL	Inh Con	Irrit eyes, nose, upper resp sys; lac; cherry red lips, tachypnea, hypernea, bradycardia; head, vert, convuls; dizz, loss of appetite, low-wgt; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support	Eyes, resp sys, CNS, CVS
Skin: Prevent skin contact (liq) **Eyes: Prevent eye contact (liq)** **Wash skin: When contam (liq)** **Remove: When wet or contam (liq)** **Change: N.R.** **Provide: Eyewash (liq), Quick drench (liq)** **[Cyanogen chloride]**	**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: Irr immed** **Skin: Water wash immed (liq)** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys, CNS, CVS**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Cyclohexane]	NIOSH/OSHA 1300 ppm: SA:CF[f]/PAPR:OV[e]/CCR:FOV/ 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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.** **Provide: Eyewash, Quick drench** **[Cyclohexanethiol]**	**NIOSH** **5 ppm: CCROV/SA** **12.5 ppm: SA:CF/PAPR:OV** **25 ppm: CCR:FOV/GMFOV/PAPR:TOV/ 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: Irr immed** **Skin: Soap flush immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Cyclohexanol $C_6H_{11}OH$ 108-93-0 GV7875000 1993 128 (combustible liquid, n.o.s.)	Anol, Cyclohexyl alcohol, Hexahydrophenol, Hexalin, Hydralin, Hydroxycyclohexane 1 ppm = 4.10 mg/m³	NIOSH 50 ppm (200 mg/m³) [skin] OSHA† 50 ppm (200 mg/m³)	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 Sp.Gr: 0.96 Class IIA Combustible Liquid	VP: 1 mm MLT: 77°F UEL: ? LEL: ?	Strong oxidizers (such as hydrogen peroxide & nitric acid)	Char; 2-Propanol/ CS_2; GC/FID; IV [#1402, Alcohols III]
Cyclohexanone $C_6H_{10}O$ 108-94-1 GW1050000 1915 127	Anone, Cyclohexyl ketone, Pimelic ketone 1 ppm = 4.02 mg/m³	NIOSH 25 ppm (100 mg/m³) [skin] OSHA† 50 ppm (200 mg/m³)	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 Sp.Gr: 0.95 Class IIA Combustible Liquid	VP: 5 mm FRZ: -49°F UEL: 9.4% LEL(212°F): 1.1%	Oxidizers, nitric acid	Char; CS_2; GC/FID; IV [#1300, Ketones I]
Cyclohexene C_6H_{10} 110-83-8 GW2500000 2256 130	Benzene tetrahydride, Tetrahydrobenzene 1 ppm = 3.36 mg/m³	NIOSH/OSHA 300 ppm (1015 mg/m³)	2000 ppm	Colorless liquid with a sweet odor.	MW: 82.2 BP: 181°F Sol: Insoluble FLP: 11°F IP: 8.95 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 67 mm FRZ: -154°F UEL: ? LEL: ?	Strong oxidizers [Note: Forms explosive peroxides with oxygen upon storage.]	Char; CS_2; GC/FID; IV [#1500, Hydrocarbons]
Cyclohexylamine $C_6H_{11}NH_2$ 108-91-8 GX0700000 2357 132	Aminocyclohexane, Aminohexahydrobenzene, Hexahydroaniline, Hexahydrobenzenamine 1 ppm = 4.06 mg/m³	NIOSH 10 ppm (40 mg/m³) 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 Sp.Gr: 0.87 Class IC Flammable Liquid	VP: 11 mm FRZ: 0°F UEL: 9.4% LEL: 1.5%	Oxidizers, organic compounds, acid anhydrides, acid chlorides, acids, lead [Note: Corrosive to copper, aluminum, zinc & galvanized steel.]	Si gel; H_2SO_4; GC/FID; II [#221]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Health hazards: Symptoms (See Table 5)	Health hazards: First aid (See Table 6)	Health hazards: Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Cyclohexanol]	NIOSH/OSHA 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: Irr immed Skin: Water wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Cyclohexanone]	NIOSH 525 ppm: SA:CF[5]/PAPROV[5] 700 ppm: CCRFOV/GMFOV/PAPRTOV[5]/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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Cyclohexene]	NIOSH/OSHA 2000 ppm: SA:CF[5]/PAPROV[5]/CCRFOV/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; drow	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench [Cyclohexylamine]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb, resp sys; eye, skin burns; skin sens; cough, pulm edema; drow, h-head, dizz; diarr, nau, vomit	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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: ? Sol: Insoluble FI.P: Explodes IP: ? Sp.Gr: 1.82 Combustible Solid [EXPLOSIVE!]	VP(230°F): 0.0004 mm MLT: 401°F UEL: ? LEL: ?	Strong oxidizers, combustible materials, heat [Note: Detonates on contact with mercury fulminate.]	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Cyclopentadiene C_5H_6 542-92-7 GY1000000 1 ppm = 2.70 mg/m^3	1,3-Cyclopentadiene	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 FI.P(oc): 77°F IP: 8.56 eV Sp.Gr: 0.80 Class IC Flammable Liquid	VP: 400 mm FRZ: -121°F UEL: ? LEL: ?	Strong oxidizers, fuming nitric acid, sulfuric acid [Note: Polymerizes to dicyclopentadiene upon standing.]	Chrom-104*; Ethyl acetate; GC/FID; IV [#2523]
Cyclopentane C_5H_{10} 287-92-3 GY2390000 1146 128 1 ppm = 2.87 mg/m^3	Pentamethylene	NIOSH 600 ppm (1720 mg/m^3) OSHA† none	N.D.	Colorless liquid with a mild, sweet odor.	MW: 70.2 BP: 121°F Sol: Insoluble FI.P: -35°F IP: 10.52 eV Sp.Gr: 0.75 Class IB Flammable Liquid	VP(88°F): 400 mm FRZ: -137°F UEL: 8.7% LEL: 1.1%	Strong oxidizers (e.g., chlorine, bromine, fluorine)	None available
Cyhexatin $(C_6H_{11})_3SnOH$ 13121-70-5 WH8750000	TCHH, Tricyclohexylhydroxystannane, Tricyclohexylhydroxytin, Tricyclohexylstannium hydroxide, Tricyclohexyltin hydroxide	NIOSH 5 mg/m^3 OSHA† 0.32 mg/m^3 [0.1 mg/m^3 (as Sn)]	80 mg/m^3 [25 mg/m^3 (as Sn)]	Colorless to white, nearly odorless, crystalline powder. [insecticide]	MW: 385.2 BP: 442°F (Decomposes) Sol: Insoluble FI.P: NA IP: NA Sp.Gr: ?	VP: 0 mm (approx) MLT: 383°F UEL: NA LEL: NA	Strong oxidizers, ultraviolet light	Filter/XAD-2; CH_3COOH/CH_3CN; HPLC/GFAAS; IV [#5504, 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)
Skin: Eyes: Wash skin: Remove: Change: Provide: [Cyclonite]	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin; head, irrity, ftg, weak, tremor, nau, dizz, vomit, insom, convuls	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, CNS
Skin: Eyes: Wash skin: Remove: Change: [Cyclopentadiene]	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 750 ppm: CCROV/GMFOV/PAPROV/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys
Skin: Eyes: Wash skin: Remove: Change: [Cyclopentane]	Prevent skin contact Prevent eye contact Daily When wet (flamm) N.R.	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; li-head, dizz, euph, inco, nau, vomit, stupor; dry, cracking skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Eyes: Wash skin: Remove: Change: [Cyhexatin]	Prevent skin contact N.R. When contam When wet or contam Daily	OSHA 3.2 mg/m³: CCROVDM/SA 8 mg/m³: SA:CF/PAPROVDM 16 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF 80 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, verti; sore throat, cough; abdom pain, vomit; skin burns, pruritus; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2,4-D $Cl_2C_6H_3OCH_2COOH$ 94-75-7 AG6825000 2765 152	Dichlorophenoxyacetic acid; 2,4-Dichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m^3	100 mg/m^3	White to yellow, crystalline, odorless powder. [herbicide]	MW: 221.0 BP: Decomposes Sol: 0.05% Fl.P: NA IP: ? 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; IV [#5001]
DDT $(C_6H_4Cl)_2CHCCl_3$ 50-29-3 KJ3325000 2761 151	p,p'-DDT; Dichlorodiphenyltrichloroethane; 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	NIOSH Ca See Appendix A 0.5 mg/m^3 OSHA 1 mg/m^3 [skin]	Ca [500 mg/m^3]	Colorless crystals or off-white powder with a slight, aromatic odor. [pesticide]	MW: 354.5 BP: 230°F (Decomposes) Sol: Insoluble Fl.P: 162-171°F IP: ? Sp.Gr: 0.99 Combustible Solid	VP: 0.0000002 mm MLT: 227°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; Isooctane; GC/ECD; II(3) [#S274]
Decaborane $B_{10}H_{14}$ 17702-41-9 HD1400000 1868 134	Decaboron tetradecahydride 1 ppm = 5.00 mg/m^3	NIOSH 0.3 mg/m^3 (0.05 ppm) ST 0.9 mg/m^3 (0.15 ppm) [skin] OSHA† 0.3 mg/m^3 (0.05 ppm) [skin]	15 mg/m^3	Colorless to white crystalline solid with an intense, bitter, chocolate-like odor.	MW: 122.2 BP: 415°F Sol: Slight Fl.P: 176°F IP: 9.88 eV Sp.Gr: 0.94 Combustible Solid	VP: 0.2 mm MLT: 211°F UEL: ? LEL: ?	Oxidizers, water, halogenated compounds (especially carbon tetrachloride) [Note: May ignite SPONTANEOUSLY on exposure to air. Decomposes slowly in hot water.]	None available
1-Decanethiol $CH_3(CH_2)_9SH$ 143-10-2	Decylmercaptan, n-Decylmercaptan, 1-Mercaptodecane 1 ppm = 7.13 mg/m^3	NIOSH C 0.5 ppm (3.6 mg/m^3) [15-min] OSHA none	N.D.	Colorless liquid with a strong odor.	MW: 174.4 BP: 465°F Sol: Insoluble Fl.P: 209°F IP: ? Sp.Gr: 0.84 Class IIIB Combustible Liquid	VP: ? FRZ: -15°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, nitric acid	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		NIOSH/OSHA 100 mg/m³: CCR/OV/CMF:u/GMF/OV/HIE/PAPR/OV/DMF:u/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/HIE/SCBAE	Inh Abs Ing Con	Weak, stupor, hyporeflexia, muscle twitch; convuls; derm; in animals: liver, kidney inj	Eye: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, CNS, liver, kidneys
[2,4-D]							
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam/Daily** **Remove: When wet or contam** **Change: Daily** **Provide: Eyewash, Quick drench**		NIOSH **ii: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMF/OV/HIE/SCBAE**	Inh **Abs** **Ing** Con	Irrit eyes, skin; pares **tongue, lips, face; tremor; appre dizz, conf, mal, head, fig; convuls; paresis hands; vomit; [carc]**	Eye: Irrimmed **Skin: Soap wash prompt** **Breath: Resp support** **Swallow: Medical attention immed**		Eyes, skin, CNS, **kidneys, liver, PNS [in animals: liver, lung & lymphatic tumors]**
[DDT]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench		NIOSH/OSHA 3 mg/m³: SA 7.5 mg/m³: SA:CF 15 mg/m³: SAT:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/HIE/SCBAE	Inh Abs Ing Con	Dizz, head, nau, li-head, drow, inco, local musc spasm, tremor, convuls, ftg; in animals: dysp, weak; liver, kidney damage	Eye: Irrimmed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CNS, liver, kidneys
[Decaborane]							
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.**		NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, resp sys; conf, dizz, head, drow, nau, vomit, weak, convuls**	**Eye: Irr immed** **Skin: Soap wash** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**
[1-Decanethiol]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Demeton $(C_2H_5O)_2PSOC_2H_4SC_2H_5$ 8065-48-3 TF3150000	O-O-Diethyl-O(and S)-2-(ethylthio)ethyl phosphorothioate mixture; Systox®	NIOSH/OSHA 0.1 mg/m^3 [skin]	10 mg/m^3	Amber, oily liquid with a sulfur-like odor. [insecticide]	MW: 258.3 BP: Decomposes Sol: 0.01% FLP: 113°F IP: ? Sp.Gr: 1.12 Class II Combustible Liquid	VP: 0.0003 mm FRZ: <-13°F UEL: ? LEL: ?	Strong oxidizers, alkalis, water	Filter/ XAD-2; Toluene; GC/FPD; IV [#5514]
Diacetone alcohol $CH_3COCH_2C(CH_3)_2OH$ 123-42-2 SA9100000 1148 129	Diacetone, 4-Hydroxy-4-methyl-2-pentanone, 2-Methyl-2-pentanol-4-one 1 ppm = 4.75 mg/m^3	NIOSH/OSHA 50 ppm (240 mg/m^3)	1800 ppm [10%LEL]	Colorless liquid with a faint, minty odor.	MW: 116.2 BP: 334°F Sol: Miscible FLP: 125°F IP: ? Sp.Gr: 0.94 Class II Combustible Liquid	VP: 1 mm FRZ: -47°F UEL: 6.9% LEL: 1.8%	Strong oxidizers, strong alkalis	Char; 2-Propanol/ CS$_2$; GC/FID; IV [#1402, Alcohols III]
2,4-Diaminoanisole (and its salts) $(NH_2)_2C_6H_3OCH_3$ 615-05-4 BZ8580500	1,3-Diamino-4-methoxybenzene; 4-Methoxy-1,3-benzenediamine; 4-Methoxy-m-phenylenediamine Synonyms of salts vary depending upon the specific compound.	NIOSH Ca Minimize occupational exposure (especially skin exposures) See Appendix A OSHA none	Ca [N.D.]	Colorless solid (needles). [Note: The primary use (including its salts such as 2,4-diaminoanisole sulfate) is a component of hair & fur dye formulations.]	MW: 138.2 BP: ? Sol: ? FLP: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 153°F UEL: ? LEL: ?	Strong oxidizers	None available
o-Dianisidine $(NH_2C_6H_3OCH_3)_2$ 119-90-4 DD0875000	Dianisidine; 3,3'-Dianisidine; 3,3'-Dimethoxybenzidine	NIOSH Ca See Appendix A See Appendix C OSHA See Appendix C	Ca [N.D.]	Colorless crystals that turn a violet color on standing. [Note: Used as a basis for many dyes.]	MW: 244.3 BP: ? Sol: Insoluble FLP: 403°F IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 279°F UEL: ? LEL: ?	Oxidizers	Filter; Water; HPLC/UVD; IV [#5013, Dyes]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide: [Demeton]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH/OSHA 1 mg/m³: SA 2.5 mg/m³: SA:CF 5 mg/m³: SAT:CF/SCBAF/SAF 10 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0VHIE/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
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **[Diacetone alcohol]**	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet or contam** **N.R.**	NIOSH/OSHA 1250 ppm: SA:CF[f]/PAPROV[f] 1800 ppm: CCRFOV/GMFOV/PAPRTOV[f]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SC8AE	**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**
Skin: Eyes: Wash skin: Remove: Change: Provide: [2,4-Diaminoanisole (and its salts)]	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: GMF0VHIE/SCBAE	Inh Abs Ing Con	In animals: irrit skin; thyroid, liver changes; terato effects; [carc]	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 sys tumors]
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** **[o-Dianisidine]**	**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: GMF0VHIE/SCBAE	**Inh** **Abs** **Ing** **Con**	**Irrit skin; in animals: kidney, liver damage; thyroid, spleen changes; [carc]**	**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]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Diazinon® $C_{12}H_{21}N_2O_3PS$ 333-41-5 TF3325000 2783 152	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% FLP: 180°F IP: ? Sp.Gr: 1.12 Class IIIA Combustible Liquid	VP: 0.0001 mm FRZ: ? UEL: ? LEL: ?	Strong acids & alkalis, copper-containing compounds [Note: Hydrolyzes slowly in water & dilute acid.]	OVS-2; Toluene/Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
Diazomethane CH_2N_2 334-88-3 PA7000000 1 ppm = 1.72 mg/m³	Azimethylene, Azomethylene, Diazirine	NIOSH/OSHA 0.2 ppm (0.4 mg/m³)	2 ppm	Yellow gas with a musty odor. [Note: Shipped as a liquefied compressed gas.]	MW: 42.1 BP: -9°F Sol: Reacts FLP: NA (Gas) IP: 9.00 eV RGasD: 1.45 Flammable Gas [EXPLOSIVE!]	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_2; GC/FID; IV [#2515]
Diborane B_2H_6 19287-45-7 HQ9275000 1911 119 1 ppm = 1.13 mg/m³	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 FLP: NA (Gas) IP: 11.38 eV RGasD: 0.97 Flammable Gas	VP(62°F): 39.5 atm FRZ: -265°F UEL: 88% LEL: 0.8%	Water, halogenated compounds, aluminum, lithium, oxidized surfaces, acids [Note: Will ignite spontaneously in moist air at room temperature. Reacts with water to form hydrogen & boric acid.]	Filter/Char*; H_2O_2; PES; IV [#6006]
1,2-Dibromo-3-chloro-propane $CH_2BrCHBrCH_2Cl$ 96-12-8 TX8750000 2872 159	1-Chloro-2,3-dibromo-propane; DBCP; Dibromochloropropane 1 ppm = 9.67 mg/m³	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% FLP(oc): 170°F IP: ? Sp.Gr: 2.05 Class IIIA Combustible Liquid	VP: 0.8 mm FRZ: 43°F UEL: ? LEL: ?	Chemically-active metals such as aluminum, magnesium & tin alloys [Note: Corrosive to metals.]	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 Daily Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes; miosis, blurred vision; dizz, conf, weak, convuls; dysg; salv, abdom cramps, nau, vomit	Eye: Skin: Breath: Swallow:	Ir immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, CNS, CVS, blood chol
[Diazinon®]							
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:**	**Frostbite** **Frostbite** **N.R.** **When wet (flamm)** **N.R.** **Frostbite**	NIOSH/OSHA 2 ppm: SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	**Inh** **Con** **(liq)**	**Irrit eyes; cough, short breath; head, ftg; flush skin, fever; chest pain, pulm edema, pneuitis; asthma; liq: frostbite**	**Eye:** **Skin:** **Breath:**	**Frostbite** **Frostbite** **Resp support**	**Eyes, resp sys**
[Diazomethane]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	NIOSH/OSHA 1 ppm: SA 2.5 ppm: SA:CF 5 ppm: SAT:CF/SCBAF/SAF 15 ppm: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF'S/SCBAE	Inh	Chest tight, precordial pain, short breath, non-productive cough, nau; head, li-head, vert, chills, fever, ftg, weak, tremor; muscfasc; in animals: liver, kidney damage; pulm edema; hemorr	Breath:	Resp support	Resp sys, CNS, liver, kidneys
[Diborane]							
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: GMF0V/HiE/SCBAE	Inh Abs Ing **Con**	Irrit eyes, skin, nose, throat; drow; nau, vomit; pulm edema; liver, kidney **inj; sterility; [carc]**	Eye: Skin: Breath: **Swallow:**	Ir immed Soap wash immed Resp support **Medical attention immed**	Eyes, skin, resp sys, CNS, liver, kidneys, spleen, repro sys, **digestive sys** **[in animals: cancer of the nasal cavity, tongue, pharynx, lungs, stomach, adrenal & mammary glands]**
[1,2-Dibromo-3-chloropropane]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2-N-Dibutylaminoethanol $(C_4H_9)_2NCH_2CH_2OH$ 102-81-8 KK3850000 2873 153	Dibutylaminoethanol; 2-Dibutylaminoethanol; 2-Di-N-butylaminoethanol; 2-Di-N-butylaminoethyl alcohol; N,N-Dibutylethanolamine 1 ppm = 7.09 mg/m³	NIOSH 2 ppm (14 mg/m³) [skin] OSHA† none	N.D.	Colorless liquid with a faint, amine-like odor.	MW: 173.3 BP: 446°F Sol: 0.4% FI.P: 195°F IP: ? Sp.Gr: 0.86 Class IIIA Combustible Liquid	VP: 0.1 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	Si gel; Methanol/ Water; GC/FID; IV [#2007, Amino-ethanol Compounds
Dibutyl phosphate $(C_4H_9O)_2(OH)PO$ 107-66-4 TB9605000	Dibutyl acid o-phosphate; di-n-Butyl hydrogen phosphate; Dibutyl phosphoric acid 1 ppm = 8.60 mg/m³	NIOSH 1 ppm (5 mg/m³) ST 2 ppm (10 mg/m³) OSHA† 1 ppm (5 mg/m³)	30 ppm	Pale amber, odorless liquid.	MW: 210.2 BP: 212°F (Decomposes) Sol: Insoluble FI.P: ? IP: ? Sp.Gr: 1.06 Combustible Liquid	VP: 1 mm (approx) FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH_3CN; GC/FPD; IV [#5017]
Dibutylphthalate $C_6H_4(COOC_4H_9)_2$ 84-74-2 TI0875000	DBP; Dibutyl 1,2-benzene-dicarboxylate; Di-n-butyl phthalate	NIOSH/OSHA 5 mg/m³	4000 mg/m³	Colorless to faint yellow, oily liquid with a slight, aromatic odor.	MW: 278.3 BP: 644°F Sol(77°F): 0.001% FI.P: 315°F IP: ? Sp.Gr: 1.05 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_2; GC/FID; IV [#5020]
Dichloroacetylene ClC≡CCl 7572-29-4 AP1080000	DCA; Dichloroethyne [Note: DCA is a possible decomposition product of trichloroethylene or trichloroethane.] 1 ppm = 3.88 mg/m³	NIOSH Ca See Appendix A C 0.1 ppm (0.4 mg/m³) OSHA† none	Ca [N.D.]	Volatile oil with a disagreeable, sweetish odor. [Note: A gas above 90°F. DCA is not produced commercially.]	MW: 94.9 BP: 90°F (Explodes) Sol: ? FI.P: ? IP: ? Sp.Gr: 1.26 Combustible Liquid	VP: ? FRZ: -58 to -87°F UEL: ? LEL: ?	Oxidizers, heat, shock	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
o-Dichlorobenzene $C_6H_4Cl_2$ 95-50-1 CZ4500000 1591 152	o-DCB; 1,2-Dichlorobenzene; ortho-Dichlorobenzene; o-Dichlorobenzol 1 ppm = 6.01 mg/m^3	NIOSH/OSHA C 50 ppm (300 mg/m^3)	200 ppm	Colorless to pale-yellow liquid with a pleasant, aromatic odor. [herbicide]	MW: 147.0 BP: 357°F Sol: 0.01% Fl.P: 151°F IP: 9.06 eV Sp.Gr: 1.30 Class IIIA Combustible Liquid	VP: 1 mm FRZ: 1°F UEL: 9.2% LEL: 2.2%	Strong oxidizers, aluminum, chlorides, acids, acid fumes	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
p-Dichlorobenzene $C_6H_4Cl_2$ 106-46-7 CZ4550000 1592 152	p-DCB; 1,4-Dichlorobenzene; para-Dichlorobenzene; Dichlorocide 1 ppm = 6.01 mg/m^3	NIOSH Ca See Appendix A OSHA† 75 ppm (450 mg/m^3)	Ca [150 ppm]	Colorless or white crystalline solid with a mothball-like odor. [insecticide]	MW: 147.0 BP: 345°F Sol: 0.008% Fl.P: 150°F IP: 8.98 eV Sp.Gr: 1.25 Combustible Solid, but may take some effort to ignite.	VP: 1.3 mm MLT: 128°F UEL: ? LEL: 2.5%	Strong oxidizers (such as chlorine or permanganate)	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
3,3'-Dichlorobenzidine (and its salts) $NH_2ClC_6H_3C_6H_3ClNH_2$ 91-94-1 DD0525000	4,4'-Diamino-3,3'-dichloro-biphenyl; Dichlorobenzidine base; o,o'-Dichlorobenzidine; 3,3'-Dichlorobiphenyl-4,4'-diamine; 3,3'-Dichloro-4,4'-biphenyl-diamine; 3,3'-Dichloro-4,4'-diamino-biphenyl	NIOSH Ca See Appendix A OSHA [1910.1007] See Appendix B	Ca [N.D.]	Gray to purple, crystalline solid.	MW: 253.1 BP: 788°F Sol(59°F): 0.07% Fl.P: ? IP: ? Sp.Gr: ?	VP: ? MLT: 271°F UEL: ? LEL: ?	None reported	Filter/ Si gel; Reagent; HPLC/UVD; IV [#5509]
Dichlorodifluoromethane CCl_2F_2 75-71-8 PA8200000 1028 126	Difluorodichloromethane, Fluorocarbon 12, Freon® 12, Genetron® 12, Halon® 122, Propellant 12, Refrigerant 12 1 ppm = 4.95 mg/m^3	NIOSH/OSHA 1000 ppm (4950 mg/m^3)	15,000 ppm	Colorless gas with an ether-like odor at extremely high concentrations. [Note: Shipped as a liquefied compressed gas.]	MW: 120.9 BP: -22°F Sol(77°F): 0.03% Fl.P: NA IP: 11.75 eV RGasD: 4.2 Nonflammable Gas	VP: 5.7 atm FRZ: -252°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium, calcium, powdered aluminum, zinc & magnesium	Char(2); CH_2Cl_2; GC/FID; IV [#1018]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet or contam N.R.	NIOSH/OSHA 200 ppm: CCRFOV/PAPROV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; liver, kidney damage; skin blisters	Eye: Skin: Breath: Swallow:	Irr immed 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 period; profuse rhinitis; head, anor, nau, vomit; low-wgt, jaun, cirr; in animals: liver, kidney inj; [carc]	Eye: Skin: Breath: Swallow:	Irr immed 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; [carc]	Eye: Skin: Breath: Swallow:	Irr immed 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 (liq)	Dizz, tremor, asphy, uncon, card arrhy, card arrest; liq: 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1,3-Dichloro-5,5-dimethylhydantoin $C_5H_6Cl_2N_2O_2$ 118-52-5 MU0700000	Dactin, DDH, Halane	NIOSH 0.2 mg/m³ ST 0.4 mg/m³ OSHA† 0.2 mg/m³	5 mg/m³	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 $CHCl_2CH_3$ 75-34-3 KI0175000 2362 130	Asymmetrical dichloroethane; Ethylidene chloride; 1,1-Ethylidene dichloride 1 ppm = 4.05 mg/m³	NIOSH 100 ppm (400 mg/m³) See Appendix C (Chloroethanes) OSHA 100 ppm (400 mg/m³)	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: 5.4%	Strong oxidizers, strong caustics	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
1,2-Dichloroethylene ClCH=CHCl 540-59-0 KV9360000 1150 132P	Acetylene dichloride, cis-Acetylene dichloride, trans-Acetylene dichloride, sym-Dichloroethylene 1 ppm = 3.97 mg/m³	NIOSH/OSHA 200 ppm (790 mg/m³)	1000 ppm	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.	MW: 97.0 BP: 118-140°F Sol: 0.4% Fl.P: 36-39°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 polymerization.]	Char; CS_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]
Dichloroethyl ether $(ClCH_2CH_2)_2O$ 111-44-4 KN0875000 1916 152	bis(2-Chloroethyl)ether; 2,2'-Dichlorodiethyl ether; 2,2'-Dichloroethyl ether 1 ppm = 5.85 mg/m³	NIOSH Ca See Appendix A 5 ppm (30 mg/m³) ST 10 ppm (60 mg/m³) [skin] OSHA† C 15 ppm (90 mg/m³) [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_2; GC/FID; IV [#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: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash	NIOSH/OSHA 2 mg/m³: SA 5 mg/m³: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/HiE/SCBAE	Inh Ing Con	Irrit eyes, mucmemb, resp sys	Eye: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys
[1,3-Dichloro-5,5-dimethylhydantoin]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: 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: Irrimmed Skin: Soap flush prompt Breath: Resp support Swallow: Medical attention immed		Skin, liver, kidneys, lungs, CNS
[1,1-Dichloroethane]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH/OSHA 1000 ppm: SA:CF[f]/PAPROV[f]/CCRFOV/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, resp sys; CNS depres	Eye: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, CNS
[1,2-Dichloroethylene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH k: 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: pulm edema; liver damage; [carc]	Eye: Irrimmed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, liver [in animals: liver tumors]
[Dichloroethyl 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dichloromonofluoro-methane $CHCl_2F$ 75-43-4 PA8400000 1029 126	Dichlorofluoromethane, Fluorodichloromethane, Freon® 21, Genetron® 21, Halon® 112, Refrigerant 21 1 ppm = 4.21 mg/m³	NIOSH 10 ppm (40 mg/m³) OSHA† 1000 ppm (4200 mg/m³)	5000 ppm	Colorless gas with a slight, ether-like odor. [Note: A liquid below 48°F. Shipped as a liquefied compressed gas.]	MW: 102.9 BP: 48°F Sol(86°F): 0.7% Fl.P: NA IP: 12.39 eV 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_2; GC/FID; IV [#2516]
1,1-Dichloro-1-nitro-ethane $CH_3CCl_2NO_2$ 594-72-9 KI1050000 2650 153	Dichloronitroethane 1 ppm = 5.89 mg/m³	NIOSH/OSHA 2 ppm (10 mg/m³) OSHA† C 10 ppm (60 mg/m³)	25 ppm	Colorless liquid with an unpleasant odor. [fumigant]	MW: 143.9 BP: 255°F Sol: 0.3% Fl.P: 136°F IP: ? Sp.Gr: 1.43 Class II Combustible Liquid	VP: 15 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers [Note: Corrosive to iron in presence of moisture.]	Char(pet); CS_2; GC/FID; IV [#1601]
1,3-Dichloropropene $ClHC{=}CHCH_2Cl$ 542-75-6 UC8310000 2047 132	3-Chloroallyl chloride; DCP; 1,3-Dichloro-1-propene; 1,3-Dichloropropylene; Telone® 1 ppm = 4.54 mg/m³	NIOSH Ca 1 ppm (5 mg/m³) [skin] See Appendix A OSHA† none	Ca [N.D.]	Colorless to straw-colored liquid with a sharp, sweet, irritating, chloroform-like odor. [insecticide] [Note: Exists as mixture of cis- & trans-isomers.]	MW: 111.0 BP: 226°F Sol: 0.2% Fl.P: 77°F IP: ? Sp.Gr: 1.21 Class IC Flammable Liquid	VP: 28 mm FRZ: -119°F UEL: 14.5% LEL: 5.3%	Aluminum, magnesium, halogens, oxidizers [Note: Epichlorohydrin may be added as a stabilizer.]	None available
2,2-Dichloropropionic acid CH_3CCl_2COOH 75-99-0 UF0690000 1760 154	Dalapon; 2,2-Dichloropropanoic acid; α,α-Dichloropropionic acid 1 ppm = 5.85 mg/m³	NIOSH 1 ppm (6 mg/m³) OSHA† none	N.D.	Colorless liquid with an acrid odor. [herbicide] [Note: A white to tan powder below 46°F. The sodium salt, a white powder, is often used.]	MW: 143.0 BP: 374°F Sol: 50% Fl.P: NA IP: ? 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

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dichlorotetrafluoroethane $CClF_2CClF_2$ 76-14-2 KI1101000 1958 126	1,2-Dichlorotetrafluoroethane; Freon® 114; Genetron® 114; Halon® 242; Refrigerant 114 1 ppm = 6.99 mg/m³	NIOSH/OSHA 1000 ppm (7000 mg/m³)	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% FI.P: 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_2Cl_2; GC/FID; IV [#1018]
Dichlorvos $(CH_3O)_2P(O)OCH{=}CCl_2$ 62-73-7 TC0350000 2783 152	DDVP; 2,2-Dichlorovinyl dimethyl phosphate 1 ppm = 9.04 mg/m³	NIOSH/OSHA 1 mg/m³ [skin]	100 mg/m³	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% FI.P: >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 $C_8H_{16}NO_5P$ 141-66-2 TC3850000 	Bidrin®, Carbicron®, 2-Dimethyl cis-2-dimethylcarbamoyl-1-methylvinyl-phosphate 1 ppm = 9.70 mg/m³	NIOSH 0.25 mg/m³ [skin] OSHA† none	N.D.	Yellow-brown liquid with a mild, ester odor. [insecticide]	MW: 237.2 BP: 752°F Sol: Miscible FI.P: >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.]	OVS-2; Toluene/Acetone; GC/FPD; IV [#5600, Organophosphorus Pesticides]
Dicyclopentadiene $C_{10}H_{12}$ 77-73-6 PC1050000 2048 129	Bicyclopentadiene; DCPD; 1,3-Dicyclopentadiene dimer; 3a,4,7,7a-Tetrahydro-4,7-methanoindene [Note: Exists in two stereoisomeric forms.] 1 ppm = 5.41 mg/m³	NIOSH 5 ppm (30 mg/m³) OSHA† none	N.D.	Colorless, crystalline solid with a disagreeable, camphor-like odor. [Note: A liquid above 90°F.]	MW: 132.2 BP: 342°F Sol: 0.02% FI.P(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

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection—maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite [Dichlorotetrafluoroethane]	NIOSH/OSHA 10,000 ppm: SA 15,000 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Irrit resp sys; asphy; card arrhy, card arrest; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support		Resp sys, CVS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Dichlorvos]	NIOSH/OSHA 10 mg/m³: SA 25 mg/m³: SA:CF 50 mg/m³: SAT,CF/SCBAF/SAF 100 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/HiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; miosis, ache eyes; min; head, chest tight, wheez, lar spasm, salv, cyan; anor, nau, vomit, diarr; sweat, muscfasc, para, gdd, ataxia; convuls; low BP, card irreg	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CVS, CNS, eyes, skin, blood chol
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Quick drench [Dicrotophos]	TBAL	Inh Abs Ing Con	Head, nau, dizz, anxiety, restless, musc twitch, weak, tremor, inco, vomit, abdom cramps, diarr; salv, sweat, lac, rhinitis; anor, mal	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed		CNS, blood chol
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Dicyclopentadiene]	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; inco, head; sneez, cough; skin blisters; in animals: kidney, lung damage	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, kidneys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dicyclopentadienyl iron $(C_5H_5)_2Fe$ 102-54-5 LK0700000	bis(Cyclopentadienyl)iron, Ferrocene, Iron dicyclopentadienyl	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Orange, crystalline solid with a camphor-like odor.	MW: 186.1 BP: 480°F Sol: Insoluble Fl.P: ? IP: 6.88 eV Sp.Gr: ? Combustible Solid	VP: ? MLT: 343°F UEL: ? LEL: ?	Ammonium perchlorate, tetranitromethane, mercury(II) nitrate	Filter; $H_2SO_4/H_2O_2/HCl$; ICP; OSHA [#ID125G, Iron Oxide Fume]
Dieldrin $C_{12}H_8Cl_6O$ 60-57-1 IO1750000 2761 151	HEOD; 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,exo-5,8-dimethanonaphthalene	NIOSH Ca See Appendix A 0.25 mg/m^3 [skin] OSHA 0.25 mg/m^3 [skin]	Ca [50 mg/m^3]	Colorless to light-tan crystals with a mild, chemical odor. [insecticide]	MW: 380.9 BP: Decomposes Sol: 0.02% Fl.P: NA IP: ? Sp.Gr: 1.75 Noncombustible Solid	VP(77°F): 8 x 10^{-7} mm MLT: 349°F UEL: NA LEL: NA	Strong oxidizers, active metals such as sodium, strong acids, phenols	Filter; Isooctane; 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	Filter; none; EGA/TOA; IV [#5040, Elemental Carbon]
Diethanolamine $(HOCH_2CH_2)_2NH$ 111-42-2 KL2975000	DEA; Di(2-hydroxyethyl)amine; 2,2'-Dihydroxydiethylamine; Diolamine; bis(2-Hydroxyethyl)amine; 2,2'-Iminodiethanol 1 ppm = 4.30 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: 516°F (Decomposes) Sol: 95% Fl.P: 279°F IP: ? Sp.Gr: 1.10 Class IIIB Combustible Liquid Combustible Solid	VP: <0.01 mm MLT: 82°F UEL: 9.8% LEL: 1.6%	Oxidizers, strong acids, acid anhydrides, halides [Note: Reacts with CO_2 in the air. Hygroscopic (i.e., absorbs moisture from the air). Corrosive to copper, zinc & galvanized iron.]	Imp; Reagent; IC; IV [#3509, Amino-ethanol Compounds II]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement† method (See Table 1)
Diethylamine $(C_2H_5)_2NH$ 109-89-7 HZ8750000 1154 132	Diethamine; N,N-Diethylamine; N-Ethylethanamine 1 ppm = 2.99 mg/m³	NIOSH 10 ppm (30 mg/m³) ST 25 ppm (75 mg/m³) OSHA† 25 ppm (75 mg/m³)	200 ppm	Colorless liquid with a fishy, ammonia-like odor.	MW: 73.1 BP: 132°F Sol: Miscible FI.P: -15°F IP: 8.01 eV Sp.Gr: 0.71 Class IB Flammable Liquid	VP: 192 mm FRZ: -58°F UEL: 10.1% LEL: 1.8%	Strong oxidizers, strong acids, cellulose nitrate	Si gel; H_2SO_4/ Methanol; GC/FID; IV [#2010]
2-Diethylaminoethanol $(C_2H_5)_2NCH_2CH_2OH$ 100-37-8 KK5075000 2686 132	Diethylaminoethanol; 2-Diethylaminoethyl alcohol; N,N-Diethylethanolamine; Diethyl-(2-hydroxyethyl)-amine; 2-Hydroxytriethylamine 1 ppm = 4.79 mg/m³	NIOSH/OSHA 10 ppm (50 mg/m³) [skin]	100 ppm	Colorless liquid with a nauseating, ammonia-like odor.	MW: 117.2 BP: 325°F Sol: Miscible FI.P: 126°F IP: ? Sp.Gr: 0.89 Class II Combustible Liquid	VP: 1 mm FRZ: -94°F UEL: ? LEL: ?	Strong oxidizers, strong acids	Si gel; Methanol/ Water; GC/FID; IV [#2007, Amino-ethanol Com-pounds I]
Diethylenetriamine $(NH_2CH_2CH_2)_2NH$ 111-40-0 IE1225000 2079 154	N-(2-Aminoethyl)1,2-ethanediamine; bis(2-Aminoethyl)amine; DETA; 2,2'-Diaminodiethylamine 1 ppm = 4.22 mg/m³	NIOSH 1 ppm (4 mg/m³) [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: 405°F Sol: Miscible FI.P: 208°F IP: ? Sp.Gr: 0.96 Class IIIB Combustible Liquid	VP: 0.4 mm FRZ: -38°F UEL: 6.7% LEL: 2%	Oxidizers, strong acids, cellulose nitrate [Note: May form explosive complexes with silver, cobalt, or chromium compounds. Corrosive to aluminum, copper, brass & zinc.]	XAD-2*; DMF; HPLC/UVD; IV [#2540]
Diethyl ketone $CH_3CH_2COCH_2CH_3$ 96-22-0 SA8050000 1156 127	DEK, Dimethylacetone, Ethyl ketone, Metacetone, 3-Pentanone, Propione 1 ppm = 3.53 mg/m³	NIOSH 200 ppm (705 mg/m³) OSHA† none	N.D.	Colorless liquid with an acetone-like odor.	MW: 86.2 BP: 215°F Sol: 5% FI.P(oc): 55°F IP: 9.32 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP(77°F): 35 mm FRZ: -44°F UEL: 6.4% LEL: 1.6%	Strong oxidizers, alkalis, mineral acids, (hydrogen peroxide + nitric acid)	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL; FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ; UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Diethyl phthalate $C_6H_4(COOC_2H_5)_2$ 84-66-2 TI1050000	DEP; Diethyl ester of phthalic acid; Ethyl phthalate	NIOSH 5 mg/m³ 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): 0.1% FLP(oc): 322°F IP: ? Sp.Gr: 1.12 Class IIIB Combustible Liquid however, ignition is difficult.	VP(77°F): 0.002 mm FRZ: -41°F UEL: ? LEL(368°F): 0.7%	Strong oxidizers, strong acids, nitric acid, permanganates, water	OVS-Tenax; Toluene; GC/FID; OSHA [#104]
Difluorodibromomethane CBr_2F_2 75-61-6 PA7525000 1941 159	Dibromodifluoromethane, Freon® 12B2, Halon® 1202 1 ppm = 8.58 mg/m³	NIOSH/OSHA 100 ppm (860 mg/m³)	2000 ppm	Colorless, heavy liquid or gas (above 76°F) with a characteristic odor.	MW: 209.8 BP: 76°F Sol: Insoluble FLP: NA IP: 11.07 eV Sp.Gr(59°F): 2.29 Noncombustible Liquid Nonflammable Gas	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; IV [#1012]
Diglycidyl ether $C_6H_{10}O_3$ 2238-07-5 KN2350000	DGE; Diallyl ether dioxide; Di(2,3-epoxypropyl) ether; 2-Epoxypropyl ether; bis(2,3-Epoxypropyl) ether 1 ppm = 5.33 mg/m³	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m³) OSHA† C 0.5 ppm (2.8 mg/m³)	Ca [10 ppm]	Colorless liquid with a strong, irritating odor.	MW: 130.2 BP: 500°F Sol: ? FLP: 141°F IP: ? Sp.Gr: 1.12 Class IIIA Combustible Liquid	VP(77°F): 0.09 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers	None available
Diisobutyl ketone $[(CH_3)_2CHCH_2]_2CO$ 108-83-8 MJ5775000 1157 127	DIBK; sym-Diisopropyl acetone; 2,6-Dimethyl-4-heptanone; Isovalerone; Valerone 1 ppm = 5.82 mg/m³	NIOSH 25 ppm (150 mg/m³) OSHA† 50 ppm (290 mg/m³)	500 ppm	Colorless liquid with a mild, sweet odor.	MW: 142.3 BP: 334°F Sol: 0.05% FLP: 120°F IP: 9.04 eV Sp.Gr: 0.81 Class II Combustible Liquid	VP: 2 mm FRZ: -43°F UEL(200°F): 7% LEL(200°F): 0.8%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1300, Ketones I]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement 1 method (See Table 1)
Diisopropylamine $[(CH_3)_2CH]_2NH$ 108-18-9 IM4025000 1158 132	**DIPA,** N-(1-Methylethyl)-2-propanamine 1 ppm = 4.14 mg/m³	NIOSH/OSHA 5 ppm (20 mg/m³) [skin]	**200 ppm**	Colorless liquid with an ammonia- or fish-like odor.	MW: 101.2 BP: 183°F Sol: Miscible Fl.P: 20°F IP: 7.73 eV Sp.Gr: 0.72 Class IB Flammable Liquid	VP: 70 mm FRZ: -141°F UEL: 7.1% LEL: 1.1%	Strong oxidizers, strong acids	Imp; KOH; GC/FID; II(4) [#S141]
Dimethyl acetamide $CH_3CON(CH_3)_2$ 127-19-5 AB7700000	N,N-Dimethyl acetamide; DMAC 1 ppm = 3.56 mg/m³	NIOSH/OSHA 10 ppm (35 mg/m³) [skin]	300 ppm	Colorless liquid with a weak, ammonia- or fish-like odor.	MW: 87.1 BP: 329°F Sol: Miscible Fl.P(oc): 158°F IP: 8.81 eV Sp.Gr: 0.94 Class IIIA Combustible Liquid	VP: 2 mm FRZ: -4°F UEL(320°F): 11.5% LEL(212°F): 1.8%	Carbon tetrachloride, other halogenated compounds when in contact with iron, oxidizers	Si gel; Methanol; GC/FID; IV [#2004]
Dimethylamine $(CH_3)_2NH$ 124-40-3 IP8750000 1032 118 (anhydrous) 1160 129 (solution)	Dimethylamine (anhydrous), N-Methylmethanamine 1 ppm = 1.85 mg/m³	NIOSH/OSHA 10 ppm (18 mg/m³)	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% Fl.P: NA (Gas) 20°F (Liq) IP: 8.24 eV RGasD: 1.56 Sp.Gr: 0.67 (Liquid at 44°F) Flammable Gas/Class IA Flammable Liquid	VP: 1.7 atm FRZ: -134°F UEL: 14.4% LEL: 2.8%	Strong oxidizers, chlorine, mercury, acraldehyde, fluorides, maleic anhydride, aluminum, brass, copper, zinc	Si gel; H_2SO_4/ Methanol; GC/FID; IV [#2010]
4-Dimethylamino-azobenzene $C_6H_5NNC_6H_4N(CH_3)_2$ 60-11-7 BX7350000	Butter yellow; DAB; p-Dimethylaminoazobenzene; N,N-Dimethyl-4-aminoazo-benzene; Methyl yellow	NIOSH Ca See Appendix A OSHA [1910.1015] See Appendix B	Ca [N.D.]	Yellow, leaf-shaped crystals.	MW: 225.3 BP: Sublimes Sol: 0.001% Fl.P: ? IP: ? Sp.Gr: ?	VP: 0.0000003 mm (est.) MLT: 237°F UEL: ? LEL: ?	None reported	G-chrom P; 2-Propanol; GC/FID; II(4) [P&CAM #284]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 (>5%) Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash (>5%) Diisopropylamine]	NIOSH/OSHA 125 ppm: SA:CF/PAPROV[c] 200 ppm: CCRF/OV/GMF/OV/PAPRTOV[c]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Ing Abs Ing Con	Irrit eyes, skin, resp sys; nau, vomit; head; vis dist	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench Dimethyl acetamide]	NIOSH/OSHA 100 ppm: SA 250 ppm: SA:CF 300 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Inh Abs Ing Con	Irrit skin; jaun, liver damage; depres, leth, halu, delusions	Eye: Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Skin, liver, CNS
Skin: Prevent skin contact (liq)/Frostbite Eyes: Prevent eye contact (liq)/Frostbite Wash skin: When contam (liq) Remove: When wet (flamm) Change: N.R. Provide: Eyewash (liq), Quick drench (liq), Frostbite Dimethylamine]	NIOSH/OSHA 250 ppm: SA:CF 500 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit nose, throat; sneez, cough, dysp; pulm edema; conj, derm; liq: frostbite	Eye: Irr immed (liq)/Frostbite Skin: Water flush immed (liq)/Frostbite Breath: Resp support	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench 4-Dimethylaminoazobenzene]	NIOSH §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Enlarged liver; liver, kidney dysfunc; contact derm; cough, wheez, dysp; bloody sputum; bronchial secretions; frequent urination, hema, dysuria; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Skin, resp sys, liver, kidneys, bladder [in animals: liver & bladder tumors]

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
bis(2-(Dimethylamino)-ethyl)ether $C_8H_{20}N_2O$ 3033-62-3 KR9460000	NIAX® A99; NIAX® Catalyst A1; 2,2'-Oxybis(N,N-dimethyl ethylamine) [$(CH_3)_2NCH_2CH_2OCH_2CH_2N(CH_3)_2$] [Note: A component (5%) of NIAX® Catalyst ESN, along with dimethylaminopropio-nitrile (95%).]	NIOSH/OSHA See Appendix C (Niax® Catalyst ESN)	N.D.	Liquid.	MW: 160.3 BP: 372°F Sol: ? Fl.P: ? Sp.Gr: ?	VP: ? FRZ: ? UEL: ? LEL: ? IP: ?	None reported	None available
Dimethylamino-propionitrile $(CH_3)_2NCH_2CH_2CN$ 1738-25-6 UG1575000	3-(Dimethylamino)-propionitrile; N,N-Dimethylamino-3-propionitrile [Note: A component (95%) of NIAX® Catalyst ESN, along with bis(2-(dimethylamino)-ethyl) ether (5%).]	NIOSH/OSHA See Appendix C (Niax® Catalyst ESN)	N.D.	Colorless liquid.	MW: 98.2 BP: 342°F Sol: Miscible Fl.P: 147°F IP: ? Sp.Gr(86°F): 0.86 Class IIIA Combustible Liquid	VP(135°F): 10mm FRZ: -48°F UEL: ? LEL: ?	Oxidizers [Note: Emits toxic oxides of nitrogen and cyanide fumes when heated to decomposition.]	None available
N,N-Dimethylaniline $C_8H_3N(CH_3)_2$ 121-69-7 BX4725000 2253 153	N,N-Dimethylbenzeneamine; N,N-Dimethylphenylamine [Note: Also known as Dimethylaniline which is a correct synonym for Xylidine.] 1 ppm = 4.96 mg/m³	NIOSH 5 ppm (25 mg/m³) ST 10 ppm (50 mg/m³) [skin] OSHA† 5 ppm (25 mg/m³) [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% Fl.P: 142°F IP: 7.14 eV Sp.Gr: 0.96 Class IIIA Combustible Liquid	VP: 1 mm FRZ: 36°F UEL: ? LEL: ?	Strong oxidizers, strong acids, benzoyl peroxide	Si gel; Ethanol; GC/FID; IV [#2002, Aromatic Amines]
Dimethyl carbamoyl chloride $(CH_3)_2NCOCl$ 79-44-7 FD4200000 2262 156	Chloroformic acid dimethylamide; Dimethylcarbamic chloride; N,N-Dimethylcarbamoyl chloride; DMCC	NIOSH Ca See Appendix A OSHA none	Ca [N.D.]	Clear, colorless liquid.	MW: 107.6 BP: 329°F Sol: Reacts Fl.P: 155°F IP: ? Sp.Gr: 1.17 Class IIIA Combustible Liquid	VP: ? FRZ: -27°F UEL: ? LEL: ?	Acids, water [Note: Rapidly hydrolyzes in water to dimethylamine, carbon dioxide, and hydrogen chloride.]	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (NUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Inh Abs Ing Con	Possible urinary dysfunc; neurological disorders; in animals: irrit eyes, skin	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, urinary tract, PNS
[bis(2-(Dimethylamino)ethyl)ether]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; urinary dysfunc; neurological disorders; pins & needles in hands & feet; musc weak, lass, nau, vomit; decr nerve conduction in lower legs	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, urinary tract, PNS
[Dimethylaminopropionitrile]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench		NIOSH/OSHA 50 ppm: SA 100 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Inh Abs Ing Con	Anoxia symptoms: cyan, weak, dizz, ataxia; methemo	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Blood, kidneys, liver, CVS
[N,N-Dimethylaniline]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench		NIOSH k: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/OV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat, resp sys; eye, skin burns; cough, wheez, laryngitis, dysp; head, nau, vomit; liver inj; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver [in animals: nasal cancer]
[Dimethyl carbamoyl chloride]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate $(CH_3O)_2P(O)OCHBrCBrCl_2$ 300-76-5 TB9450000	Dibrom®; 1,2-Dibromo-2,2-dichloro-ethyl dimethyl phosphate; Naled	NIOSH 3 mg/m³ [skin] OSHA† 3 mg/m³	200 mg/m³	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 2265 129	Dimethyl formamide; N,N-Dimethylformamide; DMF 1 ppm = 2.99 mg/m³	NIOSH/OSHA 10 ppm (30 mg/m³) [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; IV [#2004]
1,1-Dimethylhydrazine $(CH_3)_2NNH_2$ 57-14-7 MV2450000 1163 131	Dimazine, DMH, UDMH, Unsymmetrical dimethyl-hydrazine 1 ppm = 2.46 mg/m³	NIOSH Ca See Appendix A C 0.06 ppm (0.15 mg/m³) [2-hr] OSHA 0.5 ppm (1 mg/m³) [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.]	Bub; Pho-acid; Vis; IV [#3515]
Dimethylphthalate $C_6H_4(COOCH_3)_2$ 131-11-3 TI1575000 9188 171	Dimethyl ester of 1,2-benzenedicarboxylic acid; DMP	NIOSH/OSHA 5 mg/m³	2000 mg/m³	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	OVS-Tenax; Toluene; GC/FID; OSHA [#104]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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	NIOSH/OSHA 30 mg/m³: DMFu/HiE/SA 75 mg/m³: SA:CF/PAPRDMFu 150 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 200 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; miosis, lac; head; chest tight, wheez, lar spasm; salv; 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: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: 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: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; choking, chest pain, dysp; leth; nau; anoxia; convuls; liver inj; [carc]	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: N.R. Eyes: Prevent eye contact Wash skin: N.R. Remove: N.R. Change: N.R.	NIOSH/OSHA 50 mg/m³: DMF 125 mg/m³: SA:CF[f]/PAPRDM[f] 250 mg/m³: HiEF/SCBAF/SAF 2000 mg/m³: 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, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dimethyl sulfate $(CH_3)_2SO_4$ 77-78-1 WS8225000 1595 156	Dimethyl ester of sulfuric acid, Dimethylsulfate, Methyl sulfate 1 ppm = 5.16 mg/m³	NIOSH Ca See Appendix A 0.1 ppm (0.5 mg/m³) [skin] OSHA† 1 ppm (5 mg/m³) [skin]	Ca [7 ppm]	Colorless, oily liquid with a faint, onion-like odor.	MW: 126.1 BP: 370°F (Decomposes) Sol(64°F): 3% Fl.P: 182°F IP: ? Sp.Gr: 1.33 Class IIIA Combustible Liquid	VP: 0.1 mm FRZ: -25°F UEL: ? LEL: ?	Strong oxidizers, ammonia solutions [Note: Decomposes in water to sulfuric acid; corrosive to metals.]	Porapak-P; Diethyl ether; GC/EConD; IV [#2524]
Dinitolmide $(NO_2)_2C_6H_2(CH_3)CONH_2$ 148-01-6 XS4200000	3,5-Dinitro-o-toluamide; 2-Methyl-3,5-dinitro-benzamide; Zoalene	NIOSH 5 mg/m³ OSHA† none	N.D.	Yellowish, crystalline solid.	MW: 225.2 BP: ? Sol: Slight Fl.P: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP: ? MLT: 351°F UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
o-Dinitrobenzene $C_6H_4(NO_2)_2$ 528-29-0 CZ7450000 1597 152	ortho-Dinitrobenzene; 1,2-Dinitrobenzene	NIOSH/OSHA 1 mg/m³ [skin]	50 mg/m³	Pale white or yellow, crystalline solid.	MW: 168.1 BP: 606°F Sol: 0.05% Fl.P: 302°F IP: 10.71 eV Sp.Gr: 1.57 Combustible Solid	VP: ? MLT: 244°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]	Filter/Bub; Methanol; HPLC/UVD; II(4) [#S214]
m-Dinitrobenzene $C_6H_4(NO_2)_2$ 99-65-0 CZ7350000 1597 152	meta-Dinitrobenzene; 1,3-Dinitrobenzene	NIOSH/OSHA 1 mg/m³ [skin]	50 mg/m³	Pale white or yellow, crystalline solid.	MW: 168.1 BP: 572°F Sol: 0.02% Fl.P: 302°F IP: 10.43 eV Sp.Gr: 1.58 Combustible Solid	VP: ? MLT: 192°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]	Filter/Bub; Methanol; HPLC/UVD; II(4) [#S214]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Dimethyl sulfate]	NIOSH W SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Csn	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; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys, CNS [in animals: nasal & lung cancer]
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **[Dinitolmide]**	**TBAL**	**Inh** **Ing** **Csn**	**Contact eczema; in animals: methemo, liver changes**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Skin, liver, blood**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Quick drench [o-Dinitrobenzene]	NIOSH/OSHA 5 mg/m³: DM 10 mg/m³: DMXSQ/HiE/SA 25 mg/m³: SA:CF/PAPRDM 50 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Csn	Anoxia, cyan; vis dist, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, blood, liver, CVS, CNS
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **Provide: Quick drench** **[m-Dinitrobenzene]**	**NIOSH/OSHA** **5 mg/m³: DM** **10 mg/m³: DMXSQ/HiE/SA** **25 mg/m³: SA:CF/PAPRDM** **50 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF** **§ SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: HiEF/SCBAE**	**Inh** **Abs** **Ing** **Csn**	**Anoxia, cyan; vis dist, central scotomas; bad taste, burning mouth, dry throat, thirst; yellowing hair, eyes, skin; anemia; liver damage**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, blood, liver, CVS, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
p-Dinitrobenzene $C_6H_4(NO_2)_2$ 100-25-4 CZ7525000 1597 152	para-Dinitrobenzene; 1,4-Dinitrobenzene	NIOSH/OSHA 1 mg/m^3 [skin]	50 mg/m^3	Pale white or yellow, crystalline solid.	MW: 168.1 BP: 570°F Sol: 0.01% Fl.P: ? IP: 10.50 eV Sp.Gr: 1.63 Combustible Solid	VP: ? MLT: 343°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Prolonged exposure to fire and heat may result in an explosion due to SPONTANEOUS decomposition.]	Filter/Bub; Methanol; HPLC/UVD; II(4) [#S214]
Dinitro-o-cresol $CH_3C_6H_2OH(NO_2)_2$ 534-52-1 GO9625000 1598 153	4,6-Dinitro-o-cresol; 3,5-Dinitro-2-hydroxy-toluene; 4,6-Dinitro-2-methyl phenol; DNC; DNOC	NIOSH/OSHA 0.2 mg/m^3 [skin]	5 mg/m^3	Yellow, odorless solid. [insecticide]	MW: 198.1 BP: 594°F Sol: 0.01% Fl.P: NA IP: ? Sp.Gr: 1.1 (estimated) Noncombustible Solid	VP: 0.00005 mm MLT: 190°F UEL: NA LEL: NA MEC: 30 g/m^3	Strong oxidizers	Filter/Bub; 2-Propanol; HPLC/UVD; II(5) [#S166]
Dinitrotoluene $C_6H_3CH_3(NO_2)_2$ 25321-14-6 XT1300000 1600 152 (molten) 2038 152 (solid)	Dinitrotoluol, DNT, Methyldinitrobenzene	NIOSH Ca See Appendix A 1.5 mg/m^3 [skin] OSHA 1.5 mg/m^3 [skin]	Ca [50 mg/m^3]	Orange-yellow crystalline solid with a characteristic odor. [Note: Often shipped molten.]	MW: 182.2 BP: 572°F Sol: Insoluble Fl.P: 404°F IP: ? Sp.Gr: 1.32 Combustible Solid, but difficult to ignite.	VP: 1 mm MLT: 158°F UEL: ? LEL: ?	Strong oxidizers, caustics, metals such as tin & zinc [Note: Commercial grades will decompose at 482°F, with self-sustaining decomposition at 536°F.]	Filter/ Tenax; GC/TEA-EAP; OSHA [#44]
Di-sec octyl phthalate $C_{24}H_{38}O_4$ 117-81-7 TI0350000	DEHP, Di(2-Ethylhexyl)phthalate, DOP, bis-(2-Ethylhexyl)-phthalate, Octyl phthalate [$C_6H_4(COOCH_2CH(C_2H_5)C_4H_9)_2$]	NIOSH Ca See Appendix A 5 mg/m^3 ST 10 mg/m^3 OSHA† 5 mg/m^3	Ca [5000 mg/m^3]	Colorless, oily liquid with a slight odor.	MW: 390.5 BP: 727°F Sol(75°F): 0.00003% Fl.P(oc): 420°F IP: ? Sp.Gr: 0.99 Class IIIB Combustible Liquid	VP: <0.01 mm FRZ: -58°F UEL: ? LEL(474°F): 0.3%	Nitrates, strong oxidizers, acids & alkalis	Filter; CS$_2$; GC/FID; IV [#5020, di(2-Ethyl-hexyl) Phthalate]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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: Quick drench	NIOSH/OSHA 5 mg/m³: DM 10 mg/m³: DM/XSQ/HE/SA 25 mg/m³: SA:CF/PAPRDM 50 mg/m³: HiEF/SAT:CF/PAPRTHE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, blood, liver, CVS, CNS
[p-Dinitrobenzene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily	NIOSH/OSHA 2 mg/m³: DMF 5 mg/m³: HiEF/SA:CF[f]/PAPRDM[f]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA **Escape: HiEF/SCBAE**	Inh Abs Ing Con	Sense of well being; head, fever, lass, profuse sweat, excess thirst, tacar, hyperpnea, cough, short breath, coma	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		CVS, endocrine sys
[Dinitro-o-cresol]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Quick drench	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OVHIE/SCBAE	Inh Abs Ing Con	Anoxia, cyan; anemia, jaun; repro effects; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, liver, CVS, repro sys [in animals: liver, skin & kidney tumors]
[Dinitrotoluene]						
Skin: N.R. **Eyes:** N.R. **Wash skin:** N.R. **Remove:** N.R. **Change:** N.R.	**NIOSH** **#: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: HiEF/SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, muc membr; in animals: liver damage; terato effects; [carc]**	**Eye: Irr immed** **Breath: Resp support** **Swallow: 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dioxane $C_4H_8O_2$ 123-91-1 JG8225000 1165 127	Diethylene dioxide; Diethylene ether; Dioxan; p-Dioxane; 1,4-Dioxane 1 ppm = 3.60 mg/m^3	NIOSH Ca See Appendix A C 1 ppm (3.6 mg/m^3) [30-min] OSHA† 100 ppm (360 mg/m^3) [skin]	Ca [500 ppm]	Colorless liquid or solid (below 53°F) with a mild, ether-like odor.	MW: 88.1 BP: 214°F Sol: Miscible Fl.P: 55°F IP: 9.13 eV Sp.Gr: 1.03 Class IB Flammable Liquid	VP: 29 mm FRZ: 53°F UEL: 22% LEL: 2.0%	Strong oxidizers, decaborane, triethymyl aluminum	Char; CS_2; GC/FID; IV [#1602]
Dioxathion $C_4H_8O_2[SPS(OC_2H_5)_2]_2$ 78-34-2 TE3350000	Delnav®; p-Dioxane-2,3-diyl ethyl phosphorodithioate; Dioxane phosphate; 2,3-p-Dioxanethiol S,S-bis-(O,O-diethyl phosphorodithioate); Navadel®	NIOSH 0.2 mg/m^3 [skin] OSHA† none	N.D.	Viscous, brown, tan, or dark-amber liquid. [insecticide] [Note: Technical product is a mixture of cis- & trans-isomers.]	MW: 456.6 BP: ? Sol: Insoluble Fl.P: NA IP: ? Sp.Gr(79°F): 1.26 Noncombustible Liquid	VP: ? FRZ: -4°F UEL: NA LEL: NA	Alkalis, iron or tin surfaces, heat	None available
Diphenyl $C_6H_5C_6H_5$ 92-52-4 DU8050000	Biphenyl, Phenylbenzene 1 ppm = 6.31 mg/m^3	NIOSH/OSHA 1 mg/m^3 (0.2 ppm)	100 mg/m^3	Colorless to pale-yellow solid with a pleasant, characteristic odor. [fungicide]	MW: 154.2 BP: 489°F Sol: Insoluble Fl.P: 235°F IP: 7.95 eV Sp.Gr: 1.04 Combustible Solid	VP: 0.005 mm MLT: 156°F UEL(311°F): 5.8% LEL(232°F): 0.6%	Oxidizers	Tenax GC; CCl_4; GC/FID; IV [#2530, Biphenyl]
Diphenylamine $(C_6H_5)_2NH$ 122-39-4 JJ7800000	Anilinobenzene, DPA, Phenylaniline, N-Phenylaniline, N-Phenylbenzenamine [Note: The carcinogen 4-Aminodiphenyl may be present as an impurity in the commercial product.]	NIOSH 10 mg/m^3 OSHA† none	N.D.	Colorless, tan, amber, or brown crystalline solid with a pleasant, floral odor. [fungicide]	MW: 169.2 BP: 576°F Sol: 0.03% Fl.P: 307°F IP: 7.40 eV Sp.Gr: 1.16 Combustible Solid; explosive if a cloud of dust is exposed to a source of ignition.	VP(227°F): 1mm MLT: 127°F UEL: ? LEL: ?	Oxidizers, hexachloromelamine, trichloromelamine	Filter*(2); Methanol; HPLC/UV; OSHA [#78]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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: [Dioxane]	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; drow, head; nau, vomit; liver damage; kidney failure; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys [in animals: lung, liver & nasal cavity tumors]
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** **[Doxathion]**	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet or contam** **N.R.** **Eyewash, Quick drench**	**TBAL**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin; head, gidd, verti, weak; rhin, chest tight; miosis; nau, vomit; abdom cramps, diarr; saly; musc fasc; conf, drow**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap flush immed** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CNS, CVS, blood chol**
Skin: Eyes: Wash skin: Remove: Change: Provide: [Diphenyl]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash (molt), Quick drench (molt)	NIOSH/OSHA 10 mg/m³: CCROVDM/SA 25 mg/m³: SA:CF*/PAPROVDM* 50 mg/m³: CCRFOVHiE/GMFOVHiE/ PAPRTOVHiE*/SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, throat; head, nau, ftg, numb limbs; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, liver, CNS
Skin: Eyes: Wash skin: Remove: **Change:** [Diphenylamine]	Prevent skin contact Prevent eye contact Daily When wet or contam **Daily**	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; eczema; tacar; hypertension; cough, sneez, methemo, incr BP, heart rate; prot, hema, **bladder inj;** **in animals: terato effects**	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention **immed**	Eyes, skin, resp sys, CVS, blood, bladder, repro sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Dipropylene glycol methyl ether $CH_3OCH_2CH_2OCH_2CH_2OH$ 34590-94-8 JM1575000	Dipropylene glycol monomethyl ether, Dowanol® 50B 1 ppm = 6.06 mg/m³	NIOSH 100 ppm (600 mg/m³) ST 150 ppm (900 mg/m³) [skin] OSHA† 100 ppm (600 mg/m³) [skin]	600 ppm	Colorless liquid with a mild, ether-like odor.	MW: 148.2 BP: 408°F Sol: Miscible FLP: 180°F IP: ? Sp.Gr: 0.95 Class IIIA Combustible Liquid	VP: 0.5 mm FRZ: -112°F UEL: 3.0% LEL(392°F): 1.1%	Strong oxidizers	Char; CS_2; GC/FID; II(2) [#S69]
Dipropyl ketone $(CH_3CH_2CH_2)_2CO$ 123-19-3 MJ5600000 2710 127	Butyrone, DPK, 4-Heptanone, Heptan-4-one, Propyl ketone 1 ppm = 4.67 mg/m³	NIOSH 50 ppm (235 mg/m³) OSHA† none	N.D.	Colorless liquid with a pleasant odor.	MW: 114.2 BP: 291°F Sol: Insoluble FLP: 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_2; GC/FID; OSHA [Adapt #7]
Diquat (Diquat dibromide) $C_{12}H_{12}N_2Br_2$ 85-00-7 JM5690000 2781 151 (solid) 2782 131 (liquid)	Diquat dibromide; 1,1'-Ethylene-2,2'-bipyridylium dibromide [Note: Diquat is a cation ($C_{12}H_{12}N_2^{++}$; 1,1'-Ethylene-2,2-bipyridylium ion). Various diquat salts are commercially available.]	NIOSH 0.5 mg/m³ 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% FLP: ? IP: ? Sp.Gr: 1.22-1.27 Combustible Solid, but does not readily ignite and burns with difficulty.	VP: <0.00001 mm MLT: 635°F UEL: ? LEL: ?	Alkalis, UV light, basic solutions [Note: Concentrated diquat solutions corrode aluminum.]	None available
Disulfiram $[(C_2H_5)_2NCS]_2S_2$ 97-77-8 JO1225000	Antabuse®, bis(Diethylthiocarbamoyl) disulfide, Ro-Sulfiram®, TETD, Tetraethylthiuram disulfide	NIOSH 2 mg/m³ [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% FLP: NA IP: ? Sp.Gr: 1.30 Noncombustible Solid	VP: ? MLT: 158°F UEL: NA LEL: NA	None reported	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide #os.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Disulfoton $C_8H_{19}O_2PS_3$ 298-04-4 TD9275000 2783 152	O,O-Diethyl S-2-(ethylthio)-ethyl phosphorodithioate; Di-Syston®; Thiodemeton $[(C_2H_5O)_2P(S)S(CH_2)_2SC_2H_5]$	NIOSH 0.1 mg/m³ [skin] OSHA† none	N.D.	Oily, colorless to yellow liquid with a characteristic, sulfur odor. [insecticide] [Note: Technical product is a brown liquid.]	MW: 274.4 BP: ? Sol(73°F): 0.003% FI.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	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
2,6-Di-tert-butyl-p-cresol $[C(CH_3)_3]_2CH_3C_6H_2OH$ 128-37-0 GO7875000	BHT; Butylated hydroxytoluene; Dibutylated hydroxytoluene; 4-Methyl-2,6-di-tert-butyl phenol	NIOSH 10 mg/m³ OSHA† none	N.D.	White to pale-yellow, crystalline solid with a slight, phenolic odor. [food preservative]	MW: 220.4 BP: 509°F Sol: 0.00004% FI.P: 261°F IP: ? Sp.Gr: 1.05 Class IIIB Combustible Liquid	VP: 0.01 mm MLT: 158°F UEL: ? LEL: ?	Oxidizers	Silgel; Methanol/ CS_2; GC/FID; IV [P&CAM #226]
Diuron $C_9H_3Cl_2NHCON(CH_3)_2$ 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% FI.P: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP: 0.000000002 mm MLT: 316°F UEL: NA LEL: NA	Strong acids	Filter; none; Grav; IV [#5500, Particulates NOR (total)]
Divinyl benzene $C_6H_4(HC{=}CH_2)_2$ 1321-74-0 (mixed isomers) CZ9370000 2049 130	Diethyl benzene; DVB; Vinylstyrene [Note: Commercial product contains all 3 isomers, but m-isomer predominates. Usually contains an inhibitor to prevent polymerization.] 1 ppm = 5.33 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% FI.P(oc): 169°F IP: ? Sp.Gr: 0.93 Class IIA Combustible Liquid	VP: 0.7 mm FRZ: -88°F UEL: 6.2% LEL: 1.1%	None reported	Char*; Toluene; GC/FID; OSHA [#89]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: 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, salv; head, gidd, weri, weak; rhin, chest tight; blurred vision, miosis; card irreg; music fasc; dysp; eye, skin burns	Eye: Skin: Breath: Swallow	Irr immed Soap flush immed Resp. support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood 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	Eyes, 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	Eyes, 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 depres	Eye: Skin: Breath: Swallow	Irr immed Soap flush immed Resp. support Medical attention immed	Eyes, 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: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1-Dodecanethiol $CH_3(CH_2)_{11}SH$ 112-55-0 JR3155000 1228 131	Dodecyl mercaptan, 1-Dodecyl mercaptan, n-Dodecyl mercaptan, Lauryl mercaptan, n-Lauryl mercaptan, 1-Mercaptododecane 1 ppm = 8.28 mg/m³	NIOSH C 0.5 ppm (4.1 mg/m³) [15-min] OSHA none	N.D.	Colorless, water-white, or pale-yellow, oily liquid with a mild, skunk-like odor. [Note: A solid below 15°F.]	MW: 202.4 BP: 441-478°F Sol: Insoluble Fl.P(oc): 190°F IP: ? Sp.Gr: 0.85 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 1302-74-5 (corundum) 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/m³ (total) 5 mg/m³ (resp)	N.D.	Odorless, white, crystalline powder.	See α-Alumina for physical & chemical properties.			Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Endosulfan $C_9H_6Cl_6O_3S$ 115-29-7 RB9275000 2761 151	Benzoepin; Endosulphan; 6,7,8,9,10-Hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzo-dioxathiepin-3-oxide; Thiodan®	NIOSH 0.1 mg/m³ [skin] OSHA† none	N.D.	Brown crystals with a slight, sulfur dioxide odor. [insecticide] [Note: Technical product is a tan, waxy, isomer mixture.]	MW: 406.9 BP: Decomposes Sol: 0.00001% Fl.P: NA IP: ? 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	Alkalis, acids, water [Note: Corrosive to iron. Hydrolyzes slowly on contact with water or decomposes in presence of alkalis and acids to form sulfur dioxide.]	None available
Endrin $C_{12}H_8Cl_6O$ 72-20-8 I01575000 2761 151	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/m³ [skin]	2 mg/m³	Colorless to tan, crystalline solid with a mild, chemical odor. [insecticide]	MW: 380.9 BP: Decomposes Sol: Insoluble Fl.P: 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, parathion [Note: May emit hydrogen chloride & phosgene when heated or burned.]	Filter/ Chrom-102; Toluene; GC/ECD; IV [#5519]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; cough; dizz, dysp, weak, conf, cyan; abdom pain, nau; skin sens	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood
[1-Dodecanethiol]							
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 immed Fresh air Medical attention immed	Eyes, skin, resp sys
[Emery]							
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 skin; nau, conf, agitation, flushing, dry mouth, tremor, convuls, head; in animals: kidney, liver inj; decr testis weight	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Skin, CNS, liver, kidneys, repro sys
[Endosulfan]							
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: CCROVDMFu/SA 2 mg/m^3: SA:CF/PAPROVDMFu/ CCRFOVHiE/GMFOVHiE/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Epilep convuls; stupor, head, dizz; abdom discomfort, nau, vomit; insom; aggressiveness, conf; leth, weak; anor; in animals: liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, liver
[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: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Enflurane CHF_2OCF_2CHClF 13838-16-9 KN6800000	2-Chloro-1-(difluoro-methoxy)-1,1,2-trifluoro-ethane; 2-Chloro-1,1,2-trifluoro-ethyl difluoromethyl ether; Ethrane® 1 ppm = 7.55 mg/m³	NIOSH* C 2 ppm (15.1 mg/m³) [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: 184.5 BP: 134°F Sol: Low Fl.P: NA IP: ? Sp.Gr(77°F): 1.52 Noncombustible Liquid	VP: 175 mm FRZ: ? UEL: NA LEL: NA	None reported	Anasorb; CS₂; GC/FID; OSHA [#103]
Epichlorohydrin C_3H_5OCl 106-89-8 TX4900000 2023 131P	1-Chloro-2,3-epoxypropane; 2-Chloropropylene oxide; γ-Chloropropylene oxide 1 ppm = 3.78 mg/m³	NIOSH Ca See Appendix A OSHA† 5 ppm (19 mg/m³) [skin]	Ca [75 ppm]	Colorless liquid with a slightly irritating, chloroform-like odor.	MW: 92.5 BP: 242°F Sol: 7% Fl.P: 93°F IP: 10.60 eV 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; CS₂; GC/FID; IV [#1010]
EPN $C_{14}H_{14}O_4NSP$ 2104-64-5 TB1925000	Ethyl p-nitrophenyl benzenethionophosphonate, O-Ethyl O-(4-nitrophenyl) phenylphosphonothioate $[C_2H_5O(C_6H_5)P(S)OC_6H_4NO_2]$	NIOSH/OSHA 0.5 mg/m³ [skin]	5 mg/m³	Yellow solid with an aromatic odor. [pesticide] [Note: A brown liquid above 97°F.]	MW: 323.3 BP: ? Sol: Insoluble Fl.P: NA IP: ? Sp.Gr(77°F): 1.27 Noncombustible Solid	VP(212°F): 0.0003 mm MLT: 97°F UEL: NA LEL: NA	Strong oxidizers	Filter; Isooctane; GC/FPD; IV [#5012]
Ethanolamine $NH_2CH_2CH_2OH$ 141-43-5 KJ5775000 2491 153	2-Aminoethanol, ß-Aminoethyl alcohol, Ethylolamine, 2-Hydroxyethylamine, Monoethanolamine 1 ppm = 2.50 mg/m³	NIOSH 3 ppm (8 mg/m³) ST 6 ppm (15 mg/m³) OSHA† 3 ppm (6 mg/m³)	30 ppm	Colorless, viscous liquid or solid (below 51°F) with an unpleasant, ammonia-like odor.	MW: 61.1 BP: 339°F Sol: Miscible Fl.P: 186°F IP: 8.96 eV Sp.Gr: 1.02 Class IIIA Combustible Liquid	VP: 0.4 mm FRZ: 51°F UEL: 23.5% LEL(284°F): 3.0%	Strong oxidizers, strong acids, iron [Note: May attack copper, brass, and rubber.]	Si gel; Methanol/ Water; GC/FID; IV [#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 5)
Skin: Eyes: Wash skin: Remove: Change: [Enflurane]	N.R. Prevent eye contact N.R. N.R. N.R.	TBAL	Inh Ing Con	Irrit eyes; CNS depres, analgesia, anes, seiz, resp depres	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, CNS
Skin: Eyes: Wash skin: Remove: **Change:** **Provide:** **[Epichlorohydrin]**	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: GMFOVAG/SCBAE	Inh Abs Ing Con	Irrit eyes, skin with deep pain; nau, vomit; abdom pain; resp distress, cough; cyan; repro effects; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, kidneys, liver, repro sys [in animals: nasal cancer]
Skin: Eyes: Wash skin: Remove: Change: Provide: [EPN]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH/OSHA 5 mg/m³: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; miosis, lac; rhin; head; chest tight, wheez, lar spasm; saliv; cyan; anor, nau, abdom cramps, diarr; para, convuls; 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
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** **[Ethanolamine]**	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet or contam** **Daily** **Eyewash**	**NIOSH/OSHA** **30 ppm: CCRS*/GMFS/PAPRS*/SA*/SCBAF** **§: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFS/SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, skin, resp sys; leth**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water flush prompt** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FIP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethion $[(C_2H_5O)_2P(S)S]_2CH_2$ 563-12-2 TE4550000 2783 152	O,O,O',O'-Tetraethyl S,S'-methylene diphosphorodithioate)	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 technical product has a very disagreeable odor.]	MW: 384.6 BP: >302°F (Decomposes) Sol: 0.0001% FI.P: 349°F IP: ? Sp.Gr: 1.22 Class IIIB Combustible Liquid	VP: 0.0000015 mm FRZ: 10°F UEL: ? LEL: ?	Acids, alkalis	OVS-2; Toluene/Acetone; GC/FPD; IV [#5600, Organophosphorus Pesticides
2-Ethoxyethanol $C_2H_5OCH_2CH_2OH$ 110-80-5 KK8050000 1171 127	Cellosolve®, EGEE, Ethylene glycol monoethyl ether 1 ppm = 3.69 mg/m^3	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 FI.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; Methanol/CH_2Cl_2; GC/FID; IV [#1403, Alcohols IV]
2-Ethoxyethyl acetate $CH_3COOCH_2CH_2OC_2H_5$ 111-15-9 KK8225000 1172 129	Cellosolve® acetate, EGEEA, Ethylene glycol monoethyl ether acetate, Glycol monoethyl ether acetate 1 ppm = 5.41 mg/m^3	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% FI.P: 124°F IP: ? Sp.Gr: 0.98 Class II Combustible Liquid	VP: 2 mm FRZ: -79°F UEL: ? LEL: 1.7%	Nitrates, strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]
Ethyl acetate $CH_3COOC_2H_5$ 141-78-6 AH5425000 1173 129	Acetic ester, Acetic ether, Ethyl ester of acetic acid, Ethyl ethanoate 1 ppm = 3.60 mg/m^3	NIOSH/OSHA 400 ppm (1400 mg/m^3)	2000 ppm [10%LEL]	Colorless liquid with an ether-like, fruity odor.	MW: 88.1 BP: 171°F Sol(77°F): 10% FI.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_2; GC/FID; IV [#1457]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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	TBAL	Inh Abs Ing Con	Irrit eyes, skin; nau, vomit, abdom cramps, diarr, salv; head, gidd, verti. weak, thin, chest tight, blurred vision, miosis card irreg; musc fasc; dysp	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
[Ethion]					
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.**	**NIOSH** **5 ppm: SA*** **12.5 ppm: SA:CF*** **25 ppm: 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**	**Eye: Irr immed** **Skin: Water flush prompt** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, resp sys, blood, kidneys, liver, repro sys, hemato sys**
[2-Ethoxyethanol]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH 5 ppm: CCROV*/SA* 12.5 ppm: SA:CF*/PAPROV* 25 ppm: CCROV/GMFOV/PAPRTOV*/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	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, resp sys, GI tract, repro sys, hemato sys
[2-Ethoxyethyl acetate]					
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **N.R.**	**NIOSH/OSHA** **2000 ppm: SA:CF[f]/PAPROV/CCRFOV/GMFOV/SCBAF/SAF** **§ SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, skin, nose, throat; narco; derm**	**Eye: Irr immed** **Skin: Water flush prompt** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**
[Ethyl **acetate**]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp. Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethyl acrylate $CH_2=CHCOOC_2H_5$ 140-88-5 AT0700000 1917 129P (inhibited)	Ethyl acrylate (inhibited), Ethyl ester of acrylic acid, Ethyl propenoate 1 ppm = 4.09 mg/m³	NIOSH Ca See Appendix A OSHA† 25 ppm (100 mg/m³) [skin]	Ca [300 ppm]	Colorless liquid with an acrid odor.	MW: 100.1 BP: 211°F Sol: 2% FLP: 48°F IP: 10.30 eV Sp.Gr: 0.92 Class IB Flammable Liquid	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_2; GC/FID; IV [#1450, Esters I]
Ethyl alcohol CH_3CH_2OH 64-17-5 KQ6300000 1170 127	Alcohol, Cologne spirit, Ethanol, EtOH, Grain alcohol 1 ppm = 1.89 mg/m³	NIOSH/OSHA 1000 ppm (1900 mg/m³)	3300 ppm [10%LEL]	Clear, colorless liquid with a weak, ethereal, virous odor.	MW: 46.1 BP: 173°F Sol: Miscible FLP: 55°F IP: 10.47 eV Sp.Gr: 0.79 Class IB Flammable Liquid	VP: 44 mm FRZ: -173°F UEL: 19% LEL: 3.3%	Strong oxidizers, potassium dioxide, bromine pentafluoride, acetyl bromide, acetyl chloride, platinum, sodium	Char; 2-Butanol CS_2; GC/FID; IV [#1400, Alcohols I]
Ethylamine $CH_3CH_2NH_2$ 75-04-7 KH2100000 1036 118	Aminoethane, Ethylamine (anhydrous), Monoethylamine 1 ppm = 1.85 mg/m³	NIOSH/OSHA 10 ppm (18 mg/m³)	600 ppm	Colorless gas or water-white liquid (below 62°F) with an ammonia-like odor. [Note: Shipped as a liquefied compressed gas.]	MW: 45.1 BP: 62°F Sol: Miscible FLP: 1°F IP: 8.86 eV RGasD: 1.91 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_2SO_4; GC/FID; III(3) [#S144]
Ethylbenzene $CH_3CH_2C_6H_5$ 100-41-4 DA0700000 1175 129	Ethylbenzol, Phenylethane 1 ppm = 4.34 mg/m³	NIOSH 100 ppm (435 mg/m³) ST125 ppm (545 mg/m³) OSHA† 100 ppm (435 mg/m³)	800 ppm [10%LEL]	Colorless liquid with an aromatic odor.	MW: 106.2 BP: 277°F Sol: 0.01% FLP: 55°F IP: 8.76 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 7 mm FRZ: -139°F UEL 6.7% LEL 0.8%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1501, Aromatic Hydro-carbons]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethyl bromide CH_3CH_2Br 74-96-4 KH6475000 1891 131	Bromoethane, Monobromoethane 1 ppm = 4.46 mg/m³	NIOSH See Appendix D OSHA† 200 ppm (890 mg/m³)	2000 ppm	Colorless to yellow liquid with an ether-like odor. [Note: A gas above 101°F.]	MW: 109.0 BP: 101°F Sol: 0.9% Fl.P: <4°F IP: 10.29 eV Sp.Gr: 1.46 Class IB Flammable Liquid	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; IV [#1011]
Ethyl butyl ketone $CH_3CH_2CO(CH_2)_3CH_3$ 106-35-4 MJ5250000 1224 127	Butyl ethyl ketone, 3-Heptanone 1 ppm = 4.67 mg/m³	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 Sp.Gr: 0.82 Class II Combustible Liquid	VP: 4 mm FRZ: -38°F UEL: ? LEL: ?	Oxidizers, acetaldehyde, perchloric acid	Char; Methanol/ CS_2; GC/FID; IV [#1301, Ketones II]
Ethyl chloride CH_3CH_2Cl 75-00-3 KH7525000 1037 115	Chloroethane, Hydrochloric ether, Monochloroethane, Muriatic ether 1 ppm = 2.64 mg/m³	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes) OSHA 1000 ppm (2600 mg/m³)	3800 ppm [10%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_2; GC/FID; IV [#2519]
Ethylene chlorohydrin CH_2ClCH_2OH 107-07-3 KK0875000 1135 131	2-Chloroethanol, 2-Chloroethyl alcohol, Ethylene chlorhydrin 1 ppm = 3.29 mg/m³	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 Sp.Gr: 1.20 Class IIIA Combustible Liquid	VP: 5 mm FRZ: -90°F UEL: 15.9% LEL: 4.9%	Strong oxidizers, strong caustics, water or steam	Char(pet); 2-Propanol/ CS_2; GC/FID; IV [#2513]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethylenediamine $NH_2CH_2CH_2NH_2$ 107-15-3 KH8575000 1604 132	1,2-Diaminoethane; 1,2-Ethanediamine; Ethylenediamine (anhydrous) 1 ppm = 2.46 mg/m³	NIOSH/OSHA 10 ppm (25 mg/m³)	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 FI.P: 93°F IP: 8.60 eV Sp.Gr: 0.91 Class IC Flammable Liquid	VP: 11 mm FRZ: 47°F UEL(212°F): 12% LEL(212°F): 2.5%	Strong acids & oxidizers, carbon tetrachloride & other chlorinated organic compounds, carbon disulfide [Note: Corrosive to metals.]	XAD-2*; DMF; HPLC/UVD; IV [#2540]
Ethylene dibromide $BrCH_2CH_2Br$ 106-93-4 KH9275000 1605 154	1,2-Dibromoethane; Ethylene bromide; Glycol dibromide 1 ppm = 7.69 mg/m³	NIOSH Ca See Appendix A 0.045 ppm C 0.13 ppm [15-min] OSHA 20 ppm C 30 ppm 50 ppm [5-min max peak]	Ca [100 ppm]	Colorless liquid or solid (below 50°F) with a sweet odor. [fumigant]	MW: 187.9 BP: 268°F Sol: 0.4% FI.P: NA IP: 9.45 eV Sp.Gr: 2.17 Noncombustible Liquid	VP: 12 mm FRZ: 50°F UEL: NA LEL: NA	Chemically-active metals such as sodium, potassium, calcium, hot aluminum & magnesium; liquid ammonia; strong oxidizers	Char; Benzene/ Methanol; GC/ECD; IV [#1008]
Ethylene dichloride $ClCH_2CH_2Cl$ 107-06-2 KI0525000 1184 129	1,2-Dichloroethane; Ethylene chloride; Glycol dichloride 1 ppm = 4.05 mg/m³	NIOSH Ca See Appendix A, C (Chloroethanes) 1 ppm (4 mg/m³) ST 2 ppm (8 mg/m³) OSHA† 50 ppm C 100 ppm 200 ppm (5-min max peak in any 3 hrs)	Ca [50 ppm]	Colorless liquid with a pleasant, chloroform-like odor. [Note: Decomposes slowly, becomes acidic & darkens in color.]	MW: 99.0 BP: 182°F Sol: 0.9% FI.P: 56°F IP: 11.05 eV Sp.Gr: 1.24 Class IB Flammable Liquid	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; IV [#1003, Haloge-nated Hydro-carbons]
Ethylene glycol $HOCH_2CH_2OH$ 107-21-1 KW2975000	1,2-Dihydroxyethane; 1,2-Ethanediol; Glycol; Glycol alcohol; Monoethylene glycol	NIOSH See Appendix D OSHA† none	N.D.	Clear, colorless, syrupy, odorless liquid. [antifreeze] [Note: A solid below 9°F.]	MW: 62.1 BP: 388°F Sol: Miscible FI.P: 232°F IP: ? Sp.Gr: 1.11 Class IIIB Combustible Liquid	VP: 0.06 mm FRZ: 9°F UEL: 15.3% LEL: 3.2%	Strong oxidizers, chromium trioxide, potassium permanganate, sodium peroxide [Note: Hygroscopic (i.e., absorbs moisture from the air).]	OVS-7; Methanol; GC/FID; IV [#5523]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethylene glycol dinitrate $O_2NOCH_2CH_2ONO_2$ 628-96-6 KW5600000	EGDN; 1,2-Ethanediol dinitrate; Ethylene dinitrate; Ethylene nitrate; Glycol dinitrate; Nitroglycol 1 ppm = 6.22 mg/m³	NIOSH ST 0.1 mg/m³ [skin] OSHA† C 0.2 ppm (1 mg/m³) [skin]	75 mg/m³	Colorless to yellow, oily, odorless liquid. [Note: An explosive ingredient (60-80%) in dynamite along with nitroglycerine (40-20%).]	MW: 152.1 BP: 387°F Sol: Insoluble FI.P: 419°F IP: ? Sp. Gr: 1.49 Explosive Liquid	VP: 0.05 mm FRZ: -8°F UEL: ? LEL: ?	Acids, alkalis	Tenax GC; Ethanol; GC/ECD; IV [#2507]
Ethyleneimine C_2H_5N 151-56-4 KX5075000 Ethylimine 1185 131P (inhibited)	Aminoethylene, Azirane, Azinidine, Dimethyleneimine, Dimethylenimine, Ethylenimine, 1 ppm = 1.76 mg/m³	NIOSH Ca See Appendix A OSHA [1910.1012] See Appendix B	Ca [100 ppm]	Colorless liquid with an ammonia-like odor. [Note: Usually contains inhibitors to prevent polymerization.]	MW: 43.1 BP: 133°F Sol: Miscible FI.P: 12°F IP: 9.20 eV Sp.Gr: 0.83 Class IB Flammable Liquid	VP: 160 mm FRZ: -97°F UEL: 54.8% LEL: 3.3%	Polymerizes explosively in presence of acids [Note: Explosive silver derivatives may be formed with silver alloys (e.g., silver solder).]	Bub; $CHCl_3$; HPLC/UVD; IV [#3514]
Ethylene oxide C_2H_4O 75-21-8 KX2450000 1040 119	Dimethylene oxide; 1,2-Epoxy ethane; Oxirane 1 ppm = 1.80 mg/m³	NIOSH Ca See Appendix A <0.1 ppm (<0.18 mg/m³) C 5 ppm (9 mg/m³) [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 FI.P: NA (Gas) -20°F (Liq) IP: 10.56 eV RGasD: 1.49 Sp.Gr: 0.82 (Liquid at 50°F) Flammable Gas Class IA Flammable Liquid	VP: 1.46 atm FRZ: -171°F UEL: 100% LEL: 3.0%	Strong acids, alkalis & oxidizers; chlorides of iron, aluminum & tin; oxides of iron & aluminum; water	Char(pet)*; DMF; GC/ECD; IV [#1614]
Ethylene thiourea $C_3H_6N_2S$ 96-45-7 NI9625000	1,3-Ethylene-2-thiourea; N,N-Ethylenethiourea; ETU; 2-Imidazolidine-2-thione	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 polychloroprene & other elastomers.]	MW: 102.2 BP: 446-595°F Sol(86°F): 2% FI.P: 486°F IP: 8.15 eV Sp.Gr: ? Combustible Solid	VP: 16 mm MLT: 392°F UEL: ? LEL: ?	Acrolein	Filter; Water; Vis; IV [#5011]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
kin: yes: Vash skin: emove: hange: rovide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) Daily Quick drench	NIOSH 1 mg/m³: SA* 2.5 mg/m³: SA:CF* 5 mg/m³: SAT:CF*/SCBAF/SAF 75 mg/m³: SAF/PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF:OV/HE/SCBAE	Inh Abs Ing Con	Throb head; dizz; nau, vomit, abdom pain; hypotension, flush, palp, angina;methemo; delirium, CNS depres; irrit skin, in animals: anemia; liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Skin, CVS, blood liver, kidneys
Ethylene glycol dinitrate]							
kin: yes: Vash skin: emove: hange: rovide:	**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: GMF:OV/SCBAE**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, nose, throat; nau, vomit; head, dizz; pulm edema; liver, kidney damage; eye burns; skin sens; [carc]**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, liver, kidneys [in animals: lung & liver tumors]**
Ethyleneimine]							
kin: yes: Vash skin: emove: hange: rovide:	Prevent skin contact (liq) Prevent eye contact (liq) When contam (liq) When wet (flamm) N.R. Quick drench (liq)	NIOSH 5 ppm: GMFS/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing (liq) Con	Irrit eyes, skin, nose, throat; peculiar taste: head; nau, vomit, diarr; dysp, cyan, pulm edema; drow, inco; EKG abnor; eye, skin burns (liq or high vap conc); liq frostbite; repro effects; [carc]; in animals: convuls, liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed (liq)	Eyes, skin, resp sys, liver, CNS, blood, kidneys, repro sys [peritoneal cancer; leukemia]
Ethylene oxide]							
kin: yes: Vash skin: emove: hange:	**Prevent skin contact** **Prevent eye contact** **When contam/Daily** **When wet or contam** **Daily**	**NIOSH** **¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMF:OV/HE/SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, in animals: thickening of the skin; goiter; terato effects; [carc]**	Eye: Skin: Breath: Swallow:	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Eyes, skin, thyroid, repro sys [in animals: liver, thyroid & lymphatic sys tumors]**
Ethylene thiourea]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL / FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ / UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Ethyl ether $C_2H_5OC_2H_5$ 60-29-7 KI5775000 1155 127	Diethyl ether, Diethyl oxide, Ether, Ethyl oxide, Solvent ether 1 ppm = 3.03 mg/m³	NIOSH See Appendix D OSHA† 400 ppm (1200 mg/m³)	1900 ppm [10%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 Sp.Gr: 0.71 Class IA Flammable Liquid	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; IV [#1610]
Ethyl formate CH_3CH_2OCHO 109-94-4 LQ8400000 1190 129	Ethyl ester of formic acid, Ethylmethanoate 1 ppm = 3.03 mg/m³	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 Sp.Gr: 0.92 Class IB Flammable Liquid	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_2; GC/FID; IV [#1452]
Ethylidene norbornene C_9H_{12} 16219-75-3 KB9450000	ENB, 5-Ethylidenebicyclo(2.2.1)-hept-2-ene, 5-Ethylidene-2-norbornene [Note: Due to its reactivity, ENB may be stabilized with tert-butyl catechol.] 1 ppm = 4.92 mg/m³	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(oc): 101°F IP: ? Sp.Gr: 0.90 Class II Combustible Liquid	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
Ethyl mercaptan CH_3CH_2SH 75-08-1 K19625000 2363 130	Ethanethiol, Ethyl sulfhydrate, Mercaptoethane 1 ppm = 2.54 mg/m³	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 Sp.Gr: 0.84 Class IA Flammable Liquid	VP: 442 mm FRZ: -228°F UEL: 18.0% LEL: 2.8%	Strong oxidizers [Note: Reacts violently with calcium hypochlorite.]	Filter*; HCl/DCE; GC/FPD; IV [#2542]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
N-Ethylmorpholine $C_4H_8ONCH_2CH_3$ 100-74-3 QE4025000	4-Ethylmorpholine 1 ppm = 4.71 mg/m^3	NIOSH 5 ppm (23 mg/m^3) [skin] OSHA† 20 ppm (94 mg/m^3) [skin]	100 ppm	Colorless liquid with an ammonia-like odor.	MW: 115.2 BP: 281°F Sol: Miscible Fl.P(oc): 90°F IP: ? Sp.Gr: 0.90 Class IC Flammable Liquid	VP: 6 mm FRZ: -81°F UEL: ? LEL: ?	Strong acids, strong oxidizers	Si gel; H_2SO_4; GC/FID; II(3) [#S146]
Ethyl silicate $(C_2H_5)_4SiO_4$ 78-10-4 VV9450000 1292 132	Ethyl orthosilicate, Ethyl silicate (condensed), Tetraethoxysilane, Tetraethyl orthosilicate, Tetraethyl silicate 1 ppm = 8.52 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 Fl.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_2; GC/FID; II(3) [#S264]
Fenamiphos $C_{13}H_{22}NO_3PS$ 22224-92-6 TB3675000	Ethyl 3-methyl-4-(methylthio)phenyl-(1-methylethyl)phosphoramidate, Nemacur®, Phenamiphos	NIOSH 0.1 mg/m^3 [skin] OSHA† none	N.D.	Off-white to tan, waxy solid. [insecticide] [Note: Found commercially as a granular ingredient (5-15%) or in an emulsifiable concentrate (400 g/l).]	MW: 303.4 BP: ? Sol: 0.03% Fl.P: ? IP: ? Sp.Gr: 1.14	VP: 0.00005 mm MLT: 121°F UEL: ? LEL: ?	None reported [Note: May hydrolyze under alkaline conditions.]	OVS-2; Toluene/Acetone; GC/FID; IV [#5600, Organophosphorus Pesticides]
Fensulfothion $C_{11}H_{17}O_4PS_2$ 115-90-2 TF3850000	Dasanit®; O,O-Diethyl O-(p-methylsulfinyl)phenyl)-phosphorothioate; Terracur P® [$(C_2H_5O)_2P(S)OC_6H_4S(O)CH_3$]	NIOSH 0.1 mg/m^3 OSHA† none	N.D.	Brown liquid or yellow oil. [pesticide]	MW: 308.4 BP: ? Sol(77°F): 0.2% Fl.P: ? IP: ? Sp.Gr: 1.20 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Alkalis	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)
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam emove: When wet (flamm) hange: N.R. rovide: Eyewash (>15%), Quick drench	NIOSH 50 ppm: CCROV*/SA* 100 ppm: SA:CF*/PAPROV*/CCRFOV/GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; vis dist: corn edema, blue-gray vision, colored haloes	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, resp sys
N-Ethylmorpholine]						
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam emove: When wet (flamm) hange: N.R.	NIOSH 100 ppm: SA* 250 ppm: SA:CF* 500 ppm: SCBAF/SAF 700 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose; in animals: lac; dysp, pulm edema; tremor, narco; liver, kidney damage; anemia	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, Eyes: liver, kidneys, blood, skin
Ethyl silicate]						
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam/Daily emove: When wet or contam hange: Daily rovide: Quick drench	TBAL	Inh Abs Ing Con	Nau, vomit, abdom cramps, diarr, salv; head, gidd, verti, weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Resp sys, CNS, CVS, blood chol
enamiphos]						
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam emove: When wet or contam hange: N.R. rovide: Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit skin; nau, vomit, abdom cramps, diarr, salv; head, gidd, verti, weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Skin, resp sys, CNS, CVS, blood chol
ensulfothion]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Fenthion $C_{10}H_{15}O_3PS$ 55-38-9 TF9625000	Baytex®; Entex®; O,O-Dimethyl O-3-methyl-4-methylthiophenyl phosphorothioate $[(CH_3O)_2P(S)OC_6H_3(CH_3)SCH_3]$	NIOSH See Appendix D OSHA† none	N.D.	Colorless to brown liquid with a slight, garlic-like odor. [insecticide]	MW: 278.3 BP: ? Sol: 0.006% FI.P: NA IP: ? Sp.Gr: 1.25 Noncombustible Liquid	VP: 0.00003 mm FRZ: 43°F UEL: NA LEL: NA	Oxidizers	None available
Ferbam $[(CH_3)_2NCS_2]_3Fe$ 14484-64-1 NO8750000	tris(Dimethyldithio-carbamato)iron, Ferric dimethyl dithio-carbamate	NIOSH 10 mg/m³ OSHA† 15 mg/m³	800 mg/m³	Dark brown to black, odorless solid. [fungicide]	MW: 416.5 BP: Decomposes Sol: 0.01% FI.P: ? IP: 7.72 eV Sp.Gr: ? Combustible Solid	VP: 0 mm (approx) MLT: >356°F (Decomposes) UEL: ? LEL: ? MEC: 55 g/m³	Strong oxidizers, moisture	Filter; none; Grav; IV [#0500, Particulates, NOR (total)]
Ferrovanadium dust FeV 12604-58-9 LK2900000	Ferrovanadium	NIOSH* 1 mg/m³ ST 3 mg/m³ [*Note: The REL also applies to Vanadium metal and Vanadium carbide.] OSHA† 1 mg/m³	500 mg/m³	Dark, odorless particulate dispersed in air. [Note: Ferro-vanadium metal is an alloy usually contain-ing 50-80% vanadium.]	MW: 106.8 BP: ? Sol: Insoluble FI.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/m³	Strong oxidizers	Filter; Acid; FAAS; OSHA [#ID121, #ID125G]
Fibrous glass dust LK3651000	Fiber glas®, Fiberglass, Glass fibers, Glass wool [Note: Usually produced from borosilicate & low alkali silicate glasses.]	NIOSH 3 fibers/cm³ (fibers ≤ 3.5 µm in diameter & ≥ 10 µm in length) 5 mg/m³ (total) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Typically, glass filaments >3 µm in diameter or glass "wool" with diameters down to 0.05 µm & >1 µm in length.	MW: NA BP: NA Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 2.5 Noncombustible Fibers	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; PCM; IV [#7400, Asbestos and Other Fibers]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		TBAL	Inh Abs Ing Con	Nau, vomit, abdom cramps, diarr, salv; head, gidd, vert, weak; rhin, chest tight; blurred vision, miosis; card irregularities; musc fasc; dysp	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CNS, CVS, plasma chol
Ferthion]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily		NIOSH 50 mg/m³: D 100 mg/m³: DXSQ*/HiE*/SA* 250 mg/m³: SACF*/PAPRD* 500 mg/m³: HiEF/SAT:CF*/PAPRTHiE*/SCBAF/SAF 800 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, resp tract; derm; GI dist	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, GI tract
Ferbam]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 5 mg/m³: DM* 10 mg/m³: DMXSQ*/SA* 25 mg/m³: SA:CF*/PAPRDM* 50 mg/m³: HiEF/SAT:CF/PAPRTHiE*/SCBAF/SAF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, resp sys; in animals: bron, pneumonitis	Eye: Irr immed Breath: Resp support		Eyes, resp sys
Ferrovanadium dust]							
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily		NIOSH 5X REL: D 10X REL: DXSQ/HiE/SA 25X REL: SA:CF/PAPRD 50X REL: HiEF/PAPRTHiE/SCBAF/SAF 1000X REL: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, skin, nose, throat; dysp	Eye: Irr immed Breath: 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: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Fluorine F_2 7782-41-4 LM6475000 9192 167 (cryogenic liquid) 1045 124 (compressed)	Fluorine-19 1 ppm = 1.55 mg/m³	NIOSH/OSHA 0.1 ppm (0.2 mg/m³)	25 ppm	Pale-yellow to greenish gas with a pungent, irritating odor.	MW: 38.0 BP: -307°F Sol: Reacts FI.P: NA IP: 15.70 eV RGasD: 1.31 Nonflammable Gas, but an extremely strong oxidizer.	VP: >1 atm FRZ: -363°F UEL: NA LEL: NA	Water, nitric acid, oxidizers, organic compounds [Note: Reacts violently with all combustible materials, except the metal containers in which it is shipped. Reacts with H_2O to form hydrofluoric acid.]	None available
Fluorotrichloromethane CCl_3F 75-69-4 PB6125000	Freon® 11, Monofluorotrichloromethane, Refrigerant 11, Trichlorofluoromethane, Trichloromonofluoromethane 1 ppm = 5.62 mg/m³	NIOSH C 1000 ppm (5600 mg/m³) OSHA† 1000 ppm (5600 mg/m³)	2000 ppm	Colorless to water-white, nearly odorless liquid or gas (above 75°F).	MW: 137.4 BP: 75°F Sol(75°F): 0.1% FI.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_2; GC/FID; IV [#1006, Trichloro-fluoro-methane]
Fluoroxene $CF_3CH_2OCH{=}CH_2$ 406-90-6 KO4250000	2,2,2-Trifluoroethoxy-ethene; 2,2,2-Trifluoroethyl vinyl ether 1 ppm = 5.16 mg/m³	NIOSH* C 2 ppm (10.3 mg/m³) [60-min] [*Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Liquid. [inhalation anesthetic] [Note: A gas above 109°F.]	MW: 126.1 BP: 109°F Sol: ? FI.P: ? IP: ? Sp.Gr: 1.14 Combustible Liquid [potentially EXPLOSIVE!].	VP: 286 mm FRZ: ? UEL: ? LEL: ?	None reported	None available
Fonofos $C_{10}H_{15}OPS_2$ 944-22-9 TA5950000	Dyfonate®, Dyphonate, O-Ethyl-S-phenyl ethyl-phosphorothioate, Fonophos 1 ppm = 10.07 mg/m³	NIOSH 0.1 mg/m³ [skin] OSHA† none	N.D.	Light-yellow liquid with an aromatic odor. [insecticide]	MW: 246.3 BP: ? Sol: 0.001% FI.P: >201°F IP: ? Sp.Gr: 1.15 Class IIIB Combustible Liquid	VP(77°F): 0.0002 mm FRZ: ? UEL: ? LEL: ?	None reported	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus & Pesticides]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact (liq) Prevent eye contact When contam (liq) When wet or contam (liq) N.R. Eyewash (liq), Quick drench (liq)	NIOSH/OSHA 1 ppm: SA* 2.5 ppm: SA:CF* 5 ppm: SCBAF/SAF 25 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, resp sys; lar spasm, bron spasm; pulm edema; eye, skin burns; in animals: liver, kidney damage	Eye: Skin: Breath:	Irr immed Water flush immed Resp support	Eyes, skin, resp sys, liver, kidneys
[Fluorine]							
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/OSHA 2000 ppm: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Inco, tremor; derm; card arrhy, card arrest; asphy; liq: frostbite	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Skin, resp sys, CVS
[Fluorotrichloromethane]							
Skin: Eyes: Wash skin: Remove: Change:	N.R. Prevent eye contact N.R. N.R. N.R.	TBAL	Inh Ing Con	Irrit eyes; CNS depres, analgesia, anes, sez, resp depres	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Eyes, CNS
[Fluroxene]							
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	Nau, vomit, abdom cramps, diarr, salv; head, gidd, verti, weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Resp sys, CNS, CVS, blood chol
[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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Formaldehyde HCHO 50-00-0 LP8925000	Methanal, Methyl aldehyde, Methylene oxide 1 ppm = 1.23 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: 10.88 eV RGasD: 1.04 Flammable Gas	VP: >1 atm FRZ: -134°F UEL: 73% LEL: 7.0%	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; IV [#3500] [Also #2541]
Formalin (as formaldehyde) 1198 132 2209 132	Formaldehyde solution [Note: Formalin is an aqueous solution that is 37% formaldehyde by weight; inhibited solutions contain 6-12% methyl alcohol. Also see specific listings for Formaldehyde and Methyl alcohol.]	NIOSH Ca See Appendix A 0.016 ppm C 0.1 ppm [15-min] OSHA [1910.1048] 0.75 ppm ST 2 ppm	Ca [20 ppm]	Colorless liquid with a pungent odor.	MW: Varies BP: 214°F Sol: Miscible FLP: 185°F IP: ? Sp.Gr: 1.08 Class IIIA Combustible Liquid	VP: 1 mm FRZ: ? UEL: 73% LEL: 7%	Strong oxidizers, alkalis & acids; phenols; urea; oxides; isocyanates; caustics; anhydrides	Filter/Imp(2); none; Vis; IV [#3500] [Also #2541]
Formamide $HCONH_2$ 75-12-7 LQ0525000	Carbamaldehyde, Methanamide 1 ppm = 1.85 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 IIIB Combustible Liquid	VP(86°F): 0.1 mm FRZ: 37°F UEL: ? LEL: ?	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 153	Formic acid (85-95% in aqueous solution); Hydrogen carboxylic acid; Methanoic acid 1 ppm = 1.88 mg/m^3	NIOSH/OSHA 5 ppm (9 mg/m^3)	30 ppm	Colorless liquid with a pungent, penetrating odor. [Note: Often used in an aqueous solution.]	MW: 46.0 BP: 224°F (90% soln.) Sol: Miscible FLP(oc): 122°F (90% soln.) IP: 11.05 eV Sp.Gr: 1.22 (90% solution) Class II Combustible Liquid (90% solution)	VP: 35 mm FRZ: 20°F (90% soln.) UEL: 57% (90% soln.) LEL: 18% (90% soln.)	Strong oxidizers, strong caustics, concentrated sulfuric acid [Note: Corrosive to metals.]	Si gel*; Water; IC; IV [#2011]

Personal protection and sanitation (See Table 3)		Recommendations forrespirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin:	N.R.	NIOSH	Inh	Irrit eyes, nose, throat,	Eye:	Irr immed	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; [carc]			
Remove:	N.R.						
Change:	N.R.						
Formaldehyde]							
Skin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, nose, throat,	Eye:	Irr immed	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; [carc]	Breath:	Resp support	
Remove:	When wet or contam				Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
Formalin (as formaldehyde)]							
Skin:	N.R.	TBAL	Inh	Irrit eyes, skin, muc memb;	Eye:	Irr immed	Eyes, skin, resp sys,
Eyes:	Prevent eye contact		ing	drow, fig; 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 immed	
Change:	N.R.						
Formamide]							
Skin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, throat,	Eye:	Irr immed	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: GMFOVHE/SCBAE			Swallow:	Medical attention immed	
Change:	N.R.						
Provide:	Eyewash, Quick drench						
Formic acid]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Furfural $C_5H_4O_2$ 98-01-1 LT7000000 1199 132P	Fural, 2-Furancarboxaldehyde, Furfuraldehyde, 2-Furfuraldehyde 1 ppm = 3.93 mg/m³	NIOSH See Appendix D OSHA† 5 ppm (20 mg/m³) [skin]	100 ppm	Colorless to amber liquid with an almond-like odor. [Note: Darkens in light and air.]	MW: 96.1 BP: 323°F Sol: 8% FI.P: 140°F IP: 9.21 eV Sp.Gr: 1.16 Class IIA Combustible Liquid	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; IV [#2529]
Furfuryl alcohol $C_5H_6O_2$ 98-00-0 LU9100000 2874 153	2-Furylmethanol, 2-Hydroxymethylfuran 1 ppm = 4.01 mg/m³	NIOSH 10 ppm (40 mg/m³) ST 15 ppm (60 mg/m³) [skin] OSHA† 50 ppm (200 mg/m³)	75 ppm	Colorless to amber liquid with a faint, burning odor. [Note: Darkens on exposure to light.]	MW: 98.1 BP: 336°F Sol: Miscible FI.P: 149°F IP: ? Sp.Gr: 1.13 Class IIA Combustible Liquid	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; IV [#2505]
Gasoline 8005-61-9 LX3300000 1203 128	Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins & aromatics).] 1 ppm = 2.95 mg/m³ (approx)	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Clear liquid with a characteristic odor.	MW: 72 (approx) BP: 102°F Sol: Insoluble FI.P: -45°F IP: ? Class IB Flammable Liquid	VP: 38-300 mm FRZ: ? UEL: 7.6% LEL: 1.4%	Strong oxidizers such as peroxides, nitric acid & perchlorates	None available
Germanium tetrahydride GeH_4 7782-65-2 LY4900000 2192 119	Germane, Germanium hydride, Germanomethane, Monogermane [Note: Used chiefly for the production of high purity germanium for use in semiconductors.] 1 ppm = 3.13 mg/m³	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 FI.P: NA (Gas) IP: 11.34 eV RGasD: 2.65 Flammable Gas (may ignite SPONTANEOUSLY in air).	VP: >1 atm FRZ: -267°F UEL: ? LEL: ?	Bromine	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.	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:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys
[Furfural]							
Skin: Eyes: Wash skin: Remove: **Change:** **Provide:**	Prevent skin contact Prevent eye contact When contam When wet or contam **N.R.** **Quick drench**	NIOSH/OSHA 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, diarr; diuresis; resp, body temperature depres; vomit; derm	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention **immed**	Eyes, skin, resp sys CNS
[Furfuryl alcohol]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R. Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, muc memb; derm; head, ftg, blurred vision, dizz, slurred speech, conf, convuls; chemical pneu (aspir); possible liver, kidney damage; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys [in animals: liver & kidney cancer]
[Gasoline]							
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:**	N.R. N.R. N.R. N.R. N.R.	**TBAL**	**Inh**	**Mal, head, gidd, fainting; dysp; nau, vomit; kidney inj; 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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Glutaraldehyde $OCH(CH_2)_3CHO$ 111-30-8 MA2450000	Glutaric dialdehyde; 1,5-Pentanedial 1 ppm = 4.09 mg/m³	NIOSH C 0.2 ppm (0.8 mg/m³) See Appendix C (Aldehydes) OSHA† none	N.D.	Colorless liquid with a pungent odor.	MW: 100.1 BP: 212°F Sol: Miscible Fl.P: NA IP: ? Sp.Gr: 1.10 Noncombustible Liquid	VP: 17 mm FRZ: 7°F UEL: NA LEL: NA	Strong oxidizers, strong bases [Note: Alkaline solutions of glutaraldehyde (i.e., activated glutaraldehyde) react with alcohol, ketones, amines, hydrazines & proteins.]	Sil gel*; Acetonitrile; HPLC/UV; IV [#2532]
Glycerin (mist) $HOCH_2CH(OH)CH_2OH$ 56-81-5 MA8050000	Glycerin (anhydrous); Glycerol; Glycyl alcohol; 1,2,3-Propanetriol; Trihydroxypropane	NIOSH See Appendix D OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Clear, colorless, odorless, syrupy liquid or solid (below 64°F). [Note: The solid form melts above 64°F but the liquid form freezes at a much lower temperature.]	MW: 92.1 BP: 554°F (Decomposes) Sol: Miscible Fl.P: 320°F IP: ? Sp.Gr: 1.26 Class IIIB Combustible Liquid	VP(122°F): 0.003 mm MLT: 64°F UEL: ? LEL: ?	Strong oxidizers (e.g., chromium trioxide, potassium chlorate, potassium permanganate) [Note: Hygroscopic (i.e., absorbs moisture from the air).]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Glycidol $C_3H_6O_2$ 556-52-5 UB4375000	2,3-Epoxy-1-propanol; Epoxypropyl alcohol; Glycide; Hydroxymethyl ethylene oxide; 2-Hydroxymethyl oxiran; 3-Hydroxypropylene oxide 1 ppm = 3.03 mg/m³	NIOSH 25 ppm (75 mg/m³) OSHA† 50 ppm (150 mg/m³)	150 ppm	Colorless liquid.	MW: 74.1 BP: 320°F (Decomposes) Sol: Miscible Fl.P: 162°F IP: ? Sp.Gr: 1.12 Class IIIA Combustible Liquid	VP(77°F): 0.9 mm FRZ: -49°F UEL: ? LEL: ?	Strong oxidizers, nitrates	Char; THF; GC/FID; IV [#1608]
Glycolonitrile $HOCH_2CN$ 107-16-4 AM0350000	Cyanomethanol, Formaldehyde cyanohydrin, Glycolic nitrile, Glyconitrile, Hydroxyacetonitrile 1 ppm = 2.34 mg/m³	NIOSH C 2 ppm (5 mg/m³) [15-min] OSHA none	N.D.	Colorless, odorless, oily liquid. [Note: Forms cyanide in the body.]	MW: 57.1 BP: 361°F (Decomposes) Sol: Soluble Fl.P: ? IP: ? Sp.Gr(66°F): 1.10 Combustible Liquid	VP(145°F): 1 mm FRZ: <-98°F UEL: ? LEL: ?	Traces of alkalis (promote violent polymerization)	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Grain dust (oat, wheat, barley) MD7900000	None [Note: Grain dust consists of 60-75% organic materials (cereal grains) & 25-40% inorganic materials (soil), and includes fertilizers, pesticides & microorganisms.]	NIOSH 4 mg/m^3 OSHA 10 mg/m^3	N.D.	Mixture of grain and all the other substances associated with its cultivation & harvesting.	Properties depend upon the specific component of the grain dust.		None reported	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Graphite (natural) C 7782-42-5 MD9659600	Black lead, Mineral carbon, Plumbago, Silver graphite, Stove black [Note: Also see specific listing for Graphite (synthetic).]	NIOSH 2.5 mg/m^3 (resp) OSHA† 15 mppcf	1250 mg/m^3	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 2.0-2.25 Combustible Solid	VP: 0 mm (approx) MLT: 6602°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Graphite (synthetic) C 7440-44-0 FF5250100 1362 133 (carbon, activated)	Activated carbon [Note: Also see specific listing for Graphite (natural).]	NIOSH See Appendix D OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Steel gray to black, greasy feeling, odorless solid.	MW: 12.0 BP: Sublimes Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 1.5-1.8 Combustible Solid	VP: 0 mm (approx) MLT: 6602°F (Sublimes) UEL: NA LEL: NA	Very strong oxidizers such as fluorine, chlorine trifluoride & potassium peroxide	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Gypsum $CaSO_4 \cdot 2H_2O$ 13397-24-5 MG2360000	Calcium(II) sulfate dihydrate, Gypsum stone, Hydrated calcium sulfate, Mineral white [Note: Gypsum is the dihydrate form of calcium sulfate; Plaster of Paris is the hemihydrate form.]	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	White or nearly white, odorless, crystalline solid.	MW: 172.2 BP: ? Sol(77°F): 0.2% FI.P: NA IP: NA Sp.Gr: 2.32 Noncombustible Solid	VP: 0 mm (approx) MLT: 262-325°F (Loses H_2O) UEL: NA LEL: NA	Aluminum (at high temperatures), diazomethane	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hafnium Hf 7440-58-6 MG4600000 1326 170 (powder, wet) 2545 135 (powder, dry)	Celtium, Elementa 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: 8315°F Sol: Insoluble FLP: 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; III(5) [#S194]
Halothane $CF_3CHBrCl$ 151-67-7 KH6550000	1-Bromo-1-chloro-2,2,2-trifluoroethane; 2-Bromo-2-chloro-1,1,1-trifluoroethane; 1,1,1-Trifluoro-2-bromo-2-chloroethane; 2,2,2-Trifluoro-1-bromo-1-chloroethane 1 ppm = 8.07 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% FLP: 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_2; GC/FID; OSHA [#29]
Heptachlor $C_{10}H_5Cl_7$ 76-44-8 PC0700000 2761 151 (organochlorine pesticide, solid)	1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene	NIOSH Ca See Appendix A 0.5 mg/m^3 [skin] OSHA 0.5 mg/m^3 [skin]	Ca [35 mg/m^3]	White to light tan crystals with a camphor-like odor. [insecticide]	MW: 373.4 BP: 293°F (Decomposes) Sol: 0.0006% FLP: 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; III(5) [#S287]
n-Heptane $CH_3(CH_2)_5CH_3$ 142-82-5 MI7700000 1206 128	Heptane, normal-Heptane 1 ppm = 4.10 mg/m^3	NIOSH 85 ppm (350 mg/m^3) C 440 ppm (1800 mg/m^3) [15-min] OSHA† 500 ppm (2000 mg/m^3)	750 ppm	Colorless liquid with a gasoline-like odor.	MW: 100.2 BP: 209°F Sol: 0.0003% FLP: 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_2; GC/FID; IV [#1500; Hydrocarbons]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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: [Hafnium]	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH/OSHA 2.5 mg/m³: DM 5 mg/m³: DM/XSQ/SA 12.5 mg/m³: SA:CF*/PAPRDM* 25 mg/m³: HIEF/SAT:CF*/PAPRTHIE*/ SCBAF/SAF 50 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	In animals: irrit eyes, skin, muc memb; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, muc memb, liver
Skin: Eyes: Wash skin: Remove: **Change:** **Provide:** [Halothane]	**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 arrhy; liver, kidney damage; decr audio-visual performance;** **in animals: repro effects**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash prompt** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CVS, CNS, liver, kidneys, repro sys**
Skin: Eyes: Wash skin: Remove: Change: Provide: [Heptachlor]	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: GMF0VHIE/SCBAE	Inh Abs Ing Con	In animals: tremor, convuls; liver damage; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	CNS, liver [in animals: liver cancer]
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** [n-Heptane]	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet (flamm)** N.R.	**NIOSH** **750 ppm: CCROV/GMFOV/PAPROV/ SA/SCBAF** §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	**Inh** **Ing** **Con**	**Li-head, gidd, stupor, verti, inco; loss of appetite, nau; derm; chemical pneu (aspir liq); uncon**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash prompt** **Resp support** **Medical attention immed**	**Skin, resp sys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1-Heptanethiol $CH_3(CH_2)_6SH$ 1639-09-4 MJ1400000 1228 131	Heptyl mercaptan, n-Heptyl mercaptan 1 ppm = 5.41 mg/m³	NIOSH C 0.5 ppm (2.7 mg/m³) [15-min] OSHA none	N.D.	Colorless liquid with a strong odor.	MW: 132.3 BP: 351°F Sol: Insoluble FI.P: 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
Hexachlorobutadiene $Cl_2C=CClCCl=CCl_2$ 87-68-3 EJ0700000 2279 151	HCBD; Hexachloro-1,3-butadiene; 1,3-Hexachlorobutadiene; Perchlorobutadiene 1 ppm = 10.66 mg/m³	NIOSH Ca See Appendix A 0.02 ppm (0.24 mg/m³) [skin] OSHA† none	Ca [N.D.]	Clear, colorless liquid with a mild, turpentine-like odor.	MW: 260.7 BP: 419°F Sol: Insoluble FI.P: ? IP: ? Sp.Gr: 1.55 Combustible Liquid	VP: 0.2 mm FRZ: -6°F UEL: ? LEL: ?	Oxidizers	XAD-2; Hexane; GC/ECD; IV [#2543]
Hexachlorocyclo-pentadiene C_5Cl_6 77-47-4 GY1225000 2646 151	HCCPD; Hexachloro-1,3-cyclo-pentadiene; 1,2,3,4,5,5-Hexachloro-1,3-cyclopentadiene; Perchlorocyclopentadiene 1 ppm = 11.16 mg/m³	NIOSH 0.01 ppm (0.1 mg/m³) 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) FI.P: NA IP: ? Sp.Gr: 1.71 Noncombustible Liquid	VP(77°F): 0.08 mm FRZ: 16°F UEL: NA LEL: NA	Water, light [Note: Reacts slowly with water to form hydrochloric acid; will corrode iron & most metals in presence of moisture. Explosive hydrogen gas may collect in enclosed spaces in the presence of moisture.]	Porapak(2); Hexane; GC/ECD; IV [#2518]
Hexachloroethane Cl_3CCCl_3 67-72-1 KI4025000 9037 151	Carbon hexachloride, Ethane hexachloride, Perchloroethane 1 ppm = 9.68 mg/m³	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 1 ppm (10 mg/m³) [skin] OSHA 1 ppm (10 mg/m³) [skin]	Ca [300 ppm]	Colorless crystals with a camphor-like odor.	MW: 236.7 BP: Sublimes Sol(72°F): 0.005% FI.P: NA IP: 11.22 eV Sp.Gr: 2.09 Noncombustible Solid	VP: 0.2 mm MLT: 368°F (Sublimes) UEL: NA LEL: NA	Alkalis; metals such as zinc, cadmium, aluminum, hot iron & mercury	Char; CS_2; GC/FID; IV [#1003, Haloge-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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [1-Heptanethiol]	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF &: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, blood
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: N.R. Provide: **Eyewash, Quick drench** [Hexachlorobutadiene]	**NIOSH** **&: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Abs** **Ing** **Con**	**In animals: irrit eyes, skin, resp sys, kidney damage; [carc]**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, kidneys** **[in animals: kidney tumors]**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Hexachlorocyclopentadiene]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; lac; sneez, cough, dysp, salv, pulm edema; nau, vomit, diarr; in animals: liver, kidney inj	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam/Daily** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench** Hexachloroethane]	**NIOSH** **&: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, muc memb; in animals: kidney damage; [carc]**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, kidneys** **[in animals: liver cancer]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hexachloronaphthalene $C_{10}H_2Cl_6$ 1335-87-1 QJ7350000	Halowax® 1014	NIOSH/OSHA 0.2 mg/m^3 [skin]	2 mg/m^3	White to light-yellow solid with an aromatic odor.	MW: 334.9 BP: 650-730°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 1.78 Noncombustible Solid	VP: <1 mm MLT: 279°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/ECD; II(2) [#S100]
1-Hexadecanethiol $CH_3[CH_2]_{15}SH$ 2917-26-2 1228 131 (liquid)	Cetyl mercaptan, Hexadecanethiol-1, n-Hexadecanethiol, Hexadecyl mercaptan 1 ppm = 10.59 mg/m^3	NIOSH C 0.5 ppm (5.3 mg/m^3) [15-min] OSHA none	N.D.	Colorless liquid or solid (below 64-68°F) with a strong odor.	MW: 258.5 BP: ? Sol: Insoluble Fl.P: 215°F IP: ? Sp.Gr: 0.85 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: 64-68°F UEL: ? LEL: ?	Oxidizers, strong acids & bases, alkali metals, reducing agents	None available
Hexafluoroacetone $(CF_3)_2CO$ 684-16-2 UC2450000 2420 125	Hexafluoro-2-propanone; 1,1,1,3,3,3-Hexafluoro-2-propanone; HFA; Perfluoroacetone 1 ppm = 6.79 mg/m^3	NIOSH 0.1 ppm (0.7 mg/m^3) [skin] OSHA† none	N.D.	Colorless gas with a musty odor. [Note: Shipped as a liquefied compressed gas.]	MW: 166.0 BP: -18°F Sol: Reacts Fl.P: NA IP: 11.81 eV RGasD: 5.76 Nonflammable Gas, but highly reactive with water & other substances, releasing heat.	VP: 5.8 atm FRZ: -188°F UEL: NA LEL: NA	Water, acids [Note: Hygroscopic (i.e., absorbs moisture from the air); reacts with moisture to form a highly acidic sesquihydrate.]	None available
Hexamethylene diisocyanate $OCN[CH_2]_6NCO$ 822-06-0 MO1740000 2281 156	1,6-Diisocyanatohexane; HDI; Hexamethylene-1,6-diisocyanate; 1,6-Hexamethylene diisocyanate; HMDI 1 ppm = 6.88 mg/m^3	NIOSH 0.005 ppm (35 µg/m^3) C 0.020 ppm (140 µg/m^3) [10-min] OSHA none	N.D.	Clear, colorless to slightly yellow liquid with a sharp, pungent odor.	MW: 168.2 BP: 415°F Sol: Low (Reacts) Fl.P: 284°F IP: ? Sp.Gr(77°F): 1.04 Class IIIB Combustible Liquid	VP(77°F): 0.5 mm FRZ: -89°F UEL: ? LEL: ?	Water, alcohols, strong bases, amines, carboxylic acids, organotin catalysts [Note: Reacts slowly with water to form carbon dioxide. Avoid heating above 392°F (polymerizes).]	Imp; Reagent; HPLC/UVD; IV [#5522, Isocyanates]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily	NIOSH/OSHA 2 mg/m³: SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	Inh Abs Ing Con	Acne-form derm, nau, conf, jaun, coma	Eye: Irrimmed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, liver
[Hexachloronaphthalene]						
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily**	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAFROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0V/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, dizz, weak, cyan, nau, convuls	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, blood
[1-Hexadecanethiol]						
Skin: Prevent skin contact/ Frostbite Eyes: Prevent eye contact/ Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc membr, resp sys; pulm edema; liq: frostbite; in animals: terato, repro effects, kidney inj	Eye: Frostbite Skin: Frostbite Breath: Resp support		Eyes, skin, resp sys, kidneys, repro sys
[Hexafluoroacetone]						
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: N.R.** **Provide: Eyewash, Quick drench**	NIOSH 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: GMF0V/SCBAE	Inh **Ing** **Con**	Irrit eyes, skin, resp sys; **cough, dysp, bron, wheez, pulm edema, asthma; corn damage, skin blisters**	Eye: Irr immed **Skin: Soap flush immed** **Breath: Resp support** **Swallow: Medical attention immed**		Eyes, skin, resp sys
[Hexamethylene diisocyanate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hexamethyl phosphoramide $[(CH_3)_2N]_3PO$ 680-31-9 TD0875000	Hexamethylphosphoric triamide, Hexamethylphosphoro-triamide, HMPA, Tris(dimethylamino)-phosphine oxide	NIOSH Ca See Appendix A OSHA none	Ca [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 FLP: 222°F IP: ? Sp.Gr: 1.03 Class IIIB Combustible Liquid	VP: 0.03 mm FRZ: 43°F UEL: ? LEL: ?	Oxidizers, strong acids, chemically-active metals (e.g., potassium, sodium, magnesium, zinc)	None available
n-Hexane $CH_3[CH_2]_4CH_3$ 110-54-3 MN9275000 1208 128	Hexane, Hexyl hydride, normal-Hexane 1 ppm = 3.53 mg/m³	NIOSH 50 ppm (180 mg/m³) OSHA† 500 ppm (1800 mg/m³)	1100 ppm [10%LEL]	Colorless liquid with a gasoline-like odor.	MW: 86.2 BP: 156°F Sol: 0.002% FLP: -7°F IP: 10.18 eV Sp.Gr: 0.66 Class IB Flammable Liquid	VP: 124 mm FRZ: -219°F UEL: 7.5% LEL: 1.1%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydro-carbons]
Hexane isomers (excluding n-Hexane) C_6H_{14} 1208 128	Diethylmethylmethane; DiIsopropyl; 2,2-Dimethylbutane; 2,3-Dimethylbutane; Isohexane; 2-Methylpentane; 3-Methylpentane; [Note: Also see specific listing for n-Hexane.] 1 ppm = 3.53 mg/m³	NIOSH 100 ppm (350 mg/m³) C 510 ppm (1800 mg/m³) [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 FLP: -54 to 19°F IP: ? Sp.Gr: 0.65-0.66 Class IB Flammable Liquids	VP: ? FRZ: -245 to -148°F UEL: ? LEL: ?	Strong oxidizers	None available
n-Hexanethiol $CH_3[CH_2]_5SH$ 111-31-9 MO4550000	1-Hexanethiol, Hexyl mercaptan, n-Hexyl mercaptan, n-Hexylthiol 1 ppm = 4.83 mg/m³	NIOSH C 0.5 ppm (2.7 mg/m³) [15-min] OSHA none	N.D.	Colorless liquid with an unpleasant odor.	MW: 118.2 BP: 304°F Sol: Insoluble FLP: 68°F IP: ? Sp.Gr: 0.84 Class IB Flammable Liquid	VP: ? FRZ: -113°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH ¥ SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; dysp; abdom pain; [carc]	Eye: Water flush immed Skin: Wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys; CNS, GI tract [inanimals: cancer of the nasal cavity]
Hexamethyl phosphoramide]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **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; li-head; nau, head, perineur; numb extremities, musc weak; derm; gidd; chemical pneu (aspir liq)	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, PNS
n-Hexane]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH 1000 ppm: SA* 2500 ppm: SA:CF* 5000 ppm: SAT: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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Hexane isomers (excluding n-Hexane)]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **N.R.**	NIOSH 5 ppm: CCROV/SA 12.5 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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, blood
-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: MW, BP, SOL FI.P, IP, Sp. Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2-Hexanone $CH_3CO(CH_2)_3CH_3$ 591-78-6 MP1400000	Butyl methyl ketone, MBK, Methyl butyl ketone, Methyl n-butyl ketone 1 ppm = 4.10 mg/m³	NIOSH 1 ppm (4 mg/m³) OSHA† 100 ppm (410 mg/m³)	1600 ppm	Colorless liquid with an acetone-like odor.	MW: 100.2 BP: 262°F Sol: 2% FI.P: 77°F IP: 9.34 eV Sp Gr: 0.81 Class IC Flammable Liquid	VP: 11 mm FRZ: -71°F UEL: 8% LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; IV [#1300, Ketones I]
Hexone $CH_3COCH_2CH(CH_3)_2$ 108-10-1 SA9275000 1245 127	Isobutyl methyl ketone, Methyl isobutyl ketone, 4-Methyl 2-pentanone, MIBK 1 ppm = 4.10 mg/m³	NIOSH 50 ppm (205 mg/m³) ST 75 ppm (300 mg/m³) OSHA† 100 ppm (410 mg/m³)	500 ppm	Colorless liquid with a pleasant odor.	MW: 100.2 BP: 242°F Sol: 2% FI.P: 64°F IP: 9.30 eV Sp Gr: 0.80 Class IB Flammable Liquid	VP: 16 mm FRZ: -120°F UEL(200°F): 8.0% LEL(200°F): 1.2%	Strong oxidizers, potassium tert-butoxide	Char; CS_2; GC/FID; IV [#1300, Ketones I]
sec-Hexyl acetate $C_8H_{16}O_2$ 108-84-9 SA7525000 1233 129	1,3-Dimethylbutyl acetate; Methylisoamyl acetate $[CH_3COOCH(CH_3)CH_2CH(CH_3)_2]$ 1 ppm = 5.90 mg/m³	NIOSH/OSHA 50 ppm (300 mg/m³)	500 ppm	Colorless liquid with a mild, pleasant, fruity odor.	MW: 144.2 BP: 297°F Sol: 0.09% FI.P: 113°F IP: ? Sp Gr: 0.86 Class II Combustible Liquid	VP: 3 mm FRZ: -83°F UEL: ? LEL: ?	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]
Hexylene glycol $(CH_3)_2COHCH_2CHOHCH_3$ 107-41-5 SA0810000	2,4-Dihydroxy-2-methyl-pentane; 2-Methyl-2,4-pentanediol; 4-Methyl-2,4-pentanediol; 2-Methylpentane-2,4-diol 1 ppm = 4.83 mg/m³	NIOSH C 25 ppm (125 mg/m³) OSHA† none	N.D.	Colorless liquid with a mild, sweetish odor.	MW: 118.2 BP: 388°F Sol: Miscible FI.P: 209°F IP: ? Sp Gr: 0.92 Class IIB Combustible Liquid	VP: 0.05 mm FRZ: -58°F (Sets to glass) UEL(est): 7.4% LEL(calc): 1.3%	Strong oxidizers, strong acids [Note: Hygroscopic (i.e., absorbs moisture from the air)]	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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)
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet (flamm) hange: N.R. l-Hexanone]	NIOSH 10 ppm: SA 25 ppm: SA:CF 50 ppm: SAT:CF/SCBAF/SAF 1600 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; peri neur: weak, pares; derm; head, dizw	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, PNS
kin: **Prevent skin contact** yes: **Prevent eye contact** Vash skin: **When contam** emove: **When wet (flamm)** hange: **N.R.** -Hexone]	**NIOSH** **500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF** **§: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, skin, muc memb; head, narco, coma; derm; in animals: liver, kidney damage**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water flush prompt** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys** **CNS, liver, kidneys**
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: N.R. ec-Hexyl acetate]	NIOSH/OSHA 500 ppm: CCROV*/GMFOV/PAPROV*/ SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; head; in animals: narco	Eye: Skin: Breath: Swallow:	Irr immed Water flush prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS
kin: **Prevent skin contact** yes: **Prevent eye contact** Vash skin: **When contam** emove: **When wet or contam** hange: **N.R.** rovide: **Eyewash** -hexylene **glycol]**	**TBAL**	**Inh** **Ing** **Con**	**Irrit eyes, skin, resp sys; head, dizz, nau, inco, CNS depres; derm, skin sens**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water wash immed** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys,** **CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hydrazine H_2NNH_2 302-01-2 MU7175000 2029 132 (anhydrous) 3293 152 (<37% soln.) 2030 153 (37-64% soln.) 2029 132 (>64% soln.)	Diamine, Hydrazine (anhydrous), Hydrazine base 1 ppm = 1.31 mg/m³	NIOSH Ca See Appendix A C 0.03 ppm (0.04 mg/m³) [2-hr] OSHA† 1 ppm (1.3 mg/m³) [skin]	Ca [50 ppm]	Colorless, fuming, oily liquid with an ammonia-like odor. [Note: A solid below 36°F.]	MW: 32.1 BP: 236°F Sol: Miscible FI.P: 99°F IP: 8.93 eV Sp.Gr: 1.01 Class IC Flammable Liquid	VP: 10 mm FRZ: 36°F UEL: 98% LEL: 2.9%	Oxidizers, hydrogen peroxide, nitric acid, metallic oxides, acids [Note: Can ignite SPONTANEOUSLY on contact with oxidizers or porous materials such as earth, wood & cloth.]	Bub; Reagent; Vis; IV [#3503]
Hydrogenated terphenyls $(C_6H_5)_3$ 61788-32-7 WZ6535000	Hydrogenated diphenylbenzenes, Hydrogenated phenylbiphenyls, Hydrogenated triphenyls [Note: Complex mixture of terphenyl isomers that are partially hydrogenated.] 1 ppm = 12.19 mg/m³ (40% hydrogenated)	NIOSH 0.5 ppm (5 mg/m³) OSHA† none	N.D.	Clear, oily, pale-yellow liquids with a faint odor. [plasticizer/heat transfer media]	MW: 298 (40% hydrogenated) BP: 644°F (40%) Sol: Insoluble FI.P: 315°F(40%) IP: ? Sp.Gr(77°F): 1.003-1.009 (40% hydrogenated) Class IIIB Combustible Liquids	VP(77°F): 0.1 mm (40%) FRZ: ? UEL: ? LEL: ?	None reported [Note: When heated, irritating vapors will be released.]	None available
Hydrogen bromide HBr 10035-10-6 MW3850000 1048 125 (anhydrous) 1788 154 (solution)	Anhydrous hydrogen bromide; Aqueous hydrogen bromide (i.e., Hydrobromic acid) 1 ppm = 3.31 mg/m³	NIOSH C 3 ppm (10 mg/m³) OSHA† 3 ppm (10 mg/m³)	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% FI.P: NA IP: 11.62 eV RGasD: 2.81 Nonflammable Gas	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_2CO_3; IC; IV [#7903, Inorganic Acids]
Hydrogen chloride HCl 7647-01-0 MW4025000 1050 125 (anhydrous) 1789 157 (solution)	Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) [Note: Often used in an aqueous solution.] 1 ppm = 1.49 mg/m³	NIOSH/OSHA C 5 ppm (7 mg/m³)	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(86°F): 67% FI.P: NA IP: 12.74 eV RGasD: 1.27 Nonflammable Gas	VP: 40.5 atm FRZ: -174°F UEL: NA LEL: NA	Hydroxides, amines, alkalis, copper, brass, zinc [Note: Hydrochloric acid is highly corrosive to most metals.]	Si gel; $NaHCO_3$/Na_2CO_3; IC; IV [#7903, Inorganic Acids]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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)
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet (flamm) hange: N.R. rovide: Eyewash, Quick drench Hydrazine]	NIOSH ¥ SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	inh Abs ing Con	Irrit eyes, skin, nose, throat; temporary blindness; dizz, nau, derm; eye, skin burns; in animals: bron, pulm edema liver, kidney damage; convuls; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys CNS, liver, kidneys [in animals, tumors of the lungs, liver, blood vessels & intestine]
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: Daily Hydrogenated terphenyls]	TBAL	inh ing Con	Irrit eyes, skin, resp sys; liver, kidney, hemato damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys, hemato sys
kin: Prevent skin contact (soln)/Frostbite yes: Prevent eye contact (soln)/Frostbite Vash skin: When contam (soln) emove: When wet or contam (soln) hange: N.R. rovide: Eyewash (soln), Quick drench (soln), Frostbite Hydrogen bromide]	NIOSH/OSHA 30 ppm: SA:CF[f]/PAPRAG[f]/GMFAG/SCBAF/SAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	inh ing (soln) Con	Irrit eyes, skin, nose, throat; soln: eye, skin burns; liq: frostbite	Eye: Irr immed (soln)/Frostbite Skin: Water flush immed (soln)/Frostbite Breath: Resp support Swallow: Medical attention immed (soln)		Eyes, skin, resp sys
kin: Prevent skin contact (soln)/Frostbite yes: Prevent eye contact/Frostbite Vash skin: When contam (soln) emove: When wet or contam hange: N.R. rovide: Eyewash (soln), Quick drench (soln) Frostbite Hydrogen chloride]	NIOSH/OSHA 50 ppm: CCRS*/GMFS/PAPRS*/SA*/SCBAF § SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFAG/SCBAE	inh ing (soln) Con	Irrit nose, throat, larynx; cough, choking; derm; soln: eye, skin burns; liq: frostbite; in animals: lar spasm; pulm edema	Eye: Irr immed (soln)/Frostbite Skin: Water flush immed (soln)/Frostbite Breath: Resp support Swallow: Medical attention immed (soln)		Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hydrogen cyanide HCN 74-90-8 MW6825000 1051 117 (>20% soln.) 1051 117 (anhydrous) 1613 154 (≤20% soln.)	Formonitrile, Hydrocyanic acid, Prussic acid 1 ppm = 1.10 mg/m³	NIOSH ST 4.7 ppm (5 mg/m³) [skin] OSHA† 10 ppm (11 mg/m³) [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 FI.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; IV [#6010]
Hydrogen fluoride (as F) HF 7664-39-3 MW7875000 1052 125 (anhydrous) 1790 157 (solution)	Anhydrous hydrogen fluoride; Aqueous hydrogen fluoride (i.e., Hydrofluoric acid); HF-A 1 ppm = 0.82 mg/m³	NIOSH 3 ppm (2.5 mg/m³) C 6 ppm (5 mg/m³) [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 FI.P: NA IP: 15.98 eV RGasD: 1.86 Sp.Gr: 1.00 (Liquid at 67°F) Nonflammable Gas	VP: 783 mm FRZ: -118°F UEL: NA LEL: NA	Metals, water or steam [Note: Corrosive to metals. Will attack glass and concrete.]	Si gel*; $NaHCO_3$/Na_2CO_3; IC; IV [#7903, Inorganic Acids] [Also #7902, , #7906]
Hydrogen peroxide H_2O_2 7722-84-1 MX0900000 2984 140 (8-20% soln.) 2014 140 (20-60% soln.) 2015 143 (>60% soln.)	High-strength hydrogen peroxide, Hydrogen dioxide, Hydrogen peroxide (aqueous), Hydroperoxide, Peroxide 1 ppm = 1.39 mg/m³	NIOSH/OSHA 1 ppm (1.4 mg/m³)	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 FI.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.]	Bub; $TiOSO_4$; Vis; OSHA [#ID126SG]
Hydrogen selenide H_2Se 7783-07-5 MX1050000 2202 117 (anhydrous)	Selenium dihydride, Selenium hydride 1 ppm = 3.31 mg/m³	NIOSH/OSHA 0.05 ppm (0.2 mg/m³)	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% FI.P: NA (Gas) IP: 9.88 eV RGasD: 2.80 Flammable Gas	VP(70°F): 9.5 atm FRZ: -87°F UEL: ? LEL: ?	Strong oxidizers, acids, water, halogenated hydrocarbons	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp.Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Hydrogen sulfide H_2S 7783-06-4 MX1225000 1053117	Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen 1 ppm = 1.40 mg/m³	NIOSH C 10 ppm (15mg/m³) [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: 17.9 atm FRZ: -122°F UEL: 44.0% LEL: 4.0% RGasD: 1.19 Flammable Gas	Strong oxidizers, strong nitric acid, metals	Char NH_4OH/H_2O_2 IC IV [#6013]
Hydroquinone $C_6H_4(OH)_2$ 123-31-9 MX3500000 2662 153	p-Benzenediol; 1,4-Benzenediol; Dihydroxybenzene; 1,4-Dihydroxybenzene; Quinol	NIOSH C 2 mg/m³ [15-min] OSHA 2 mg/m³	50 mg/m³	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; HPLC/UVD; IV [#5004]
2-Hydroxypropyl acrylate $CH_2{=}CHCOOCH_2CHOHCH_3$ 999-61-1 AT1925000	HPA, 9-Hydroxypropyl acrylate, Propylene glycol monoacrylate 1 ppm = 5.33 mg/m³	NIOSH 0.5 ppm (3 mg/m³) [skin] OSHA† none	N.D.	Clear to light-yellow liquid with a sweetish, solvent odor.	MW: 130.2 BP: 376°F Sol: ? FLP: 149°F IP: ? Sp.Gr: 1.05 Class IIIA Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: 1.8%	Water [Note: Can become unstable at high temperatures & pressures or may react with water with some release of energy, but not violently.]	None available
Indene C_9H_8 95-13-6 NK8225000 1 ppm = 4.75 mg/m³	Indonaphthene	NIOSH 10 ppm (45 mg/m³) OSHA† none	N.D.	Colorless liquid. [Note: A solid below 29°F.]	MW: 116.2 BP: 359°F Sol: Insoluble FLP: 173°F IP: 8.81 eV Sp.Gr: 0.997 Class IIIA Combustible Liquid	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

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite [Hydrogen sulfide]	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, conj vesic; dizz, head, ftg, irrity, insom; GI dist	Eye: Frostbite Skin: Frostbite Breath: Resp support	Eyes, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash (>7%) [Hydroquinone]	NIOSH/OSHA 50 mg/m³: PAPRD[f]/HiEF/SAT:CF[f]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, conj, kera; CNS excitement; colored urine, nau, dizz, suffocation, rapid breath; musc twitch, delirium; collapse; skin irrit, sens, derm	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [2-Hydroxypropyl acrylate]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; eye, skin burns; cough, dysp	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: When wet or contam Change: N.R. [Indene]	TBAL	Inh Ing Con	In animals: irrit eyes, skin, mucmemb; derm, skin sens; chemical pneu (aspir liq); liver, kidney, spleen inj	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, liver, kidneys, spleen

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Indium In 7440-74-6 NL1050000	Indium metal	NIOSH* 0.1 mg/m³ [*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 FI.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 tetraoxide + acetonitrile), mercury(II) bromide (at 662°F), sulfur (mixtures ignite when heated) [Note: oxidizes readily at higher temperatures.]	Filter; Acid; FAA; II(5) [P&CAM #173]
Iodine I_2 7553-56-2 NN1575000	Iodine crystals, Molecular iodine 1 ppm = 10.38 mg/m³	NIOSH/OSHA C 0.1 ppm (1 mg/m³)	2 ppm	Violet solid with a sharp, characteristic odor.	MW: 253.8 BP: 365°F Sol: 0.01% FI.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_2CO_3; IC; IV [#6005]
Iodoform CHI_3 75-47-8 PB7000000	Trilodomethane 1 ppm = 16.10 mg/m³	NIOSH 0.6 ppm (10 mg/m³) 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% FI.P: NA IP: ? Sp.Gr: 4.01 Noncombustible Solid	VP: ? MLT: 246°F UEL: NA LEL: NA	Strong oxidizers, lithium, metallic salts (e.g., mercuric oxide, silver nitrate), strong bases, calomel, tannin	None available
Iron oxide dust and fume (as Fe) Fe_2O_3 1309-37-1 NO7400000 NO7525000 (fume) 1376 135 (spent)	Ferric oxide, Iron(III) oxide	NIOSH 5 mg/m³ OSHA 10 mg/m³	2500 mg/m³ (as Fe)	Reddish-brown solid. [Note: Exposure to fume may occur during the arc-welding of iron.]	MW: 159.7 BP: ? Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2664°F UEL: NA LEL: NA	Calcium hypochlorite	Filter; Acid; ICP; IV [#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 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Indium]		TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; possible liver, kidney, heart, blood effects; pulm edema	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys heart, blood
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash (>7%), Quick drench (>7%) [Iodine]		NIOSH/OSHA 1 ppm: SA* 2 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF/AGIHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, nose; lac; head; chest tight; skin burns, rash; cutaneous hypersensitivity	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, CVS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Iodoform]		TBAL	Inh Abs Ing Con	Irrit eyes, skin; li-head, dizz, nau, inco, CNS depres; dysp; liver, kidney, heart damage; vis dist	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys, heart
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Iron oxide dust and fume (as Fe)]		NIOSH 50 mg/m³: DMFu/SA 125 mg/m³: SA:CF/PAPRDMFu 250 mg/m³: HIEF/SAT:CF/PAPR:THIE/SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh	Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)	Breath: Resp support		Resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp. Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Iron pentacarbonyl (as Fe) $Fe(CO)_5$ 13463-40-6 NO4900000 1994 131	Iron carbonyl, Pentacarbonyl iron 1 ppm = 2.28 mg/m³ (as Fe)	NIOSH 0.1 ppm (0.23 mg/m³) ST 0.2 ppm (0.46 mg/m³) OSHA† none	N.D.	Colorless to yellow to dark-red, oily liquid.	MW: 195.9 BP:(749 mm): 217°F Sol: Insoluble FI.P: 5°F IP: ? Sp Gr: 1.46-1.52 Class IB Flammable Liquid	VP(87°F): 40 mm FRZ: -5°F UEL: ? LEL: ?	Oxidizers, nitrogen oxide, (zinc + cobalt halides) [Note: Pyrophoric (i.e., ignites spontaneously in air). Decomposed by light or air, releasing carbon monoxide.]	None available
Iron salts (soluble, as Fe)	$FeSO_4$ Ferrous sulfate, Iron(II) sulfate $FeCl_2$ Ferrous chloride, Iron(II) chloride $Fe(NO_3)_3$ Ferric nitrate, Iron(III) nitrate $Fe(SO_4)_3$ Ferric sulfate, Iron(III) sulfate $FeCl_3$ Ferric chloride, Iron(III) chloride	NIOSH 1 mg/m³ OSHA† none	N.D.	Appearance and odor vary depending upon the specific soluble iron salt.	Properties vary depending upon the specific soluble iron salt. Noncombustible Solids		Varies	Filter; Acid; ICP; IV [#7300, Elements]
Isoamyl acetate $CH_3COOCH_2CH_2CH(CH_3)_2$ 123-92-2 NS9800000	Banana oil, Isopentyl acetate, 3-Methyl-1-butanol acetate, 3-Methylbutyl ester of acetic acid, 3-Methylbutyl ethanoate 1 ppm = 5.33 mg/m³	NIOSH/OSHA 100 ppm (525 mg/m³)	1000 ppm	Colorless liquid with a banana-like odor.	MW: 130.2 BP: 288°F Sol: 0.3% FI.P: 77°F IP: ? Sp.Gr: 0.87 Class IC Flammable Liquid	VP: 4 mm FRZ: -100°F UEL: 7.5% LEL(212°F): 1.0%	Nitrates; strong oxidizers, alkalis & acids	Char; CS; GC/FID; IV [#1450, Esters I]
Isoamyl alcohol (primary) $(CH_3)_2CHCH_2CH_2OH$ 123-51-3 EL5425000 1105 129	Fermentation amyl alcohol, Fusel oil, Isobutyl carbinol, Isopentyl alcohol, 3-Methyl-1-butanol, Primary isoamyl alcohol 1 ppm = 3.61 mg/m³	NIOSH 100 ppm (360 mg/m³) ST 125 ppm (450 mg/m³) OSHA† 100 ppm (360 mg/m³)	500 ppm	Colorless liquid with a disagreeable odor.	MW: 88.2 BP: 270°F Sol(57°F): 2% FI.P: 109°F IP: ? Sp.Gr(57°F): 0.81 Class II Combustible Liquid	VP: 28 mm FRZ: -179°F UEL(212°F): 9.0% LEL: 1.2%	Strong oxidizers	Char; 2-Propanol/CS; GC/FID; IV [#1402, Alcohols III]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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: Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, mucmemb, resp sys; head, dizz, nau; vomit; fever, cyan; cough, dysp; liver, kidney, lung inj; degenerative changes in CNS	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys, CNS, liver, kidneys
Iron pentacarbonyl (as Fe)]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb; abdom pain, diarr, vomit; possible liver damage	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, GI tract
Iron salts (soluble, as Fe)]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH/OSHA 1000 ppm: CCROV//PAPROV/GMFOV/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; derm; in animals: narco	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Iscamyl acetate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH/OSHA 500 ppm: SA:CF[d]/CCRFOV/GMFOV/PAPROV[d]/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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Iscamyl 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: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Isoamyl alcohol (secondary) $(CH_3)_2CHCH(OH)CH_3$ 6032-29-7 1105 129	3-Methyl-2-butanol, Secondary isoamyl alcohol 1 ppm = 3.61 mg/m³	NIOSH 100 ppm (360 mg/m³) ST 125 ppm (450 mg/m³) OSHA† 100 ppm (360 mg/m³)	500 ppm	Colorless liquid with a disagreeable odor.	MW: 88.2 BP: 234°F Sol: ? Fl.P(oc): 95°F IP: ? Sp.Gr: 0.82 Class IC Flammable Liquid	VP: 1 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char; 2-Propanol/ CS₂; GC/FID; IV [#1402, Alcohols III]
Isobutane $CH_3CH(CH_3)_2$ 75-28-5 TZ4300000 1075 115 1969 115	2-Methylpropane [Note: Also see specific listing for n-Butane.] 1 ppm = 2.38 mg/m³	NIOSH 800 ppm (1900 mg/m³) OSHA† none	N.D.	Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 11°F.]	MW: 58.1 BP: 11°F Sol: Slight Fl.P: NA (Gas) IP: 10.74 eV RGasD: 2.06 Flammable Gas Class IA Flammable Liquid	VP(70°F): 3.1 atm FRZ: -255°F UEL: 8.4% LEL: 1.6%	Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, (nickel carbonyl + oxygen)	None available
Isobutyl acetate $CH_3COOCH_2CH(CH_3)_2$ 110-19-0 AI4025000 1213 129	Isobutyl ester of acetic acid, 2-Methylpropyl acetate, 2-Methylpropyl ester of acetic acid, ß-Methylpropyl ethanoate 1 ppm = 4.75 mg/m³	NIOSH/OSHA 150 ppm (700 mg/m³)	1300 ppm [10%LEL]	Colorless liquid with a fruity, floral odor.	MW: 116.2 BP: 243°F Sol(77°F): 0.6% FI.P: 64°F IP: 9.97 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 13 mm FRZ: -145°F UEL: 10.5% LEL: 1.3%	Nitrates; strong oxidizers, alkalis & acids	Char; CS₂; GC/FID; IV [#1450, Esters I]
Isobutyl alcohol $(CH_3)_2CHCH_2OH$ 78-83-1 NP9625000 1212 129	IBA, Isobutanol, Isopropylcarbinol, 2-Methyl-1-propanol 1 ppm = 3.03 mg/m³	NIOSH 50 ppm (150 mg/m³) OSHA† 100 ppm (300 mg/m³)	1600 ppm	Colorless, oily liquid with a sweet, musty odor.	MW: 74.1 BP: 227°F Sol: 10% FI.P: 82°F IP: 10.12 eV Sp.Gr: 0.80 Class IC Flammable Liquid	VP: 9 mm FRZ: -162°F UEL(202°F): 10.6% LEL(123°F): 1.7%	Strong oxidizers	Char; 2-Propanol/ CS₂; GC/FID; IV [#1401, Alcohols II]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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. Isoamyl alcohol (secondary)]	NIOSH/OSHA 500 ppm: SA:CF[f]/CCRFOV/GMFOV/ PAPROV[f]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; head, dizz; cough, dysp, sau, vomit, diarr; skin cracking; in animals: narco	Eye: Irrimmed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite Isobutane]	TBAL	Inh Con (liq)	Drow, narco, asphy; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support		CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Isobutyl acetate]	NIOSH/OSHA 1300 ppm: SA:CF[f]/CCRFOV/GMFOV/ PAPROV[f]/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: Irrimmed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Skin, eyes, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Isobutyl alcohol]	NIOSH 500 ppm: CCROV*/SA* 1250 ppm: SA:CF*/PAPROV* 1600 ppm: CCRFOV/GMFOV/ PAPRTOV*/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: Irrimmed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Isobutyronitrile $(CH_3)_2CHCN$ 78-82-0 TZ4900000 2284 131	Isopropyl cyanide, 2-Methylpropanenitrile, 2-Methylpropionitrile 1 ppm = 2.83 mg/m³	NIOSH 8 ppm (22 mg/m³) 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 Fl.P: 47°F IP: ? Sp.Gr: 0.76 Class IB Flammable Liquid	VP(130°F): 100 mm FRZ: -97°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases	Char; Benzene; GC/FID; IV [Adapt #1606]
Isooctyl alcohol $C_7H_{15}CH_2OH$ 26952-21-6 NS7700000	Isooctanol, Oxooctyl alcohol [Note: A mixture of closely related isomeric, primary alcohols with branched chains such as 2-Ethyl-hexanol, $CH_3(CH_2)_3CH(CH_2CH_3)CH_2OH$.] 1 ppm = 5.33 mg/m³	NIOSH 50 ppm (270 mg/m³) [skin] OSHA† none	N.D.	Clear, colorless liquid.	MW: 130.3 BP: 367°F Sol: Insoluble Fl.P(oc): 180°F IP: ? Sp.Gr: 0.83 Class IIIA Combustible Liquid	VP: 0.4 mm FRZ: <-105°F UEL(est.): 57% LEL(calc.): 0.9%	None reported	None available
Isophorone $C_9H_{14}O$ 78-59-1 GW7700000 1993 128 (combustible liquid, n.o.s.)	Isoacetophorone; 3,5,5-Trimethyl-2-cyclo-hexenone; 3,5,5-Trimethyl-2-cyclo-hexen-1-one 1 ppm = 5.65 mg/m³	NIOSH 4 ppm (23 mg/m³) OSHA† 25 ppm (140 mg/m³)	200 ppm	Colorless to white liquid with a peppermint-like odor.	MW: 138.2 BP: 419°F Sol: 1% Fl.P: 184°F IP: 9.07 eV Sp.Gr: 0.92 Class IIIA Combustible Liquid	VP: 0.3 mm FRZ: 17°F UEL: 3.8% LEL: 0.8%	Oxidizers, strong alkalis, amines	Char(pet); CS_2; GC/FID; IV [#2508]
Isophorone diisocyanate $C_{12}H_{18}N_2O_2$ 4098-71-9 NQ9370000 2290 156	IPDI; 3-Isocyanatomethyl-3,5,5-trimethylcyclohexyl-isocyanate; Isophorone diamine diisocyanate 1 ppm = 9.09 mg/m³	NIOSH 0.005 ppm (0.045 mg/m³) ST 0.02 ppm (0.180 mg/m³) [skin] OSHA† none	N.D.	Colorless to slightly yellow liquid with a pungent odor.	MW: 222.3 BP: ? Sol: Decomposes Fl.P: 311°F IP: ? Sp.Gr: 1.06 Class IIIB Combustible Liquid	VP: 0.0003 mm FRZ: -76°F UEL: ? LEL: ?	Water, alcohols, phenols, amines, mercaptans, amides, urethanes, ureas [Note: Reacts with water to form carbon dioxide.]	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Isobutyronitrile]	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: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, CVS
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam/Daily** **Remove: When wet or contam** **Change: N.R.** **Provide: Eyewash** **[Isooctyl alcohol]**	**TBAL**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, nose, throat; eye, skin burns**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash [Isophorone]	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, fig, mal, narco; derm; in animals: kidney, liver damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys CNS, liver, kidneys
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily** **Provide: Quick drench** **[Isophorone diisocyanate]**	**NIOSH** **0.05 ppm: SA*** **0.125 ppm: SA:CF*** **0.25 ppm: SCBAF/SAF** **1 ppm: SAF:PD,PP** **§: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, resp sys; chest tight, dysp, cough, sore throat; bron, wheez, pulm edema; possible resp sens, asthma**	**Eye: Irr immed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2-Isopropoxyethanol $(CH_3)_2CHOCH_2CH_2OH$ 109-59-1 KL5075000	Ethylene glycol isopropyl ether, ß-Hydroxyethyl isopropyl ether, Isopropyl Cellosolve®, Isopropyl glycol	NIOSH See Appendix D OSHA† none	N.D.	Colorless liquid with a mild, ethereal odor.	MW: 104.2 BP: 283°F Sol: Miscible Fl.P(oc): 92°F IP: ? Sp.Gr: 0.90 Class IC Flammable Liquid	VP: 3 mm FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
Isopropyl acetate $CH_3COOCH(CH_3)_2$ 108-21-4 AI4930000 1220 129	Isopropyl ester of acetic acid, 1-Methylethyl ester of acetic acid, 2-Propyl acetate 1 ppm = 4.18 mg/m³	NIOSH See Appendix D OSHA† 250 ppm (950 mg/m³)	1800 ppm	Colorless liquid with a fruity odor.	MW: 102.2 BP: 194°F Sol: 3% Fl.P: 36°F IP: 9.95 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 42 mm FRZ: -92°F UEL: 8% LEL(100°F): 1.8%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1454]
Isopropyl alcohol $(CH_3)_2CHOH$ 67-63-0 NT8050000 1219 129	Dimethyl carbinol, IPA, Isopropanol, 2-Propanol, sec-Propyl alcohol, Rubbing alcohol 1 ppm = 2.46 mg/m³	NIOSH 400 ppm (980 mg/m³) ST 500 ppm (1225 mg/m³) OSHA† 400 ppm (980 mg/m³)	2000 ppm [10%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 Sp.Gr: 0.79 Class IB Flammable Liquid	VP: 33 mm FRZ: -127°F UEL(200°F): 12.7% LEL: 2.0%	Strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids, isocyanates	Char; 2-Butanol/ CS_2; GC/FID; IV [#1400, Alcohols I]
Isopropylamine $(CH_3)_2CHNH_2$ 75-31-0 NT8400000 1221 132	2-Aminopropane, Monoisopropylamine, 2-Propylamine, sec-Propylamine 1 ppm = 2.42 mg/m³	NIOSH See Appendix D OSHA† 5 ppm (12 mg/m³)	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 Sp.Gr: 0.69 Class IA Flammable Liquid	VP: 460 mm FRZ: -150°F UEL: ? LEL: ?	Strong acids, strong oxidizers, aldehydes, ketones, epoxides	Bub; NaOH; GC/FID; II(3) [#S147]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
N-Isopropylaniline $C_6H_5NHCH(CH_3)_2$ 768-52-5 BY4190000	N-IPA, Isopropylaniline, N- (1-Methylethyl)-benzenamine, N-Phenylisopropylamine 1 ppm = 5.53 mg/m³	NIOSH 2 ppm (10 mg/m³) [skin] OSHA† none	N.D.	Clear, yellowish liquid with a sweet, aromatic odor.	MW: 135.2 BP: 397°F Sol: Insoluble FLP(oc): 190°F IP: ? Sp.Gr(60°F): 0.93 Class IIIB Combustible Liquid	VP(77°F): 0.03 mm FRZ: -58°F UEL: ? LEL: ?	None reported	Filter*(2); Methanol; HPLC/UV; OSHA [#78]
Isopropyl ether $(CH_3)_2CHOCH(CH_3)_2$ 108-20-3 TZ5425000 1159 127	Diisopropyl ether, Diisopropyl oxide, 2-Isopropoxy propane 1 ppm = 4.18 mg/m³	NIOSH/OSHA 500 ppm (2100 mg/m³)	1400 ppm [10%LEL]	Colorless liquid with a sharp, sweet, ether-like odor.	MW: 102.2 BP: 154°F Sol: 0.2% FLP: -18°F IP: 9.20 eV Sp.Gr: 0.73 Class IB Flammable Liquid	VP: 119 mm FRZ: -76°F UEL: 7.9% LEL: 1.4%	Strong oxidizers, acids [Note: Unstable peroxides may form on long contact of isopropyl ether with air.]	Char; CS_2; GC/FID; IV [#1618]
Isopropyl glycidyl ether $C_6H_{12}O_2$ 4016-14-2 TZ3500000	1,2-Epoxy-3-isopropoxy-propane; IGE; Isopropoxymethyl oxirane 1 ppm = 4.75 mg/m³	NIOSH C 50 ppm (240 mg/m³) [15-min] OSHA† 50 ppm (240 mg/m³)	400 ppm	Colorless liquid.	MW: 116.2 BP: 279°F Sol: 19% FLP: 92°F IP: ? Sp.Gr: 0.92 Class IC Flammable Liquid	VP(77°F): 9 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, strong caustics [Note: May form explosive peroxides upon exposure to air or light.]	Char; CS_2; GC/FID; IV [#1620]
Kaolin 1332-58-7 GF1670500	China clay, Clay, Hydrated aluminum silicate, Hydrite, Porcelain clay [Note: Main constituent of Kaolin is Kaolinite ($Al_2Si_2O_5(OH)_4$).]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	White to yellowish or grayish powder. [Note: When moistened, darkens & develops a clay-like odor.]	MW: varies BP: ? Sol: Insoluble FLP: NA IP: NA Sp.Gr: 1.8-2.6 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [Particulates NOR; #0500 (total), #0600 (resp)]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Kepone $C_{10}Cl_{10}O$ 143-50-0 PC8575000	Chlordecone; Decachlorooctahydro-kepone-2-one; Decachlorooctahydro-1,3,4-metheno-2H-cyclobuta(cd)-pentalen-2-one; Decachlorotetrahydro-4,7-methanoindeneone;	NIOSH Ca See Appendix A 0.001 mg/m^3 OSHA none	Ca [N.D.]	Tan to white, crystalline, odorless solid. [insecticide]	MW: 490.6 BP: Sublimes Sol(212°F): 0.5% FI.P: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP(77°F): <3 x 10^{-7} mm MLT: 662°F (Sublimes) UEL: NA LEL: NA	Acids, acid fumes	Filter/ Imp; Benzene/ Methanol; GC/ECD; IV [#5508]
Kerosene 8008-20-6 OA5500000 1223 128	Fuel Oil No. 1, Range oil [Note: A refined petroleum solvent (predominantly C_5-C_{16}), which typically is 25% normal paraffins, 11% branched paraffins, 30% monocycloparaffins, 12% dicycloparaffins, 1% tricycloparaffins, 16% mononuclear aromatics & 5% dinuclear aromatics.]	NIOSH 100 mg/m^3 OSHA none	N.D.	Colorless to yellowish, oily liquid with a strong, characteristic odor.	MW: 170(approx) BP: 347-617°F Sol: Insoluble FI.P: 100-162°F IP: ? Sp.Gr: 0.81 Class II Combustible Liquid	VP(100°F): 5 mm FRZ: -50°F UEL: 5% LEL: 0.7%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1550, Naphthas]
Ketene CH_2=CO 463-51-4 OA7700000	Carbomethene, Ethenone, Keto-ethylene 1 ppm = 1.72 mg/m^3	NIOSH 0.5 ppm (0.9 mg/m^3) ST 1.5 ppm (3 mg/m^3) OSHA† 0.5 ppm (0.9 mg/m^3)	5 ppm	Colorless gas with a penetrating odor.	MW: 42.0 BP: -69°F Sol: Reacts FI.P: NA (Gas) IP: 9.61 eV RGasD: 1.45 Flammable Gas	VP: >1 atm FRZ: -238°F UEL: ? LEL: ?	Water, alcohols, ammonia [Note: Readily polymerizes. Reacts with water to form acetic acid.]	Bub; $FeCl_3$; Vis; II(2) [#S92]
Lead Pb 7439-92-1 OF7525000	Lead metal, Plumbum	NIOSH* 0.100 mg/m^3 See Appendix C OSHA* [1910.1025] 0.050 mg/m^3 See Appendix C [*Note: The REL and PEL also apply to other lead compounds (as Pb) -- See Appendix C.]	100 mg/m^3 (as Pb)	A heavy, ductile, soft, gray solid.	MW: 207.2 BP: 3164°F Sol: Insoluble FI.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_2O_2; AAS; III [#7082] [Also #7105.]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
ɔkin: ɣyes: s/ash skin: eemove: rhange: ɔrovide: eɔepone]	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/HiE/SCBAE	Inh Abs Ing Con	Head, ner, tremor; liver, kidney damage; vis dist; ataxia, chest pain, skin eryt; testicular atrophy, low sperm count; [carc]	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]
ɔkin: ɣyes: s/ash skin: eemove: rhange: ɔrovide: eɔerosene]	Prevent skin contact Prevent eye contact When contam When wet or contam N.R. Quick drench	NIOSH 1000 mg/m^3: CCROV/SA 2500 mg/m^3: SA:CF/PAPROV 5000 mg/m^3: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; burning sensation in chest; head, nau, weak, restless, inco, conf, drow; vomit, diarr; derm; chemical pneu (aspir liq)	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS
ɔkin: ɣyes: s/ash skin: eemove: rhange: eɔetene]	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	Irrit eyes, skin, nose, throat, resp sys; pulm edema	Breath:	Resp support	Eyes, skin, resp sys
ɔkin: ɣyes: s/ash skin: eemove: rhange: aead]	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	OSHA 0.5 mg/m^3: HiE/SA 1.25 mg/m^3: SA:CF/PAPRHiE 2.5 mg/m^3: HiEF/SAT:CF/PAPRTHiE/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, insom; 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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Limestone $CaCO_3$ 1317-65-3 EV9580000	Calcium carbonate, Natural calcium carbonate [Note: Calcite & aragonite are commercially important natural calcium carbonates.]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Odorless, white to tan powder.	MW: 100.1 BP: Decomposes Sol: 0.001% FLP: NA IP: NA Sp.Gr: 2.7-2.9 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517-2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; IV [Particulates a NOR: #0500 (total), #0600 (resp)]
Lindane $C_6H_6Cl_6$ 58-89-9 GV4900000 2761 151	BHC; HCH; γ-Hexachlorocyclohexane; gamma-isomer of 1,2,3,4,5,6-Hexachlorocyclohexane	NIOSH/OSHA 0.5 mg/m³ [skin]	50 mg/m³	White to yellow, crystalline powder with a slight, musty odor. [pesticide]	MW: 290.8 BP: 614°F Sol: 0.001% FLP: NA IP: ? Sp.Gr: 1.85 Noncombustible Solid, but may be dissolved in flammable liquids.	VP: 0.00001 mm MLT: 235°F UEL: NA LEL: NA	Corrosive to metals	Filter/Bub; Isooctane; GC/EConD; IV [#5502]
Lithium hydride LiH 7580-67-8 OJ6300000 1414 138 2805 138 (fused solid)	Lithium monohydride	NIOSH/OSHA 0.025 mg/m³	0.5 mg/m³	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 FLP: NA IP: NA	VP: 0 mm (approx) MLT: 1256°F UEL: NA LEL: NA	Strong oxidizers, halogenated hydrocarbons, acids, water [Note: May ignite SPONTANEOUSLY in air and may reignite after fire is extinguished. Reacts with water to form hydrogen & lithium hydroxide.]	None available
L.P.G. $C_3H_8/C_3H_6/C_4H_{10}/C_4H_8$ 68476-85-7 SE7545000 1075 115	Bottled gas, Compressed petroleum gas, Liquefied hydrocarbon gas, Liquefied petroleum gas, LPG [Note: A fuel mixture of propane, propylene, butanes & butylenes.] 1 ppm = 1.72-2.37 mg/m³	NIOSH/OSHA 1000 ppm (1800 mg/m³)	2000 ppm [10%LEL]	Colorless, noncorrosive, 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 FLP: NA (Gas) IP: 10.95 eV RGasD: 1.45-2.00 Flammable Gas	VP: >1 atm FRZ: ? UEL: 9.5% (Propane) 8.5% (Butane) LEL: 2.1% (Propane) 1.9% (Butane)	Strong oxidizers, chlorine dioxide	Combustible gas meter; none; none; II(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 5)
Skin: Eyes: Wash skin: Remove: Change:	N.R. N.R. N.R. N.R. N.R.	TBAL	Inh Con	Irrit eyes, skin, muc memb; cough, sneez, rhin; lac	Eye: Skin: Breath:	Irr immed Soap wash Fresh air	Eyes, skin, resp sys
i_imestone]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact N.R. When contam When wet or contam Daily Quick drench	NIOSH/OSHA 5 mg/m³: CCRO/DMFu/SA 12.5 mg/m³: SA:CF*/PAPRO/DMFu* 25 mg/m³: CCRFO/HiE/GMFO/VHiE/ PAPRTO/VHiE*/SCBAF/SAF 50 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFO/HiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; head; nau; clonic convuls; resp difficulty; cyan; aplastic anemia; musc spasm; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, blood, liver, kidneys
i_indane]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact Brush (DO NOT WASH) When wet or contam Daily Eyewash, Quick drench (>0.5 mg/m³)	NIOSH/OSHA 0.25 mg/m³: HiE/SA 0.5 mg/m³: SA:CF*/HiEF/PAPRHiE*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin; eye, skin burns; mouth, esophagus burns (if ingested); nau; musc twitches; mental conf; blurred vision	Eye: Skin: Breath: Swallow:	Irr immed Brush (DO NOT WASH) Resp support Medical attention immed	Eyes, skin, resp sys, CNS
i_ithium hydride]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet (flamm) N.R. Frostbite	NIOSH/OSHA 2000 ppm: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Con (liq)	Li-head, drow, asphy; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Resp sys, CNS
_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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Magnesite $MgCO_3$ 546-93-0 OM2470000	Carbonate magnesium, Hydromagnesite, Magnesium carbonate, Magnesium(II) carbonate [Note: Magnesite is a naturally-occurring form of magnesium carbonate.]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	White, odorless, crystalline powder.	MW: 84.3 BP: Decomposes Sol: 0.01% Fl.P: NA IP: NA Sp.Gr: 2.96 Noncombustible Solid	VP: 0 mm (approx) MLT: 662°F (Decomposes) UEL: NA LEL: NA	Acids, formaldehyde	Filter; none; Grav; IV [Particulates a NOR: #0500 (total), #0600 (resp)]
Magnesium oxide fume MgO 1309-48-4 OM3850000	Magnesia fume	NIOSH See Appendix D OSHA† 15 mg/m³	750 mg/m³	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(86°F): 0.009% Fl.P: NA IP: NA Sp.Gr: 3.58 Noncombustible Solid	VP: 0 mm (approx) MLT: 5072°F UEL: NA LEL: NA	Chlorine trifluoride, phosphorus penta-chloride	Filter; Acid; ICP; IV [#7300, Elements]
Malathion $C_{10}H_{19}O_6PS_2$ 121-75-5 WM8400000 2783 152	S-[1,2-bis(ethoxycarbonyl) ethyl]0,0-dimethyl-phosphorodithioate; Diethyl (dimethoxyphosphino-thioylthio) succinate [$(CH_3O)_2P(S)SCH(COOC_2H_5)CH_2COOC_2H_5$]	NIOSH 10 mg/m³ [skin] OSHA† 15 mg/m³ [skin]	250 mg/m³	Deep-brown to yellow liquid with a garlic-like odor. [insecticide] [Note: A solid below 37°F.]	MW: 330.4 BP: 140°F (Decomposes) Sol: 0.02% Fl.P(oc): >325°F IP: ? Sp.Gr: 1.21 Class IIIB Combustible Liquid, but may be difficult to ignite.	VP: 0.00004 mm FRZ: 37°F UEL: ? LEL: ?	Strong oxidizers, magnesium, alkaline pesticides [Note: Corrosive to metals.]	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
Maleic anhydride $C_4H_2O_3$ 108-31-6 ON3675000 2215 156	cis-Butenedioic anhydride; 2,5-Furanedione; Maleic acid anhydride; Toxilic anhydride 1 ppm = 4.01 mg/m³	NIOSH/OSHA 1 mg/m³ (0.25 ppm)	10 mg/m³	Colorless needles, white lumps, or pellets with an irritating, choking odor.	MW: 98.1 BP: 396°F Sol: Reacts Fl.P: 218°F IP: 9.90 eV Sp.Gr: 1.48 Combustible Solid, but may be difficult to ignite.	VP: 0.2 mm MLT: 127°F UEL: 7.1% LEL: 1.4%	Strong oxidizers, water, alkalis, metals, caustics & amines above 150°F [Note: Reacts slowly with water (hydro-lyzes) to form maleic acid.]	Bub; none; HPLC/UVD; IV [#3512]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R [Magnesite]	TBAL	Inh Con	Irrit eyes, skin, resp sys; cough	Eye: Breath:	Irr immed Fresh air	Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Magnesium oxide fume]	OSHA 150 mg/m³: DMFu/SA 375 mg/m³: SA:CF*/PAPRDMFu 750 mg/m³: HiEF/PAPRTHiE*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, nose; metal fume fever: cough, chest pain, flu-like fever	Breath:	Resp support	Eyes, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Malathion]	NIOSH 100 mg/m³: CCROVDMFu/SA 250 mg/m³: SA:CF*/CCRFOVHiE/ GMFOVHiE/PAPROVDMFu*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; miosis, aching eyes, blurred vision, lac; salv, anor, nau, vomit, abdom cramps, diarr, gidd, conf, ataxia; rhin, head; chest tight, wheez, lar spasm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, liver, blood chol, CNS, CVS, GI tract
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash [Maleic anhydride]	NIOSH/OSHA 10 mg/m³: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit nose, upper resp sys; conj; photo, double vision; bronchial asthma; derm	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Malonaldehyde $CHOCH_2CHO$ 542-78-9 TX6475000	Malonic aldehyde; Malonodialdehyde; Propanedial; 1,3-Propanedial [Note: Pure Malonaldehyde is unstable and may be used as its sodium salt.]	NIOSH Ca See Appendix A See Appendix C (Aldehydes) OSHA none	Ca [N.D.]	Solid (needles).	MW: 72.1 BP: ? Sol: ? Fl.P: ? IP: ? Sp.Gr: ?	VP: ? MLT: 161°F UEL: ? LEL: ?	Proteins [Note: Pure compound is stable under neutral conditions, but not under acidic conditions.]	None available
Malononitrile $NCCH_2CN$ 109-77-3 OO3150000 2647 153	Cyanoacetonitrile, Dicyanomethane, Malonic dinitrile 1 ppm = 2.70 mg/m³	NIOSH 3 ppm (8 mg/m³) 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% Fl.P(oc): 266°F IP: 12.88 eV Sp.Gr: 1.19 Combustible Solid	VP: ? MLT: 90°F UEL: ? LEL: ?	Strong bases [Note: May polymerize violently on prolonged heating at 265°F, or in contact with strong bases at lower temperatures.]	Char; Toluene; GC/FID; NIOSH Nitriles Crit. Doc.
Manganese compounds and fume (as Mn) Mn (Metal) 7439-96-5 (Metal) OO9275000 (Metal)	Manganese metal: Colloidal manganese, Manganese-55 Synonyms of other compounds vary depending upon the specific manganese compound.	NIOSH* 1 mg/m³ ST 3 mg/m³ OSHA†* C 5 mg/m³ [*Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.]	500 mg/m³ (as Mn)	Metal: A lustrous, brittle, silvery solid.	MW: 54.9 BP: 3564°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 7.20 (Metal) Metal: Combustible Solid	VP: 0 mm (approx) MLT: 2271°F UEL: NA LEL: NA	Oxidizers [Note: Will react with water or steam to produce hydrogen.]	Filter; Acid; ICP; IV [#7300, Elements]
Manganese cyclopentadienyl tricarbonyl (as Mn) $C_5H_5Mn(CO)_3$ 12079-65-1 OO9720000	Cyclopentadienylmanganese tricarbonyl, Cyclopentadienyl tricarbonyl manganese, MCT	NIOSH 0.1 mg/m³ [skin] OSHA† C 5 mg/m³	N.D.	Yellow, crystalline solid with a characteristic odor. [Note: An antiknock additive for gasoline. May be found in an oil & gaseous solution.]	MW: 204.1 BP: Sublimes Sol: Slight Fl.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 167°F (Sublimes) UEL: ? LEL: ?	None reported	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH *: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; cough; CNS depres; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS [in animals: thyroid gland tumors]
[Malonaldehyde]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** **Remove: When wet or contam** **Change: Daily** **Provide: Eyewash, Quick drench**	**NIOSH** **80 mg/m³: SA** **200 mg/m³: SA:CF** **400 mg/m³: SCBAF/SAF** **667 mg/m³: 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: Irr immed** **Skin: Water wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS, CVS**
[Malononitrile]						
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	NIOSH 10 mg/m³: DMXSQ^/SA 25 mg/m³: SA:CF/PAPRDM^ 50 mg/m³: HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF/ 500 mg/m³: 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; ftg; kidney damage	Breath: Resp support Swallow: Medical attention immed		Resp sys, CNS, blood, kidneys
[Manganese compounds and fume (as Mn)]						
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: Daily**	**TBAL**	**Inh** **Abs** **Ing** **Con**	**In animals: irrit skin; pulm edema; convuls; CNS, resp sys, kidney changes; decr resistance to infection**	**Eye: Irr immed** **Skin: Soap wash** **Breath: Resp support** **Swallow: Medical attention immed**		**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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Manganese tetroxide (as Mn) Mn_3O_4 1317-35-7 OP0895000	Manganese oxide, Manganomanganic oxide, Trimanganese tetraoxide, Trimanganese tetroxide	NIOSH See Appendix D OSHA† C 5 mg/m³	N.D.	Brownish-black powder. [Note: Fumes are generated whenever 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) MLT: 2847°F UEL: NA LEL: NA	Soluble in hydrochloric acid (liberates chlorine gas)	Filter; Acids; ICP; IV [#7300, Elements]
Marble $CaCO_3$ 1317-65-3 EV9580000	Calcium carbonate, Natural calcium carbonate [Note: Marble is a metamorphic form of calcium carbonate.]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Odorless, white powder.	MW: 100.1 BP: Decomposes Sol: 0.001% Fl.P: NA IP: NA Sp.Gr: 2.7-2.9 Noncombustible Solid	VP: 0 mm (approx) MLT: 1517-2442°F (Decomposes) UEL: NA LEL: NA	Fluorine, magnesium, acids, alum, ammonium salts	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Mercury compounds [except (organo) alkyls] (as Hg) Hg (Metal) 7439-97-6 (Metal) OV4550000 (Metal) 2809 172	Mercury metal: Colloidal mercury, Elemental mercury, Metallic mercury, Quicksilver Synonyms of "other" Hg compounds vary depending upon the specific compound.	NIOSH Hg Vapor: 0.05 mg/m³ [skin] Other: C 0.1 mg/m³ [skin] OSHA† C 0.1 mg/m³	10 mg/m³ (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	Hopcalite; Acid; AA cold; IV [#6009, Mercury]
Mercury (organo) alkyl compounds (as Hg)	Synonyms vary depending upon the specific (organo) alkyl mercury compound.	NIOSH 0.01 mg/m³ ST 0.03 mg/m³ [skin] OSHA† 0.01 mg/m³ C 0.04 mg/m³	2 mg/m³ (as Hg)	Appearance and odor vary depending upon the specific (organo) alkyl mercury compound.	Properties vary depending upon the specific (organo) alkyl mercury compound.		Strong oxidizers such as chlorine	None available

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards					
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: [Manganese tetroxide (as Mn)]	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; pneuitis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Resp sys, CNS, blood, kidneys
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **[Marble]**	**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 immed** **Soap wash** **Fresh air**	**Eyes, skin, resp sys**
Skin: Eyes: Wash skin: Remove: Change: [Mercury compounds [except (organo) alkyls] (as Hg)]	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 pneuitis; tremor, insom, irrity, indecision, head, ftg, weak; stomatitis, salv; GI dist, anor, low-wgt; prot	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, kidneys
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** **[Mercury (organo) alkyl compounds (as Hg)]**	**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; salv, lac; nau, vomit, diarr, constip; skin burns; emotional dist; kidney inj; possible terato effects**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Eyes, skin, CNS, PNS, kidneys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Mesityl oxide $(CH_3)_2C{=}CHCOCH_3$ 141-79-7 SB4200000 1229 129	Isobutenyl methyl ketone, Isopropylideneacetone, Methyl isobutenyl ketone, 4-Methyl-3-penten-2-one 1 ppm = 4.02 mg/m³	NIOSH 10 ppm (40 mg/m³) OSHA† 25 ppm (100 mg/m³)	1400 ppm [10%LEL]	Oily, colorless to light-yellow liquid with a peppermint- or honey-like odor.	MW: 98.2 BP: 266°F Sol: 3% FI.P: 87°F IP: 9.08 eV Sp.Gr(59°F): 0.86 Class IC Flammable Liquid	VP: 9 mm FRZ: -52°F UEL: 7.2% LEL: 1.4%	Oxidizers, acids	Char; Methanol/ CS_2; GC/FID; IV [#1301, Ketones II]
Methacrylic acid $CH_2{=}C(CH_3)COOH$ 79-41-4 OZ2975000 2531 153P (inhibited)	Methacrylic acid (glacial), Methacrylic acid (inhibited), α -Methacrylic acid, 2-Methylacrylic acid, 2-Methylpropenoic acid 1 ppm = 3.52 mg/m³	NIOSH 20 ppm (70 mg/m³) [skin] OSHA† none	N.D.	Colorless liquid or solid (below 61°F) with an acrid, repulsive odor.	MW: 86.1 BP: 325°F Sol(77°F): 9% FI.P(oc): 171°F IP: ? Sp.Gr: 1.02 (Liquid) Class IIIA Combustible Liquid	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.]	Anasorb(2) Methanol/ Water; HPLC/UV; OSHA [#28]
Methomyl $CH_3C(SCH_3)NOC(O)NHCH_3$ 16752-77-5 AK2975000 2757 151 (carbamate pesticide, solid, n.o.s.)	Lannate®, Methyl N-((methylamino)-carbonyl)oxy)ethanimi-dothioate, S-Methyl-N-(methylcarbamoyl-oxy)thioacetimidate	NIOSH 2.5 mg/m³ OSHA† none	N.D.	White, crystalline solid with a slight, sulfur-like odor. [insecticide]	MW: 162.2 BP: ? Sol(77°F): 6% FI.P: NA IP: ? Sp.Gr(75°F): 1.29 Noncombustible Solid, but may be dissolved in flammable liquids.	VP(77°F): 0.00005 mm MLT: 172°F UEL: NA LEL: NA	Strong bases	None available
Methoxychlor $(C_6H_4OCH_3)_2CHCCl_3$ 72-43-5 KJ3675000 2761 151 (organochlorine pesticide, solid, n.o.s.)	p,p'-Dimethoxydiphenyltri-chloroethane; DMDT; Methoxy-DDT; 2,2-bis(p-Methoxyphenyl)-1,1,1-trichloroethane; 1,1,1-Trichloro-2,2-bis-(p-methoxyphenyl)ethane	NIOSH Ca See Appendix A OSHA† 15 mg/m³	Ca [5000 mg/m³]	Colorless to light-yellow crystals with a slight, fruity odor. [insecticide]	MW: 345.7 BP: Decomposes Sol: 0.00001% FI.P: ? IP: ? Sp.Gr: 1.41 Combustible Solid, but difficult to burn.	VP: Very low MLT: 171°F UEL: ? LEL: ?	Oxidizers	Filter; Isooctane; GC/ECD; II(4) [#S371]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methoxyflurane $CHCl_2CF_2OCH_3$ 76-38-0 KN7820000	2,2-Dichloro-1,1-difluoro-ethyl methyl ether; 2,2-Dichloro-1,1-difluoro-1-methoxyethane; Methoflurane; Methoxyfluorane; Penthrane 1 ppm = 6.75 mg/m³	NIOSH* C 2 ppm (13.5 mg/m³) [60-min] [*Note: REL for exposure to waste anesthetic gas.] OSHA none	N.D.	Colorless liquid with a fruity odor. [inhalation anesthetic]	MW: 165.0 BP: 220°F Sol: Slight Fl.P: ? IP: ? Sp.Gr(77°F): 1.42 Combustible Liquid	VP: 23 mm FRZ: -31°F UEL: ? LEL(176°F): 7%	None reported	None available
4-Methoxyphenol $CH_3OC_6H_4OH$ 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: 469°F Sol(77°F): 4% Fl.P(oc): 270°F IP: 7.50 eV Sp.Gr: 1.55 Combustible Solid; under certain conditions, a dust cloud can probably explode if ignited by a spark or flame.	VP: <0.01 mm MLT: 135°F UEL: ? LEL: ?	Strong oxidizers, strong bases, acid chlorides, acid anhydrides	None available
Methyl acetate CH_3COOCH_3 79-20-9 AI9100000 1231 26	Methyl ester of acetic acid, Methyl ethanoate 1 ppm = 3.03 mg/m³	NIOSH 200 ppm (610 mg/m³) ST 250 ppm (760 mg/m³) OSHA† 200 ppm (610 mg/m³)	3100 ppm [10%LEL]	Colorless liquid with a fragrant, fruity odor.	MW: 74.1 BP: 135°F Sol: 25% Fl.P: 14°F IP: 10.27 eV Sp.Gr: 0.93 Class IB Flammable Liquid	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; CS₂; GC/FID; IV [#1458]
Methyl acetylene $CH_3C{\equiv}CH$ 74-99-7 UK4250000	Allylene, Propine, Propyne, 1-Propyne 1 ppm = 1.64 mg/m³	NIOSH/OSHA 1000 ppm (1650 mg/m³)	1700 ppm [10%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 RGasD: 1.41 Flammable Gas	VP: 5.2 atm FRZ: -153°F UEL: ? LEL: 1.7%	Strong oxidizers (such as chlorine), copper alloys [Note: Can decompose explosively at 4.5 to 5.6 atmospheres of pressure.]	Bag; none; GC/FID; II(5) [#S84]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: Prevent eye contact Wash skin: N.R. Remove: When wet or contam Change: N.R. Methoxyflurane]	TBAL	Inh Ing Con	Irrit eyes; CNS depres, analgesia; anes, sez, resp depres; liver, kidney inj, in animals: repro, terato effects	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, CNS, liver, kidneys, repro sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench** 4-Methoxyphenol]	TBAL	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, nose, throat, upper resp sys; eye, skin burns; CNS depres**	**Eye: Irr immed** **Skin: Soap flush immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Methyl acetate]	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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Skin: **Frostbite** Eyes: **Frostbite** Wash skin: **N.R.** Remove: **When wet (flamm)** Change: N.R. Provide: **Frostbite** Methyl **acetylene]**	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: Frostbite** **Skin: Frostbite** **Breath: Resp support**		**Resp sys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl acetylene-propadiene mixture $CH_3C \equiv CH/CH_2=C=CH_2$ 59355-75-8 UK4920000 1060 116P (stabilized)	MAPP gas, Methyl acetylene-allene mixture, Methyl acetylene-propadiene mixture (stabilized), Propadiene-methyl acetylene, Propyne-allene mixture, Propyne-propadiene mixture 1 ppm = 1.64 mg/m³	NIOSH 1000 ppm (1800 mg/m³) ST 1250 ppm (2250 mg/m³) OSHA† 1000 ppm (1800 mg/m³)	3400 ppm [10%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 FI.P: NA (Gas) IP: ? RGasD: 1.48 Flammable Gas	VP: >1 atm FRZ: -213°F UEL: 10.8% LEL: 3.4%	Strong oxidizers, copper alloys [Note: Forms explosive compounds at high pressure in contact with alloys containing more than 67% copper.]	Bag; none; GC/FID; II(6) [#S85]
Methyl acrylate $CH_2=CHCOOCH_3$ 96-33-3 AT2800000 1919 129P (inhibited)	Methoxycarbonylethylene, Methyl ester of acrylic acid, Methyl propenoate 1 ppm = 3.52 mg/m³	NIOSH/OSHA 10 ppm (35 mg/m³) [skin]	250 ppm	Colorless liquid with an acrid odor.	MW: 86.1 BP: 176°F Sol: 6% FI.P: 27°F IP: 9.90 eV Sp.Gr: 0.96 Class IB Flammable Liquid	VP: 65 mm FRZ: -106°F UEL: 25% LEL: 2.8%	Nitrates, oxidizers such as peroxides, strong alkalis [Note: Polymerizes easily, usually contains an inhibitor such as hydroquinone.]	Char; CS_2; GC/FID; IV [#1459]
Methylacrylonitrile $CH_2=C(CH_3)CN$ 126-98-7 UD1400000 3079 131P (inhibited)	2-Cyanopropene-1, 2-Cyano-1-propene, Isoprene cyanide, Isopropenylnitrile, Methacrylonitrile, α-Methylacrylonitrile, 2-Methylpropenenitrile 1 ppm = 2.74 mg/m³	NIOSH 1 ppm (3 mg/m³) [skin] OSHA† none	N.D.	Colorless liquid with an odor like bitter almonds.	MW: 67.1 BP: 195°F Sol: 3% FI.P: 34°F IP: ? Sp.Gr: 0.80 Class IB Flammable Liquid	VP(77°F): 71 mm FRZ: -32°F UEL: 6.8% LEL: 2%	Strong acids, strong oxidizers, alkali, light **[Note: Polymerization may occur due to elevated temperature, visible light, or contact with a concentrated alkali.]**	None available
Methylal $CH_3OCH_2OCH_3$ 109-87-5 PA8750000 1234 127	Dimethoxymethane, Formal, Formaldehyde dimethylacetal, Methoxymethyl methyl ether, Methylene dimethyl ether 1 ppm = 3.11 mg/m³	NIOSH/OSHA 1000 ppm (3100 mg/m³)	2200 ppm [10%LEL]	Colorless liquid with a chloroform-like odor.	MW: 76.1 BP: 111°F Sol: 33% FI.P(oc): -26°F IP: 10.00 eV Sp.Gr: 0.86 Class IB Flammable Liquid	VP: 330 mm FRZ: -157°F UEL: 13.8% LEL: 2.2%	Strong oxidizers, acids	Char; Hexane; GC/FID; IV [#1611]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH/OSHA 3400 ppm: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con (liq)	Irrit resp sys; excitement, conf, anes; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support		Resp sys, CNS
Methyl acetylene-propadiene mixture]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **N.R.** Provide: **Quick drench**	NIOSH/OSHA 100 ppm: SA* 250 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Methyl **acrylate]**						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	TBAL	Inh Abs Ing Con	Irrit eyes, skin; lac, in animals: convuls, loss of motor control in hind limbs	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, CNS
Methylacrylonitrile]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: **N.R.**	NIOSH/OSHA 2200 ppm: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	**Inh** **Ing** **Con**	**Irrit eyes, skin, upper resp sys; anes**	**Eye: Irr immed** **Skin: Water flush prompt** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**
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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl alcohol CH_3OH 67-56-1 PC1400000 1230 131	Carbinol, Columbian spirits, Methanol, Pyroligneous spirit, Wood alcohol, Wood naphtha, Wood spirit 1 ppm = 1.31 mg/m³	NIOSH 200 ppm (260 mg/m³) ST 250 ppm (325 mg/m³) [skin] OSHA† 200 ppm (260 mg/m³)	6000 ppm	Colorless liquid with a characteristic pungent odor.	MW: 32.1 BP: 147°F Sol: Miscible Fl.P: 52°F IP: 10.84 eV Sp.Gr: 0.79 Class IB Flammable Liquid	VP: 96 mm FRZ: -144°F UEL: 36% LEL: 6.0%	Strong oxidizers	Si gel; Water; GC/FID; IV [#2000, Methanol]
Methylamine CH_3NH_2 74-89-5 PF6300000 1061 118 (anhydrous) 1235 132 (aqueous)	Aminomethane, Anhydrous methylamine, Aqueous methylamine, Monomethylamine 1 ppm = 1.27 mg/m³	NIOSH/OSHA 10 ppm (12 mg/m³)	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 Fl.P: 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; THF; HPLC/FLU/vis OSHA [#40]
Methyl (n-amyl) ketone $CH_3CO[CH_2]_4CH_3$ 110-43-0 MJ5075000 1110 127	Amyl methyl ketone, n-Amyl methyl ketone, 2-Heptanone 1 ppm = 4.67 mg/m³	NIOSH/OSHA 100 ppm (465 mg/m³)	800 ppm	Colorless to white liquid with a banana-like, fruity odor.	MW: 114.2 BP: 305°F Sol: 0.4% Fl.P: 102°F IP: 9.33 eV Sp.Gr: 0.81 Class II Combustible Liquid	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_2; GC/FID; IV [#1301, Ketones II]
Methyl bromide CH_3Br 74-83-9 PA4900000 1062 123	Bromomethane, Monobromomethane 1 ppm = 3.89 mg/m³	NIOSH Ca See Appendix A OSHA† C 20 ppm (80 mg/m³) [skin]	Ca [250 ppm]	Colorless gas with a chloroform-like odor at high concentrations. [Note: A liquid below 38°F. Shipped as a liquefied compressed gas.]	MW: 95.0 BP: 38°F Sol: 2% Fl.P: NA (Gas) IP: 10.54 eV RGasD: 3.36 Sp.Gr: 1.73 (Liquid at 32°F) Flammable Gas, but only in presence of a high energy ignition source.	VP: 1.9 atm FRZ: -137°F UEL: 16.0% LEL: 10%	Aluminum, magnesium, strong oxidizers [Note: Attacks aluminum to form aluminum trimethyl, which is SPONTANEOUSLY flammable.]	Char(pet)(2)/V dry tube; CS_2; GC/FID; IV [#2520]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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. [Methyl alcohol]	NIOSH/OSHA 2000 ppm: SA 5000 ppm: SA:CF 6000 ppm: SAT: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, verti, li-head, nau, vomit; vis dist, optic nerve damage (blindness); derm	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, GI tract
Skin: Prevent skin contact (soln)/Frostbite **Eyes: Prevent eye contact (soln)/Frostbite** **Wash skin: When contam (soln)** **Remove: When wet (flamm)** **Change: N.R.** **Provide: Frostbite** **[Methylamine]**	**NIOSH/OSHA** **100 ppm: CCRFS/GMFS/PAPRS[f]/SCBAF/SAF** **§: 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; derm; conj; liq: frostbite**	**Eye: Irr immed (soln)/Frostbite** **Skin: Water flush immed (soln)/Frostbite** **Breath: Resp support** **Swallow: Medical attention immed (soln)**		**Eyes, skin, resp sys**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Methyl (n-amyl) ketone]	NIOSH/OSHA 800 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; narco, coma; derm	Eye: Irr immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, PNS
Skin: Prevent skin contact (liq) **Eyes: Prevent eye contact (liq)** **Wash skin: When contam (liq)** **Remove: When wet (flamm)** **Change: N.R.** **Provide: Quick drench (liq)** **[Methyl bromide]**	**NIOSH** **¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Abs (liq)** **Con (liq)**	**Irrit eyes, skin, resp sys; musc weak, inco, vis dist, verti; nau, vomit, head; mal; hand tremor; convuls; dysp; skin vesic; liq: frostbite; [carc]**	**Eye: Irr immed (liq)** **Skin: Water flush immed (liq)** **Breath: Resp support**		**Eyes, skin, resp sys, CNS** **[in animals: lung, kidney & forestomach tumors]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl Cellosolve® $CH_3OCH_2CH_2OH$ 109-86-4 KL5775000 1188 127	EGME, Ethylene glycol monomethyl ether, Glycol monomethyl ether, 2-Methoxyethanol 1 ppm = 3.11 mg/m³	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 Sp.Gr: 0.96 Class II Combustible Liquid	VP: 6 mm FRZ: -121°F UEL: 14% LEL: 1.8%	Strong oxidizers, caustics	Char; Methanol/ CH_2Cl_2; GC/FID; IV [#1403, Alcohols IV]
Methyl Cellosolve® acetate $CH_3COOCH_2CH_2OCH_3$ 110-49-6 KL5950000 1189 129	EGMEA, Ethylene glycol monomethyl ether acetate, Glycol monomethyl ether acetate, 2-Methoxyethyl acetate 1 ppm = 4.83 mg/m³	NIOSH 0.1 ppm (0.5 mg/m³) [skin] OSHA 25 ppm (120 mg/m³) [skin]	200 ppm	Colorless liquid with a mild, ether-like odor.	MW: 118.1 BP: 293°F Sol: Miscible Fl.P: 120°F IP: ? Sp.Gr: 1.01 Class II Combustible Liquid	VP: 2 mm FRZ: -85°F UEL: 8.2% LEL: 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1451]
Methyl chloride CH_3Cl 74-87-3 PA6300000 1063 115	Chloromethane, Monochloromethane 1 ppm = 2.07 mg/m³	NIOSH Ca See Appendix A 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 RGasD: 1.78 Flammable Gas	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_2Cl_2; GC/FID; IV [#1001]
Methyl chloroform CH_3CCl_3 71-55-6 KJ2975000 2831 160	Chlorothene; 1,1,1-Trichloroethane; 1,1,1-Trichloroethane (stabilized) 1 ppm = 5.46 mg/m³	NIOSH C 350 ppm (1900 mg/m³) [15-min] See Appendix C (Chloroethanes) 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 Sp.Gr: 1.34 Combustible Liquid, but burns with difficulty.	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_2; GC/FID; IV [#1003, Halogenated Hydrocarbons]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl-2-cyano-acrylate $CH_2=C(CN)COOCH_3$ 137-05-3 AS7000000	Mecrylate, Methyl cyanoacrylate, Methyl α-cyanoacrylate, Methyl ester of 2-cyano-acrylic acid 1 ppm = 4.54 mg/m³	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: ? Sp.Gr(81°F): 1.10 Class IIIA Combustible Liquid	VP(77°F): 0.2 mm FRZ: ? UEL: ? LEL: ?	Moisture [Note: Contact with moisture causes rapid polymerization.]	XAD-7*; CH_3CN/ H_3PO_4; HPLC/UV; OSHA [#55]
Methylcyclohexane $CH_3C_6H_{11}$ 108-87-2 GV6125000 2296 128	Cyclohexylmethane, Hexahydrotoluene 1 ppm = 4.02 mg/m³	NIOSH 400 ppm (1600 mg/m³) OSHA† 500 ppm (2000 mg/m³)	1200 ppm [10%LEL]	Colorless liquid with a faint, benzene-like odor.	MW: 98.2 BP: 214°F Sol: Insoluble FLP: 25°F IP: 9.85 eV Sp.Gr: 0.77 Class IB Flammable Liquid	VP: 37 mm FRZ: -196°F UEL: 6.7% LEL: 1.2%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydro-carbons]
Methylcyclohexanol $CH_3C_6H_{11}OH$ 25639-42-3 GW0175000 2617 129	Hexahydrocresol, Hexahydromethylphenol 1 ppm = 4.67 mg/m³	NIOSH 50 ppm (235 mg/m³) OSHA† 100 ppm (470 mg/m³)	500 ppm	Straw-colored liquid with a weak odor like coconut oil.	MW: 114.2 BP: 311-356°F Sol: 4% FLP: 149-158°F IP: 9.80 eV Sp.Gr: 0.92 Class IIIA Combustible Liquid	VP(86°F): 2 mm FRZ: -58°F UEL: ? LEL: ?	Strong oxidizers	Char; CH_2Cl_2; GC/FID; IV [#1404]
o-Methylcyclohexanone $CH_3C_6H_9O$ 583-60-8 GW1750000 2297 127	2-Methylcyclohexanone 1 ppm = 4.59 mg/m³	NIOSH 50 ppm (230 mg/m³) ST 75 ppm (345 mg/m³ [skin] OSHA† 100 ppm (460 mg/m³) [skin]	600 ppm	Colorless liquid with a weak, peppermint-like odor.	MW: 112.2 BP: 325°F Sol: Insoluble FLP: 118°F IP: ? Sp.Gr: 0.93 Class II Combustible Liquid	VP: 1 mm FRZ: 7°F UEL: ? LEL: ?	Strong oxidizers	Porapak; Acetone; GC/FID; IV [#2521]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl cyclopentadienyl manganese tricarbonyl (as Mn) $CH_3C_5H_4Mn(CO)_3$ 12108-13-3 OP1450000	CI-2, Combustion Improver-2, Manganese tricarbonyl-methylcyclopentadienyl, 2-Methylcyclopentadienyl manganese tricarbonyl, MMT	NIOSH 0.2 mg/m^3 [skin] OSHA† C 5 mg/m^3	N.D.	Yellow to dark-orange liquid with a faint, pleasant odor. [Note: A solid below 36°F.]	MW: 218.1 BP: 449°F Sol: Insoluble FLP: 230°F IP: ? Sp.Gr: 1.39 Class IIIB Combustible Liquid	VP(212°F): 7 mm FRZ: 36°F UEL: ? LEL: ?	Light (decomposes)	None available
Methyl demeton $C_6H_{18}O_3PS_2$ 8022-00-2 TG1760000	Demeton methyl; O,O-Dimethyl 2-ethylmercaptoethyl thiophosphate; Metasystox®; Methyl mercaptophos; Methyl systox®	NIOSH 0.5 mg/m^3 [skin] OSHA† none	N.D.	Oily, colorless to pale-yellow liquid with an unpleasant odor. [insecticide] [Note: Technical grade consists of 2 isomers: thiono & thiolo.]	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) $CH_2(C_6H_3ClNH_2)_2$ 101-14-4 CY1050000	DACPM; 3,3'-Dichloro-4,4'-diaminodiphenylmethane; MBOCA; 4,4'-Methylenebis(o-chloroaniline); 4,4'-Methylenebis(2-chlorobenzenamine); MOCA	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)	Filters*(2); Water; GC/ECD; OSHA [#71]
Methylene bis(4-cyclohexylisocyanate) $CH_2[(C_6H_{10})NCO]_2$ 5124-30-1 NQ9250000	Dicyclohexylmethane 4,4'-diisocyanate; DMDI; bis(4-Isocyanatocyclohexyl)-methane; HMDI; Hydrogenated MDI; Reduced MDI; Saturated MDI 1 ppm = 10.73 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: >395°F IP: ? Sp.Gr(77°F): 1.07 Class IIIB 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)
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam emove: When wet or contam hange: 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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, CNS, liver, kidneys
fethyl cyclopentadienyl manganese tricarbonyl (as Mn)]						
kin: **Prevent skin contact** yes: **Prevent eye contact** lash skin: **When contam** emove: **When wet or contam** hange: **Daily** rovide: **Eyewash, Quick drench**	**TBAL**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin; ache eyes, rhin; nau, head, dizz, vomit**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS, CVS, blood chol**
fethyl **demeton]**						
kin: Prevent skin contact yes: Prevent eye contact lash skin: When contam/Daily emove: When wet or contam hange: Daily rovide: Eyewash, Quick drench	NIOSH ⓦ: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Hema, cyan, nau, methemo, kidney irrit; [carc]	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Liver, blood, kidneys [in animals: liver, lung & bladder tumors]
,4'-Methylenebis(2-chloroaniline)]						
kin: **Prevent skin contact** yes: **Prevent eye contact** lash skin: **When contam** emove: **When wet or contam** hange: **N.R.** rovide: **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: Irr immed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys**
fethylene **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: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methylene bisphenyl isocyanate $CH_2(C_6H_4NCO)_2$ 101-68-8 NQ9350000 2489 156	4,4'-Diphenylmethane diisocyanate; MDI; Methylene bis(4-phenyl isocyanate); Methylene di-p-phenylene ester of isocyanic acid 1 ppm = 10.24 mg/m³	NIOSH 0.05 mg/m³ (0.005 ppm) C 0.2 mg/m³ (0.020 ppm) [10-min] OSHA C 0.2 mg/m³ (0.02 ppm)	75 mg/m³	White to light-yellow, odorless flakes. [Note: A liquid above 99°F.]	MW: 250.3 BP: 597°F Sol: 0.2% FI.P: 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/ Methanol; HPLC/UV/ ECD; IV [#5521]
Methylene chloride CH_2Cl_2 75-09-2 PA8050000 1593 160	Dichloromethane, Methylene dichloride 1 ppm = 3.47 mg/m³	NIOSH Ca See Appendix A OSHA[1910.1052] 25 ppm ST 125 ppm	Ca [2300 ppm]	Colorless liquid with a chloroform-like odor. [Note: A gas above 104°F.]	MW: 84.9 BP: 104°F Sol: 2% FI.P: ? 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_2; GC/FID; IV [#1005]
4,4'-Methylene-dianiline $CH_2(C_6H_4NH_2)_2$ 101-77-9 BY5425000	4,4'-Diaminodiphenylmethane; para, para'-Diaminodiphenyl-methane; Dianilinomethane; 4,4'-Diphenylmethanediamine; MDA	NIOSH Ca See Appendix A OSHA[1910.1050] 0.010 ppm ST 0.100 ppm	Ca [N.D.]	Pale-brown, crystalline solid with a faint, amine-like odor.	MW: 198.3 BP: 748°F Sol: 0.1% FI.P: 374°F IP: 10.70 eV Sp.Gr: 1.06 (Liquid at 212°F) Combustible Solid	VP(77°F): 0.0000002 mm MLT: 198°F UEL: ? LEL: ?	Strong oxidizers	Filter*; KOH/ Methanol; HPLC/UV/ ECD IV [#5029]
Methyl ethyl ketone peroxide $C_8H_{18}O_4$ 1338-23-4 EL9450000 2550 147	2-Butanone peroxide, Ethyl methyl ketone peroxide, MEKP; MEK peroxide, Methyl ethyl ketone hydroperoxide 1 ppm = 7.21 mg/m³	NIOSH C 0.2 ppm (1.5 mg/m³) OSHA† none	N.D.	Colorless liquid with a characteristic odor. [Note: Explosive decomposition occurs at 230°F.]	MW: 176.2 BP: 244°F (Decomposes) Sol: Soluble FI.P(oc): 125-200°F (60% MEKP) IP: ? Sp.Gr(59°F): 1.12 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Organic materials, heat, flames, sunlight, trace contaminants [Note: A strong oxidizing 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; IV [#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: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH 0.5 mg/m³: SA* 1.25 mg/m³: SA:CF* 2.5 mg/m³: SCBAF/SAF 75 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; resp sens, cough, pulm secretions, chest pain, dysp; asthma	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, resp sys
[Methylene bisphenyl isocyanate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH ✱: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; flg, weak, som, li-head; numb tingle limbs; nau; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, CVS, CNS [in animals: lung, liver, salivary & mammary gland tumors]
[Methylene chloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH ✱: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Irrit eyes; jaun, hepatitis; myocardial damage; in animals: heart, liver, spleen damage; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, liver, CVS, spleen [in animals: bladder cancer]
[4,4'-Methylenedianiline]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; cough, dysp, pulm edema; blurred vision; blisters, scars skin; abdom pain, vomit, diarr; derm; in animals: liver, kidney damage	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: 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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl formate $HCOOCH_3$ 107-31-3 LQ8925000 1243 129	Methyl ester of formic acid, Methyl methanoate 1 ppm = 2.46 mg/m³	NIOSH 100 ppm (250 mg/m³) ST 150 ppm (375 mg/m³) OSHA† 100 ppm (250 mg/m³)	4500 ppm	Colorless liquid with a pleasant odor. [Note: A gas above 89°F.]	MW: 60.1 BP: 89°F Sol: 30% FLP: -2°F IP: 10.82 eV Sp.Gr: 0.98 Class IA Flammable Liquid	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; II(5); [#S291]
5-Methyl-3-heptanone $C_2H_5COCH_2CH(CH_3)CH_2CH_3$-Methyl-5-heptanone 541-85-5 MJ7350000 2271 127	Amyl ethyl ketone, Ethyl amyl ketone, 1 ppm = 5.24 mg/m³	NIOSH/OSHA 25 ppm (130 mg/m³)	100 ppm	Colorless liquid with a pungent odor.	MW: 128.2 BP: 315°F Sol: Insoluble FLP: 138°F IP: ? Sp.Gr: 0.82 Class II Combustible Liquid	VP: 2 mm FRZ: -70°F UEL: ? LEL: ?	Strong oxidizers	Char; Methanol/ CS_2; GC/FID; IV [#1301, Ketones II]
Methyl hydrazine CH_3NHNH_2 60-34-4 MV5600000 1244 131	MMH, Monomethylhydrazine 1 ppm = 1.89 mg/m³	NIOSH Ca See Appendix A C 0.04 ppm (0.08 mg/m³) [2-hr] OSHA C 0.2 ppm (0.35 mg/m³) [skin]	Ca [20 ppm]	Fuming, colorless liquid with an ammonia-like odor.	MW: 46.1 BP: 190°F Sol: Miscible FLP: 17°F IP: 8.00 eV Sp.Gr(77°F): 0.87 Class IB Flammable Liquid	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	Bub; Pho-acid; Vis; IV [#3510]
Methyl iodide CH_3I 74-88-4 PA9450000 2644 151	Iodomethane, Monoiodomethane 1 ppm = 5.80 mg/m³	NIOSH Ca See Appendix A 2 ppm (10 mg/m³) [skin] OSHA† 5 ppm (28 mg/m³) [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% FLP: NA IP: 9.54 eV Sp.Gr: 2.28 Noncombustible Liquid	VP: 400 mm FRZ: -88°F UEL: NA LEL: NA	Strong oxidizers [Note: Decomposes at 518°F.]	Char; Toluene; GC/FID; IV [#1014]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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: [Methyl formate]	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH/OSHA 1000 ppm: SA* 2500 ppm: SA:CF* 4500 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose; chest tight, dysp; vis dist; CNS depres; in animals: pulm edema; narco	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, CNS
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **[5-Methyl-3-heptanone]**	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet or contam** **N.R.**	**NIOSH/OSHA** **100 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; narco, coma; derm**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water flush** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CNS**
Skin: Eyes: Wash skin: Remove: Change: Provide: [Methyl hydrazine]	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: SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; vomit, diarr; tremor, ataxia; anoxia, cyan; convuls; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, blood, CVS; [in animals: lung, liver, blood vessel & intestine tumors]
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** **[Methyl iodide]**	**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, resp sys; nau, vomit; verti, ataxia; slurred speech, drow; derm; [carc]**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap flush immed** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CNS [in animals: lung, kidney & forestomach tumors]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl isoamyl ketone $CH_3COCH_2CH_2CH(CH_3)_2$ 110-12-3 MP3850000 2302 127	Isoamyl methyl ketone, Isopentyl methyl ketone, 2-Methyl-5-hexanone, 5-Methyl-2-hexanone, MIAK 1 ppm = 4.67 mg/m³	NIOSH 50 ppm (240 mg/m³) OSHA† 100 ppm (475 mg/m³)	N.D.	Colorless, clear liquid with a pleasant, fruity odor.	MW: 114.2 BP: 291°F Sol: 0.5% FLP: 97°F IP: 9.284 eV Sp.Gr: 0.81 Class IC Flammable Liquid	VP: 5 mm FRZ: -101°F UEL(200°F): 8.2% LEL(200°F): 1.0%	Oxidizers	None available
Methyl isobutyl carbinol $(CH_3)_2CHCH_2CH(OH)CH_3$ 108-11-2 SA7350000 2053 129	Isobutylmethylcarbinol, Methyl amyl alcohol, 4-Methyl-2-pentanol, MIBC 1 ppm = 4.18 mg/m³	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% FLP: 106°F IP: ? Sp.Gr: 0.81 Class II Combustible Liquid	VP: 3 mm FRZ: -130°F UEL: 5.5% LEL: 1.0%	Strong oxidizers	Char; 2-Propanol/ CS_2; GC/FID; IV [#1402, Alcohols III]
Methyl isocyanate CH_3NCO 624-83-9 NQ9450000 2480 155	Methyl ester of isocyanic acid, MIC 1 ppm = 2.34 mg/m³	NIOSH/OSHA 0.02 ppm (0.05 mg/m³) [skin]	3 ppm	Colorless liquid with a sharp, pungent odor.	MW: 57.1 BP: 199°F Sol(59°F): 10% FLP: 19°F IP: 10.67 eV Sp.Gr: 0.96 Class IB Flammable Liquid	VP: 348 mm FRZ: -49°F UEL: 26% LEL: 5.3%	Water, oxidizers, acids, alkalis, amines, iron, tin, copper [Note: Usually contains inhibitors to prevent polymerization.]	XAD-7; CH_2CN; HPLC/FLD; OSHA [#54]
Methyl isopropyl ketone $CH_3COCH(CH_3)_2$ 563-80-4 EL9100000 2397 127	2-Acetyl propane, Isopropyl methyl ketone, 3-Methyl-2-butanone, 3-Methyl butan-2-one, MIPK 1 ppm = 3.53 mg/m³	NIOSH 200 ppm (705 mg/m³) OSHA† none	N.D.	Colorless liquid with an acetone-like odor.	MW: 86.2 BP: 199°F Sol: Very slight FLP: ? IP: 9.32 eV Sp.Gr: 0.81 Combustible Liquid	VP: 42 mm FRZ: -134°F UEL: ? LEL: ?	Oxidizers	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Methyl mercaptan CH_3SH 74-93-1 PB4375000 1064 117	Mercaptomethane, Methanethiol, Methyl sulfhydrate 1 ppm = 1.97 mg/m³	NIOSH C 0.5 ppm (1 mg/m³) [15-min] OSHA† C 10 ppm (20 mg/m³)	150 ppm	Colorless gas with a disagreeable odor like garlic or rotten cabbage. [Note: A liquid below 43°F. Shipped as a liquefied compressed gas.]	MW: 48.1 BP: 43°F Sol: 2% Fl.P: NA (Gas) (oc) 0°F (Liq) IP: 9.44 eV RGasD: 1.66 Sp.Gr: 0.90 (Liquid at 32°F) Flammable Gas Class IA Flammable Liquid	VP: 1.7 atm FRZ: -186°F UEL: 21.8% LEL: 3.9%	Strong oxidizers, bleaches, copper, aluminum, nickel-copper alloys	Filter*; HCl/DCE; GC/FPD; IV [#2542]
Methyl methacrylate $CH_2{=}C(CH_3)COOCH_3$ 80-62-6 OZ5075000 1247 129P (inhibited)	Methacrylate monomer, Methyl ester of methacrylic acid, Methyl-2-methyl-2-propenoate 1 ppm = 4.09 mg/m³	NIOSH/OSHA 100 ppm (410 mg/m³)	1000 ppm	Colorless liquid with an acrid, fruity odor.	MW: 100.1 BP: 214°F Sol: 1.5% Fl.P(oc): 50°F IP: 9.70 eV Sp.Gr: 0.94 Class IB Flammable Liquid	VP: 29 mm FRZ: -54°F UEL: 8.2% LEL: 1.7%	Nitrates, oxidizers, peroxides, strong alkalis, moisture [Note: May polymerize if subjected to heat, oxidizers, or ultraviolet light. Usually contains an inhibitor such as hydroquinone.]	XAD-2; CS_2; GC/FID; IV [#2537]
Methyl parathion $(CH_3O)_2P(S)OC_6H_4NO_2$ 298-00-0 TG0175000 2783 152	Azophos®; O,O-Dimethyl-O-p-nitrophenylphosphorothioate; 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 commercial product in xylene is a tan liquid.]	MW: 263.2 BP: 289°F Sol(77°F): 0.006% Fl.P: ? IP: ? Sp.Gr: 1.36 Combustible Solid	VP: 0.00001 mm MLT: 99°F UEL: ? LEL: ?	Strong oxidizers, water [Note: Explosive risk when heated above 122°F.]	OVS-2; Toluene/Acetone; GC/FPD; IV [#5600, Organophosphorus Pesticides]
Methyl silicate $(CH_3O)_4Si$ 681-84-5 VV9800000 2606 155	Methyl orthosilicate, Tetramethoxysilane, Tetramethyl ester of silicic acid, Tetramethyl silicate 1 ppm = 6.23 mg/m³	NIOSH 1 ppm (6 mg/m³) OSHA† none	N.D.	Clear, colorless liquid. [Note: A solid below 28°F.]	MW: 152.3 BP: 250°F Sol: Soluble Fl.P: 205°F IP: ? Sp.Gr: 1.02 Class IIIB Combustible Liquid	VP(77°F): 12 mm FRZ: 28°F UEL: ? LEL: ?	Oxidizers, hexafluorides of rhenium, molybdenum & tungsten	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
α-Methyl styrene $C_6H_5C(CH_3)=CH_2$ 98-83-9 WL5075300	AMS, Isopropenyl benzene, 1-Methyl-1-phenylethylene, 2-Phenyl propylene 1 ppm = 4.83 mg/m³	NIOSH 50 ppm (240 mg/m³) ST 100 ppm (485 mg/m³) OSHA† C 100 ppm (480 mg/m³)	700 ppm	Colorless liquid with a characteristic odor.	MW: 118.2 BP: 330°F Sol: Insoluble FI.P: 129°F IP: 8.35 eV Sp.Gr: 0.91 Class II Combustible Liquid	VP: 2 mm FRZ: -10°F UEL: 6.1% LEL: 1.9%	Oxidizers, peroxides, halogens, catalysts for vinyl or ionic polymers; aluminum, iron chloride, copper [Note: Usually contains an inhibitor such as tert-butyl catechol.]	Char; CS_2; GC/FID; IV [#1501, Aromatic Hydrocarbons]
Metribuzin $C_8H_{14}N_4OS$ 21087-64-9 XZ2990000	4-Amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one; Sencor®	NIOSH 5 mg/m³ OSHA† none	N.D.	Colorless, crystalline solid. [herbicide]	MW: 214.3 BP: ? Sol: 0.1% FI.P: NA IP: ? Sp.Gr: 1.31 Noncombustible Solid	VP: 0.0000004 mm MLT: 257°F UEL: NA LEL: NA	None reported	None available
Mica (containing less than 1% quartz) 12001-26-2 VV8760000	Biotite, Lepidolite, Margarite, Muscovite, Phlogopite, Roscoelite, Zimmwaldite	NIOSH 3 mg/m³ (resp) OSHA† 20 mppcf	1500 mg/m³	Colorless, odorless flakes or sheets of hydrous silicates.	MW: 797 (approx) BP: ? Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 2.6-3.2 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [#0600, Particulates NOR resp)]
Mineral wool fiber PY8070000	Manmade mineral fibers, Rock wool, Slag wool, Synthetic vitreous fibers [Note: Produced by blowing steam or air through molten rock (rock wool) or various furnace slags that are by-products of metal smelting or refining processes (slag wool).]	NIOSH 3 fibers/cm³ (fibers ≤ 3.5 µm diameter & ≥ 10 µm in length) 5 mg/m³ (total) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Typically, a mineral "wool" with diameters >0.5 µm & >1.5 µm in length.	MW: varies BP: NA Sol: Insoluble FI.P: NA IP: NA Sp.Gr: ? Noncombustible Fibers	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [#0500, Particulates NOR (total)] [Also #7400]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [α-Methyl styrene]	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: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily [Metribuzin]	TBAL	Inh Ing Con	In animals: CNS depres; thyroid, liver, enzyme changes	Eye: Irr immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed		CNS, thyroid, liver
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Mica (containing less than 1% quartz)]	NIOSH 15 mg/m^3: DM 30 mg/m^3: DMXSQ/SA 75 mg/m^3: SA:CF/PAPRDM 150 mg/m^3: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 1500 mg/m^3: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes; pneumoconiosis, cough, dysp; weak; low-wgt	Eye: Irr immed Breath: Fresh air		Resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: Daily [Mineral Wool]	NIOSH 5X REL: D 10X REL: DXSQ/HiE/SA 25X REL: SA:CF/PAPRD 50X REL: HiEF/PAPRTHiE/SCBAF/SAF 1000X REL: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, skin, resp sys; dysp	Eye: Irr immed Skin: Soap wash Breath: Fresh air		Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Molybdenum M o 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; IV [#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; IV [#7300, Elements]
Monocrotophos $C_7H_{14}NO_5P$ 6923-22-4 TC4375000 2783 152 (organophosphorus pesticide, solid)	3-Hydroxy-N-methylcrotonamide dimethylphosphate, Monocron [$(CH_3O)_2P(O)OC(CH_3)=CHC(O)NHCH_3$]	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.]	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
Monomethyl aniline $C_6H_5NHCH_3$ 100-61-8 BY4550000 2294 153	MA, (Methylamino)benzene, N-Methyl aniline, Methylphenylamine, N-Phenylmethylamine 1 ppm = 4.38 mg/m³	NIOSH 0.5 ppm (2 mg/m³) [skin] OSHA† 2 ppm (9 mg/m³) [skin]	100 ppm	Yellow to light-brown liquid with a weak, ammonia-like odor.	MW: 107.2 BP: 384°F Sol: Insoluble 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	Bub; NaOH; GC/FID; IV [#3511]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Morpholine C_4H_9ON 110-91-8 QD6475000 1760 154 (aqueous) 2054 132	Diethylene imidoxide; Diethylene oximide; Tetrahydro-1,4-oxazine; Tetrahydro-p-oxazine 1 ppm = 3.56 mg/m^3	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 [10%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 FI.P(oc): 98°F IP: 8.88 eV Sp.Gr: 1.007 Class IC Flammable Liquid	VP: 6 mm FRZ: 23°F UEL: 11.2% LEL: 1.4%	Strong acids, strong oxidizers, metals, nitro compounds [Note: Corrosive to metals.]	Si gel; H_2SO_4/NaOH; GC/FID; II(3) [#S150]
Naphtha (coal tar) 8030-30-6 DE3030000 1256 128 (solvent) 2553 128	Crude solvent coal tar naphtha, High solvent naphtha, Naphtha 1 ppm = 4.50 mg/m^3(approx)	NIOSH/OSHA 100 ppm (400 mg/m^3)	1000 ppm [10%LEL]	Reddish-brown, mobile liquid with an aromatic odor.	MW: 110 (approx) BP: 320-428°F Sol: Insoluble FI.P: 100-109°F IP: ? Sp.Gr: 0.89-0.97 Class II Combustible Liquid	VP: <5 mm FRZ: ? UEL: ? LEL: 1%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1550]
Naphthalene $C_{10}H_8$ 91-20-3 QJ0525000 1334 133 (crude or refined) 2304 133 (molten)	Naphthalin, Tar camphor, White tar 1 ppm = 5.24 mg/m^3	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% FI.P: 174°F IP: 8.12 eV Sp.Gr: 1.15 Combustible Solid, but will take some effort to ignite.	VP: 0.08 mm MLT: 176°F UEL: 5.9% LEL: 0.9%	Strong oxidizers, chromic anhydride	Char; CS_2; GC/FID; IV [#1501, Aromatic Hydro-carbons]
Naphthalene diisocyanate $C_{10}H_6(NCO)_2$ 3173-72-6 NQ9600000	1,5-Diisocyanatonaphtha-lene; 1,5-Naphthalene diiso-cyanate; 1,5-Naphthalene ester of isocyanic acid; NDI 1 ppm = 8.60 mg/m^3	NIOSH 0.040 mg/m^3 (0.005 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: 505°F Sol: ? FI.P(oc): 311°F IP: ? Sp.Gr: ? Combustible Solid	VP(75°F): 0.003 mm MLT: 261°F UEL: ? LEL: ?	None reported	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
α-Naphthylamine $C_{10}H_7NH_2$ 134-32-7 QM1400000 2077 153	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% Fl.P: 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_3COOH/ 2-Pro-panol; GC/FID; IV [#5518]
ß-Naphthylamine $C_{10}H_7NH_2$ 91-59-8 QM2100000 1650 153	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 Fl.P: 315°F IP: 9.71 eV Sp.Gr(208°F): 1.06 Combustible Solid	VP(226°F): 1mm MLT: 232°F UEL: ? LEL: ?	None reported	Filter/ Si gel; CH_3COOH/ 2-Pro-panol; GC/FID; IV [#5518]
Niax® Catalyst ESN 62765-93-9 QR3900000	None [Note: A Mixture of 95% dimethylaminopropio-nitrile & 5% bis(2-dimethylamino)ethyl ether.]	NIOSH/OSHA See Appendix C	N.D.	A liquid mixture. [Note: Used in the past as a catalyst in the manufacture of flexible poly-urethane foams.]	MW: mixture BP: ? Sol: ? Fl.P: ? IP: ? Sp.Gr: ?	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers	None available
Nickel carbonyl $Ni(CO)_4$ 13463-39-3 QR6300000 1259 131	Nickel tetracarbonyl, Tetracarbonyl nickel 1 ppm = 6.98 mg/m³	NIOSH Ca See Appendix A 0.001 ppm (0.007 mg/m³) OSHA 0.001 ppm (0.007 mg/m³)	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% Fl.P: <-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; GFAAS; IV [#6007]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection -- 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: [α-Naphthylamine]	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Derm; hemorrhagic cystitis; dysp, ataxia, methemo; hema; dysuria; [carc]	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Bladder, skin [bladder cancer]
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:** [ß-Naphthylamine]	**Prevent skin contact** **Prevent eye contact** **When contam/Daily** **When wet or contam** **Daily** **Eyewash, Quick drench**	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	**Inh** **Abs** **Ing** **Con**	**Derm; hemorrhagic cystitis; dysp; ataxia; methemo, hema; dysuria; [carc]**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Bladder, skin [bladder cancer]**
Skin: Eyes: Wash skin: Remove: Change: Provide: [NIAX® Catalyst ESN]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; urinary dysfunc; neurological disorders; pins & needles sensation in hands & feet; musc weak, lass, nau, vomit; decr nerve conduction times of lower legs	Eye: Skin: Breath: Swallow:	Irr immed Soap flush immed Resp support Medical attention immed	Eyes, skin, urinary tract, PNS
Skin: Eyes: Wash skin: Remove: Change: Provide: [Nickel carbonyl]	**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: GMFS/SCBAE**	**Inh** **Abs** **Ing** **Con**	**Head, vertl; nau, vomit, epigastric pain; subs pain; cough, hyperpnea; cyan; weak; leucyt; pneuitis; delirium; convuls; [carc]; in animals: repro, terato effects**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Lungs, paranasal sinus, CNS, repro sys [lung & nasal cancer]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Nickel metal and other compounds (as Ni) Ni (Metal) 7440-02-0 (Metal) QR5950000 (Metal)	Nickel metal: Elemental metal, Nickel catalyst Synonyms of other nickel compounds vary depending upon the specific compound.	NIOSH* Ca See Appendix A 0.015 mg/m^3 OSHA†* 1 mg/m^3 [*Note: The REL and PEL do not apply to Nickel carbonyl.]	Ca [10 mg/m^3 (as Ni)]	Metal: Lustrous, silvery, odorless solid.	MW: 58.7 BP: 5139°F Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 8.90 (Metal) Metal: Combustible Solid; nickel sponge catalyst may ignite SPONTANEOUSLY in air.	VP: 0 mm (approx) MLT: 2831°F UEL: NA LEL: NA	Strong acids, sulfur, selenium, wood & other combustibles, nickel nitrate	Filter; Acid; ICP; IV [#7300, Elements]
Nicotine $C_5H_4NC_4H_7NCH_3$ 54-11-5 QS5250000 1654 151	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: 482°F (Decomposes) Sol: Miscible FI.P: 203°F IP: 8.01 eV Sp.Gr: 1.01 Class IIIB Combustible Liquid	VP: 0.08 mm FRZ: -110°F UEL: 4.0% LEL: 0.7%	Strong oxidizers, strong acids	XAD-2; Ethyl acetate; GC/NPD; IV [#2544]
Nitric acid HNO_3 7697-37-2 QU5775000 1760 154 (≤40% acid) 2031 157 (>40% acid) 2032 157 (fuming)	Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA) 1 ppm = 2.58 mg/m^3	NIOSH/OSHA 2 ppm (5 mg/m^3) ST 4 ppm (10 mg/m^3) OSHA† 2 ppm (5 mg/m^3) [Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]	25 ppm	Colorless, yellow, or red, fuming liquid with an acrid, suffocating odor.	MW: 63.0 BP: 181°F Sol: Miscible FI.P: NA IP: 11.95 eV Sp.Gr(77°F): 1.50 Noncombustible Liquid, but increases the flammability of combustible materials.	VP: 48 mm FRZ: -44°F UEL: NA LEL: NA	Combustible materials, metallic powders, hydrogen sulfide, carbides, alcohols [Note: Reacts with water to produce heat. Corrosive to metals.]	Si gel; $NaHCO_3$/Na_2CO_3; IC; IV [#7903, Inorganic Acids]
Nitric oxide NO 10102-43-9 QX0525000 1660 124	Mononitrogen monoxide, Nitrogen monoxide 1 ppm = 1.23 mg/m^3	NIOSH/OSHA 25 ppm (30 mg/m^3)	100 ppm	Colorless gas. [Note: Shipped as a nonliquefied compressed gas.]	MW: 30.0 BP: -241°F Sol: 5% FI.P: NA IP: 9.27 eV RGasD: 1.04 Nonflammable Gas, but will accelerate the burning of combustible materials.	VP: 34.2 atm FRZ: -263°F UEL: NA LEL: NA	Fluorine, combustible materials, ozone, NH_3, chlorinated hydrocarbons, metals, carbon disulfide [Note: Reacts with water to form nitric acid. Rapidly converted] in air to nitrogen dioxide.]	Mol-sieve*; Reagent; Vis; IV [#6014]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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: N.R. Wash skin: When contam/Daily Remove: When wet or contam Change: Daily [Nickel metal and other compounds (as Ni)]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Sens derm, allergic asthma, pneuitis; [carc]	Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Nasal cavities, lungs, skin, [lung & nasal cancer]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Nicotine]	NIOSH/OSHA 5 mg/m^3: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Nau, salv, abdom pain, vomit, diarr; head, dizz, hearing, vis dist; conf, weak, inco; paroxysmal atrial fibrl; convuls, dysp; in animals: terato effects	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		CNS, CVS, lungs, GI tract, repro sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash (pH<2.5), Quick drench (pH<2.5) [Nitric acid]	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, pneuitis, bron; dental erosion	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, teeth
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Nitric oxide]	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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
p-Nitroaniline $NO_2C_6H_4NH_2$ 100-01-6 BY7000000 1661 153	para-Aminonitrobenzene, 4-Nitroaniline, 4-Nitrobenzenamine, p-Nitrophenylamine, PNA	NIOSH 3 mg/m^3 [skin] OSHA† 6 mg/m^3 (1 ppm) [skin]	300 mg/m^3	Bright yellow, crystalline powder with a slight, ammonia-like odor.	MW: 138.1 BP: 630°F Sol: 0.08% FI.P: 390°F IP: 8.85 eV Sp.Gr: 1.42 Combustible Solid	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/UVD; IV [#5033]
Nitrobenzene $C_6H_5NO_2$ 98-95-3 DA6475000 1662 152	Essence of mirbane, Nitrobenzol, Oil of mirbane 1 ppm = 5.04 mg/m^3	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% FI.P: 190°F IP: 9.92 eV Sp.Gr: 1.20 Class IIIA Combustible Liquid	VP(77°F): 0.3 mm FRZ: 42°F UEL: ? LEL(200°F): 1.8%	Concentrated nitric acid, nitrogen tetroxide, caustics, phosphorus penta-chloride, chemically-active metals such as tin or zinc	Si gel; Methanol; GC/FID; IV [#2005]
4-Nitrobiphenyl $C_6H_5C_6H_4NO_2$ 92-93-3 DV5600000	p-Nitrobipheny, 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 FI.P: 290°F IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 237°F UEL: ? LEL: ?	Strong reducers	Filter/ Si gel(2); 2-Propanol; GC/FID; II(4) [P&CAM #273]
p-Nitrochlorobenzene $ClC_6H_4NO_2$ 100-00-5 CZ1050000 1578 152	p-Chloronitrobenzene, 4-Chloronitrobenzene, 1-Chloro-4-nitrobenzene, 4-Nitrochlorobenzene, PCNB, PNCB	NIOSH Ca See Appendix A [skin] OSHA 1 mg/m^3 [skin]	Ca [100 mg/m^3]	Yellow, crystalline solid with a sweet odor.	MW: 157.6 BP: 468°F Sol: Slight FI.P: 261°F IP: 9.96 eV Sp.Gr: 1.52 Solid that does not burn, or burns with difficulty.	VP(86°F): 0.2 mm MLT: 182°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Si gel; Methanol; GC/FID; IV [#2005, Nitro-benzenes]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Nitroethane $CH_3CH_2NO_2$ 79-24-3 K15600000 2842 129	Nitroetan 1 ppm = 3.07 mg/m³	NIOSH/OSHA 100 ppm (310 mg/m³)	1000 ppm	Colorless, oily liquid with a mild, fruity odor.	MW: 75.1 BP: 237°F Sol: 5% FLP: 82°F IP: 10.88 eV Sp.Gr: 1.05 Class IC Flammable Liquid	VP(77°F): 21mm FRZ: -130°F UEL: ? LEL: 3.4%	Amines; strong acids, alkalis & oxidizers; hydrocarbons; combustibles; metal oxides	XAD-2(2); Ethyl acetate; GC/FID; IV [#2526]
Nitrogen dioxide NO_2 10102-44-0 QW9800000 1067 124	Dinitrogen tetroxide (N_2O_4), Nitrogen peroxide 1 ppm = 1.88 mg/m³	NIOSH ST 1 ppm (1.8 mg/m³) OSHA† C 5 ppm (9 mg/m³)	20 ppm	Yellowish-brown liquid or reddish-brown gas (above 70°F) with a pungent, acrid odor. [Note: In solid form (below 15°F) it is found structurally as N_2O_4.]	MW: 46.0 BP: 70°F Sol: Reacts FLP: 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.]	Mol-sieve*; Reagent; Vis; IV [#6014]
Nitrogen trifluoride NF_3 7783-54-2 QX1925000 2451 122	Nitrogen fluoride, Trifluoramine, Trifluorammonia 1 ppm = 2.90 mg/m³	NIOSH/OSHA 10 ppm (29 mg/m³)	1000 ppm	Colorless gas with a moldy odor. [Note: Shipped as a nonliquefied compressed gas.]	MW: 71.0 BP: -200°F Sol: Slight FLP: NA IP: 12.97 eV RGasD: 2.46 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
Nitroglycerine $CH_2NO_3CHNO_3CH_2NO_3$ 55-63-0 QX2100000 1204 127 (<1% soln. in alcohol) 3064 127 (1-5% soln. in alcohol)	Glyceryl trinitrate; NG; 1,2,3-Propanetriol trinitrate; Trinitroglycerine 1 ppm = 9.29 mg/m³	NIOSH ST 0.1 mg/m³ [skin] OSHA† C 0.2 ppm (2 mg/m³) [skin]	75 mg/m³	Colorless to pale-yellow, viscous liquid or solid (below 56°F). [Note: An explosive ingredient in dynamite (20-40%) with ethylene glycol dinitrate (80-60%).]	MW: 227.1 BP: Begins to decompose at 122-140°F Sol: 0.1% FLP: Explodes IP: ? Sp.Gr: 1.60 Explosive Liquid	VP: 0.0003 mm FRZ: 56°F UEL: ? LEL: ?	Heat, ozone, shock, acids [Note: An OSHA Class A Explosive (1910.109).]	Tenax GC; Ethanol; GC/ECD; IV [#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 5)
kin: Prevent skin contact yes: Prevent eye contact Wash skin: When contam emove: When wet (flamm) hange: N.R.	NIOSH/OSHA 1000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Ing Con	Derm; in animals: lac; dysp, pulm rales, edema; liver, kidney inj; narco	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, resp sys, CNS, kidneys, liver
Nitroethane]						
kin: **Prevent skin contact** yes: **Prevent eye contact** Wash skin: **When contam** emove: **When wet or contam** hange: **N.R.** rovide: **Eyewash, Quick drench**	**NIOSH** **20 ppm: SA:CF[f]/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, tacar**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water flush immed** **Resp support** **Medical attention immed**	**Eyes, resp sys, CVS**
Nitrogen dioxide]						
kin: N.R. yes: N.R. Wash skin: N.R. emove: N.R. hange: N.R.	NIOSH/OSHA 100 ppm: CCRS/SA 250 ppm: SA:CF/PAPRS 500 ppm: CCRFS/GMFS/PAPRTS*/ 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]						
kin: **Prevent skin contact** yes: **Prevent eye contact** Wash skin: **When contam** emove: **When wet (flamm)** hange: **Daily** rovide: **Quick drench**	**NIOSH** **1 mg/m³: SA*** **2.5 mg/m³: SA:CF*** **5 mg/m³: SAT:CF*/SCBAF/SAF** **75 mg/m³: 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; palp; methemo; delirium, CNS depres; angina; skin irrit**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr 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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Nitromethane CH_3NO_2 75-52-5 PA9800000 1261 129	Nitrocarbol 1 ppm = 2.50 mg/m³	NIOSH See Appendix D OSHA 100 ppm (250 mg/m³)	750 ppm	Colorless, oily liquid with a disagreeable odor.	MW: 61.0 BP: 214°F Sol: 10% Fl.P: 95°F IP: 11.08 eV Sp.Gr: 1.14 Class IC Flammable Liquid	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; IV [#2527]
2-Nitronaphthalene $C_{10}H_7NO_2$ 581-89-5 QJ9760000 2538 133	ß-Nitronaphthalene	NIOSH Ca* See Appendix A [*Note: Since metabolized to ß-Naphthylamine.] OSHA none	Ca [N.D.]	Colorless solid.	MW: 178.2 BP: ? Sol: Insoluble Fl.P: ? IP: 8.67 eV Sp.Gr: ? Combustible Solid	VP: ? MLT: 174°F UEL: ? LEL: ?	For "Nitrates" in general: Aluminum, cyanides, esters, phosphorus, tin chlorides, thiocyanates, sodium hypophosphite	None available
1-Nitropropane $CH_3CH_2CH_2NO_2$ 108-03-2 TZ5075000 2608 129	Nitropropane, 1-NP 1 ppm = 3.64 mg/m³	NIOSH/OSHA 25 ppm (90 mg/m³)	1000 ppm	Colorless liquid with a somewhat disagreeable odor.	MW: 89.1 BP: 269°F Sol: 1% Fl.P: 96°F IP: 10.81 eV Sp.Gr: 1.00 Class IC Flammable Liquid	VP: 8 mm FRZ: -162°F UEL: ? LEL: 2.2%	Amines; strong acids, alkalis & oxidizers; hydrocarbons & other combustible materials; metal oxides	XAD-4; CS_2; GC/NPD; OSHA [#46]
2-Nitropropane $(CH_3)_2CHNO_2$ 79-46-9 TZ5250000 2608 129	Dimethylnitromethane, iso-Nitropropane, 2-NP 1 ppm = 3.64 mg/m³	NIOSH Ca See Appendix A OSHA† 25 ppm (90 mg/m³)	Ca [100 ppm]	Colorless liquid with a pleasant, fruity odor.	MW: 89.1 BP: 249°F Sol: 2% Fl.P: 75°F IP: 10.71 eV Sp.Gr: 0.99 Class IC Flammable Liquid	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; IV [#2528]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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)
kin: yes: Vash skin: emove: hange:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	OSHA 750 ppm: SA:CF[f]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Ing Con	Derm; in animals: irrit eyes, resp sys; convuls, narco; liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, CNS, liver
Nitromethane]							
kin: yes: Vash skin: emove: hange: rovide:	**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 skin, resp sys;** **derm, [carc]**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash immed** **Resp support** **Medical attention immed**	**Skin, resp sys [bladder cancer]**
2-Nitronaphthalene]							
kin: yes: Vash skin: emove: hange:	N.R. Prevent eye contact N.R. When wet (flamm) N.R.	NIOSH/OSHA 250 ppm: SA* 625 ppm: SA:CF* 1000 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Ing Con	Irrit eyes; head, nau, vomit, diarr; in animals: liver, kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, CNS, liver, kidneys
1-Nitropropane]							
kin: yes: Vash skin: emove: hange:	**Prevent skin contact** **Prevent eye contact** **When contam** **When wet (flamm)** **N.R.**	**NIOSH** **¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: SCBAE**	**Inh** **Ing** **Con**	**Irrit eyes, skin, nose, resp sys; head, anor, nau, vomit, diarr; kidney, liver damage; [carc]**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Soap wash prompt** **Resp support** **Medical attention immed**	**Eyes, skin, resp sys, CNS, kidneys, liver [in animals: liver tumors]**
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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
N-Nitrosodimethylamine $(CH_3)_2N_2O$ 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, characteristic odor.	MW: 74.1 BP: 306°F Sol: Soluble Fl.P: ? IP: 8.69 eV Sp.Gr: 1.005 Combustible Liquid	VP: 3 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers [Note: Should be stored in dark bottles.]	T-Sorb; Methanol/ CH_2Cl_2; GC/FID; IV [#2522]
o-Nitrotoluene $NO_2C_6H_4CH_3$ 88-72-2 XT3150000 1664 152	o-Methylnitrobenzene, 2-Methylnitrobenzene, ortho-Nitrotoluene, 2-Nitrotoluene 1 ppm = 5.61 mg/m³	NIOSH 2 ppm (11 mg/m³) [skin] OSHA† 5 ppm (30 mg/m³) [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 Sp.Gr: 1.16 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: 25°F UEL: ? LEL: 2.2%	Strong oxidizers, sulfuric acid	Si gel; Methanol; GC/FID; IV [#2005, Nitro-benzenes]
m-Nitrotoluene $NO_2C_6H_4CH_3$ 99-08-1 XT2975000 1664 152	m-Methylnitrobenzene, 3-Methylnitrobenzene, meta-Nitrotoluene, 3-Nitrotoluene 1 ppm = 5.61 mg/m³	NIOSH 2 ppm (11 mg/m³) [skin] OSHA† 5 ppm (30 mg/m³) [skin]	200 ppm	Yellow liquid with a weak, aromatic odor. [Note: A solid below 59°F.]	MW: 137.1 BP: 450°F Sol: 0.05% Fl.P: 223°F IP: 9.48 eV Sp.Gr: 1.16 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: 59°F UEL: ? LEL: 1.6%	Strong oxidizers, sulfuric acid	Si gel; Methanol; GC/FID; IV [#2005, Nitro-benzenes]
p-Nitrotoluene $NO_2C_6H_4CH_3$ 99-99-0 XT3325000 1664 152	p-Methylnitrobenzene, 4-Methylnitrobenzene, para-Nitrotoluene, 4-Nitrotoluene 1 ppm = 5.61 mg/m³	NIOSH 2 ppm (11 mg/m³) [skin] OSHA† 5 ppm (30 mg/m³) [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 Sp.Gr: 1.12 Combustible Solid	VP: 0.1 mm MLT: 126°F UEL: ? LEL: 1.6%	Strong oxidizers, sulfuric acid	Si gel; Methanol; GC/FID; IV [#2005, Nitro-benzenes]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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)
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam/Daily emove: When wet or contam hange: Daily rovide: Eyewash, Quick drench	NIOSH *: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Nau, vomit, diarr; abdom cramps; head; fever; enlarged liver, jaun; decr liver, kidney, pulm func; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Liver, kidneys, lungs [in animals: lung, kidney, liver & nasal cavity tumors]
N-Nitrosodimethylamine]						
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: N.R.	NIOSH 20 ppm: SA* 50 ppm: SA:CF* 100 ppm: SAT:CF*/SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Anoxia, cyan; head, weak, dizz; ataxia; dysp; tacar; nau, vomit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, CNS, CVS, skin, GI tract
o-Nitrotoluene]						
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: N.R.	NIOSH 20 ppm: SA* 50 ppm: SA:CF* 100 ppm: SAT:CF*/SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Anoxia, cyan; head, weak, dizz; ataxia; dysp; tacar; nau, vomit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, CNS, CVS, skin, GI tract
m-Nitrotoluene]						
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: Daily	NIOSH 20 ppm: SA* 50 ppm: SA:CF* 100 ppm: SAT:CF*/SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Abs Ing Con	Anoxia, cyan; head, weak, dizz; ataxia; dysp; tacar; nau, vomit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Blood, CNS, CVS, skin, GI tract
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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Nitrous oxide N_2O 10024-97-2 QX1350000 1070 122 (compressed) 2201 122 (refrigerated liquid)	Dinitrogen monoxide, Hyponitrous acid anhydride, Laughing gas 1 ppm = 1.80 mg/m³	NIOSH* 25 ppm (46 mg/m³) (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% Fl.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; IV [#6600]
Nonane $CH_3(CH_2)_7CH_3$ 111-84-2 RA6115000 1920 128	n-Nonane, Nonyl hydride 1 ppm = 5.25 mg/m³	NIOSH 200 ppm (1050 mg/m³) OSHA† none	N.D.	Colorless liquid with a gasoline-like odor.	MW: 128.3 BP: 303°F Sol: Insoluble Fl.P: 88°F IP: 10.21 eV Sp.Gr: 0.72 Class IC Flammable Liquid	VP: 3 mm FRZ: -60°F UEL: 2.9% LEL: 0.8%	Strong oxidizers (e.g., peroxides, nitrates, perchlorates)	None available
1-Nonanethiol $CH_3(CH_2)_8SH$ 1455-21-6 1228 131	1-Mercaptononane, n-Nonyl mercaptan, Nonylthiol 1 ppm = 6.56 mg/m³	NIOSH C 0.5 ppm (3.3 mg/m³) [15-min] OSHA none	N.D.	Liquid.	MW: 160.3 BP: ? Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: ? Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
Octachloronaphthalene $C_{10}Cl_8$ 2234-13-1 QK0250000	Halowax® 1051; 1,2,3,4,5,6,7,8-Octa-chloronaphthalene; Perchloronaphthalene	NIOSH 0.1 mg/m³ ST 0.3 mg/m³ [skin] OSHA† 0.1 mg/m³ [skin]	Unknown	Waxy, pale-yellow solid with an aromatic odor.	MW: 403.7 BP: 770°F Sol: Insoluble Fl.P: NA IP: ? Sp.Gr: 2.00 Noncombustible Solid	VP: <1 mm MLT: 365°F UEL: NA LEL: NA	Strong oxidizers	Filter; Hexane; GC/FID; II(2) [#S97]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1-Octadecanethiol $CH_3(CH_2)_{17}SH$ 2885-00-9	1-Mercaptooctadecane, Octadecyl mercaptan, Stearyl mercaptan 1 ppm = 11.72 mg/m³	NIOSH C 0.5 ppm (5.9 mg/m³) [15-min] OSHA none	N.D.	Solid or liquid (above 77°F).	MW: 286.6 BP: ? Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 0.85 Combustible Solid Combustible Liquid	VP: ? MLT: 77°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
Octane $CH_3(CH_2)_6CH_3$ 111-65-9 RG8400000 1262 128	n-Octane, normal-Octane 1 ppm = 4.67 mg/m³	NIOSH 75 ppm (350 mg/m³) C 385 ppm (1800 mg/m³) [15-min] OSHA† 500 ppm (2350 mg/m³)	1000 ppm [10%LEL]	Colorless liquid with a gasoline-like odor.	MW: 114.2 BP: 258°F Sol(77°F): 0.00007% Fl.P: 56°F IP: 9.82 eV Sp.Gr: 0.70 Class IB Flammable Liquid	VP: 10 mm FRZ: -70°F UEL: 6.5% LEL: 1.0%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydro-carbons]
1-Octanethiol $CH_3(CH_2)_7SH$ 111-88-6	1-Mercaptooctane, n-Octyl mercaptan, Octylthiol, 1-Octylthiol 1 ppm = 5.98 mg/m³	NIOSH C 0.5 ppm (3.0 mg/m³) [15-min] OSHA none	N.D.	Water-white liquid with a mild odor.	MW: 146.3 BP: 390°F Sol: Insoluble Fl.P(oc): 115°F IP: ? Sp.Gr: 0.84 Class II Combustible Liquid	VP(212°F): 3 mm FRZ: -57°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	Tenax GC; Acetone; GC/FPD; IV [#2510]
Oil mist (mineral) 8012-95-1 PY8030000	Heavy mineral oil mist, Paraffin oil mist, White mineral oil mist	NIOSH 5 mg/m³ ST 10 mg/m³ OSHA 5 mg/m³	2500 mg/m³	Colorless, oily liquid aerosol dispersed in air. [Note: Has an odor like burned lubricating oil.]	MW: Varies BP: 680°F Sol: Insoluble Fl.P(oc): 380°F IP: ? Sp.Gr: 0.90 Class IIIB Combustible Liquid	VP: <0.5 mm FRZ: 0°F UEL: ? LEL: ?	None reported	Filter; CCl_4; IR; IV [#5026]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, resp sys; head, dizz, weak, cyan, nau, convuls	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, blood
1-Octadecanethiol]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: 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 liq); in animals: narco**	**Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**
Octane]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; weak, cyan, incr respiration, nau, drow, head, vomit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, blood, CNS
1-Octanethiol]						
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: Daily	**NIOSH/OSHA 50 mg/m³: HiE/SA 125 mg/m³: SA:CF/PAPRHiE 250 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE**	**Inh Con**	**Irrit eyes, skin, resp sys**	**Skin: Soap wash Breath: Fresh air**		**Eyes, skin, resp sys**
Oil mist (mineral)]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Osmium tetroxide OsO_4 20816-12-0 RN1140000 2471 154	Osmic acid anhydride, Osmium oxide 1 ppm = 10.40 mg/m^3	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	Colorless, crystalline solid or pale-yellow mass with an unpleasant, acrid, chlorine-like odor. [Note: A liquid above 105°F.]	MW: 254.2 BP: 266°F Sol(77°F): 6% FI.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 $HOOCCOOH{\cdot}2H_2O$ 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% FI.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 2190 124	Difluorine monoxide, Fluorine monoxide, Oxygen fluoride 1 ppm = 2.21 mg/m^3	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% FI.P: NA IP: 13.11 eV RGasD: 1.88 Nonflammable Gas, but a strong oxidizer.	VP: >1 atm FRZ: -371°F UEL: NA LEL: NA	Combustible materials, chlorine, bromine, iodine, platinum, metal oxides, moist air, hydrogen sulfide, hydrocarbons, water [Note: Reacts very slowly with water to form hydrofluoric acid.]	None available
Ozone O_3 10028-15-6 RS8225000	Triatomic oxygen 1 ppm = 1.96 mg/m^3	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% FI.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)	Filters (2)/ Oxidizer; Water; IC; OSHA [#ID214]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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		NIOSH/OSHA 0.1 mg/m³: CCRFSHIE/GMFSHIE/SCBAF/SAF 1 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHIE/SCBAE	Inh Ing Con	Irrit eyes, resp sys; lac, vis dist; conj; head; cough, dysp; derm	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Osmium tetroxide]							
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash**		NIOSH/OSHA 25 mg/m³: SA:CF[f]/PAPRDM[f] 50 mg/m³: HIEF/SCBAF/SAF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	**Inh** **Ing** **Con**	**Irrit eyes, skin, muc memb; eye burns; local pain, cyan; shock, collapse, convuls; kidney damage**	**Eye: Irr immed** **Skin: Water flush prompt** **Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, kidneys**
Oxalic acid]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 0.5 ppm: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS+/SCBAE	Inh Con	Irrit eyes, skin, resp sys; head; pulm edema; eye, skin burns (from contact with the gas under pressure)	Eye: Irr immed Skin: Water flush immed Breath: Resp support		Eyes, skin, resp sys
Oxygen difluoride]							
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.		NIOSH/OSHA 1 ppm: CCRS+/SA 2.5 ppm: SA:CF/PAPRS+ 5 ppm: CCRFS+/GMFS+/SAT:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS+/SCBAE	**Inh** **Con**	**Irrit eyes, muc memb; pulm edema; chronic resp disease**	**Eye:** **Breath: Medical attention** **Fresh air; 100% O_2**		**Eyes, resp sys**
Ozone]							

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Paraffin wax fume C_nH_{2n+2} 8002-74-2 RV0350000	Paraffin fume, Paraffin scale fume	NIOSH 2 mg/m^3 OSHA† none	N.D.	Paraffin wax is a white to slightly yellowish, odorless solid. [Note: Consists of a mixture of high molecular weight hydrocarbons (e.g., $C_{35}H_{74}$).]	MW: 350-420 BP: ? Sol: Insoluble FI.P: 390°F IP: ? Sp.Gr: 0.88-0.92 Combustible Solid	VP: ? MLT: 115-154°F UEL: ? LEL: ?	None reported	None available
Paraquat (Paraquat dichloride) $CH_3(C_5H_4N)_2CH_3{\cdot}2Cl$ 1910-42-5 DW2275000	1,1'-Dimethyl-4,4'-bipyridinium dichloride; N,N'-Dimethyl-4,4'-bipyridinium dichloride; Paraquat chloride; Paraquat dichloride [Note: Paraquat is a cation ($C_{12}H_{14}N_2^{++}$; 1,1-dimethyl-4,4'-bipyridinium ion); 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 FI.P: 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/UVD; IV [#5003]
Parathion $(C_2H_5O)_2P(S)OC_6H_4NO_2$ 56-38-2 TF4550000 2783 152	O,O-Diethyl-O(p-nitrophenyl) phosphorothioate; Diethyl parathion; Ethyl parathion; Parathion-ethyl	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% FI.P(oc): 392°F IP: ? Sp.Gr: 1.27 Class IIIB Combustible Liquid	VP: 0.00004 mm FRZ: 43°F UEL: ? LEL: ?	Strong oxidizers, alkaline materials	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
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; IV [Particulates NOR: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: Prevent eye contact Wash skin: N.R. Remove: N.R. Change: N.R. [Paraffin wax fume]	TBAL	Inh Con	Irrit eyes, skin, resp sys; discomfort, nau	Eye: Breath:	Irr immed Resp support	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench [Paraquat]	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:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, heart, liver, kidneys, GI tract
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Parathion]	NIOSH 0.5 mg/m^3: CCROVDMFu/SA 1.25 mg/m^3: SA:CF/PAPROVDMFu 2.5 mg/m^3: CCRFOVHE/SAT:CF/ PAPRTOVHE/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:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS, blood chol
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Particulates not otherwise regulated]	TBAL	Inh Con	Irrit eyes, skin, throat, upper resp sys	Eye: Breath:	Irr immed Fresh air	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Pentaborane B_5H_9 19624-22-7 RY8925000 1380 135	Pentaboron nonahydride 1 ppm = 2.58 mg/m³	NIOSH 0.005 ppm (0.01 mg/m³) ST 0.015 ppm (0.03 mg/m³) OSHA† 0.005 ppm (0.01 mg/m³)	1 ppm	Colorless liquid with a pungent odor like sour milk.	MW: 63.1 BP: 140°F Sol: Reacts FI.P: 86°F IP: 9.90 eV Sp.Gr: 0.62 Class IC Flammable Liquid	VP: 171 mm FRZ: -52°F UEL: ? LEL: 0.42%	Oxidizers, halogens, water, halogenated hydrocarbons [Note: May ignite SPONTANEOUSLY in moist air. Corrosive to natural rubber. Hydrolyzes slowly with heat in water to form boric acid.]	None available
Pentachloroethane $CHCl_2CCl_3$ 76-01-7 KI6300000 1669 151	Ethane pentachloride, Pentalin	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes) OSHA none	N.D.	Colorless liquid with a sweetish, chloroform-like odor.	MW: 202.3 BP: 322°F Sol: 0.05% FI.P: ? IP: 11.28 eV Sp.Gr: 1.68 Combustible Liquid	VP: 3 mm MLT: -20°F UEL: ? LEL: ?	(Sodium-potassium alloy + bromoform), alkalis, metals, water [Note: Hydrolysis produces dichloroacetic acid. Reaction with alkalis & metals produces spontaneously explosive chloroacetylenes.]	Porapak; Hexane; GC/ECD; IV [#2517]
Pentachloronaphthalene $C_{10}H_3Cl_5$ 1321-64-8 QK0300000	Halowax® 1013; 1,2,3,4,5-Pentachloronaphthalene	NIOSH/OSHA 0.5 mg/m³ [skin]	Unknown	Pale-yellow or white solid or powder with an aromatic odor.	MW: 300.4 BP: 636°F Sol: Insoluble FI.P: NA IP: ? Sp.Gr: 1.67 Noncombustible Solid	VP: <1 mm MLT: 248°F UEL: NA LEL: NA	Strong oxidizers	Filter/Bub; Isooctane; GC/ECD; II(2) [#S96]
Pentachlorophenol C_6Cl_5OH 87-86-5 SM6300000 2020 154	PCP; Penta; 2,3,4,5,6-Pentachlorophenol	NIOSH/OSHA 0.5 mg/m³ [skin]	2.5 mg/m³	Colorless to white, crystalline solid with a benzene-like odor. [fungicide]	MW: 266.4 BP: 588°F (Decomposes) Sol: 0.001% FI.P: NA IP: NA Sp.Gr: 1.98 Noncombustible Solid	VP(77°F): 0.0001 mm MLT: 374°F UEL: NA LEL: NA	Strong oxidizers, acids, alkalis	Filter/Bub; Methanol; HPLC/UVD; IV [#5512]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Pentaborane]	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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Pentachloroethane]	TBAL	Inh Ing Con	In animals: irrit eyes, skin; weak, restless, irreg respiration, musc inco; liver, kidney, lung changes	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Pentachloronaphthalene]	NIOSH/OSHA 5 mg/m^3: SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Head, ftg, verti, anor; pruritus, acne-form skin eruptions; jaun, liver nec	Eye: Irr immed Skin: Soap prompt/molten flush immed Breath: Resp support Swallow: Medical Attention immed	Skin, liver, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Pentachlorophenol]	NIOSH/OSHA 2.5 mg/m^3: CCROVDMFu*/PAPROVDMFu*/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CVS, liver, kidneys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Pentaerythritol $C(CH_2OH)_4$ 115-77-5 RZ2490000	2,2-bis(Hydroxymethyl)-1,3-propanediol; Methane tetramethylol; Monopentaerythritol; PE; Tetrahydroxymethylmethane; Tetramethylolmethane	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Colorless to white, crystalline, odorless powder. [Note: Technical grade is 88% monopentaerythritol & 12% dipentaerythritol.]	MW: 136.2 BP: Sublimes Sol(59°F): 6% FLP: ? IP: ? Sp.Gr: 1.38 Combustible Solid	VP: 0 mm (approx) MLT: 500°F (Sublimes) UEL: ? LEL: ?	Organic acids, oxidizers [Note: Explosive compound is formed when a mixture of PE & thiophosphoryl chloride is heated.]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
n-Pentane $CH_3CH_2)_3CH_3$ 109-66-0 RZ9450000 1265 128	Pentane, normal-Pentane 1 ppm = 2.95 mg/m³	NIOSH 120 ppm (350 mg/m³) C 610 ppm (1800 mg/m³) [15-min] OSHA† 1000 ppm (2950 mg/m³)	1500 ppm [10%LEL]	Colorless liquid with a gasoline-like odor. [Note: A gas above 97°F. May be utilized as a fuel.]	MW: 72.2 BP: 97°F Sol: 0.04% FLP: -57°F IP: 10.34 eV Sp.Gr: 0.63 Class IA Flammable Liquid	VP: 420 mm FRZ: -202°F UEL: 7.8% LEL: 1.5%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydrocarbons]
1-Pentanethiol $CH_3(CH_2)_4SH$ 110-66-7 SA3150000 1111 130	Amyl hydrosulfide, Amyl mercaptan, Amyl sulfhydrate, Pentyl mercaptan 1 ppm = 4.26 mg/m³	NIOSH C 0.5 ppm (2.1 mg/m³) [15-min] OSHA none	N.D.	Water-white to yellowish liquid with a strong, garlic-like odor.	MW: 104.2 BP: 260°F Sol: Insoluble FLP(oc): 65°F IP: ? Sp.Gr: 0.84 Class IB Flammable Liquid	VP(77°F): 14 mm FRZ: -104°F UEL: ? LEL: ?	Oxidizers, reducing agents, alkali metals, calcium hypochlorite, concentrated nitric acid	None available
2-Pentanone $CH_3COCH_2CH_2CH_3$ 107-87-9 SA7875000 1249 127	Ethyl acetone, Methyl propyl ketone, MPK 1 ppm = 3.52 mg/m³	NIOSH 150 ppm (530 mg/m³) OSHA† 200 ppm (700 mg/m³)	1500 ppm	Colorless to water-white liquid with a characteristic acetone-like odor.	MW: 86.1 BP: 215°F Sol: 6% FLP: 45°F IP: 9.39 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 27 mm FRZ: -108°F UEL: 8.2% LEL: 1.5%	Oxidizers, bromine trifluoride	Char; CS_2; GC/FID; IV [#1300, Ketones I]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: 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:	Irr immed Water wash Fresh air Medical attention immed	Eyes, resp sys
[Pentaerythritol]							
Skin: Eyes: Wash skin: Remove: Change:	Prevent skin contact Prevent eye contact When contam When wet (flamm) N.R.	NIOSH 1200 ppm: SA 1500 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose; derm; chemical pneu; (aspir liq); drow; in animals: narco	Eye: Skin: Breath: Swallow:	Irr 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 (flamm) N.R.	NIOSH 5 ppm: CCRFOV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, resp sys; head, nau, dizz; vomit, diarr; derm, skin sens	Eye: Skin: Breath: Swallow:	Irr 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 (flamm) N.R.	NIOSH 1500 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, muc memb; head; derm; narco, coma	Eye: Skin: Breath: Swallow:	Irr 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: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Perchloromethyl mercaptan Cl_3CSCl 594-42-3 PB0370000 1670 157	PCM, PMM, Tricholoromethane sulfenyl chloride, Trichloromethyl sulfur chloride 1 ppm = 7.60 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 FI.P: NA IP: ? Sp.Gr: 1.69 Noncombustible Liquid, but will support combustion.	VP: 3 mm FRZ: ? UEL: NA LEL: NA	Alkalis, amines, hot iron, water [Note: Corrosive to most metals. Forms HCl, sulfur & CO_2 on contact with water.]	None available
Perchloryl fluoride ClO_3F 7616-94-6 SD1925000 3083 124	Chlorine fluoride oxide, Chlorine oxyfluoride, Trioxychlorofluoride 1 ppm = 4.19 mg/m^3	NIOSH 3 ppm (14 mg/m^3) ST 6 ppm (28 mg/m^3) OSHA† 3 ppm (13.5 mg/m^3)	100 ppm	Colorless gas with a characteristic, sweet odor. [Note: Shipped as a liquefied compressed gas.]	MW: 102.5 BP: -52°F Sol: 0.06% FI.P: NA IP: 13.60 eV RGasD: 3.64 Nonflammable Gas, but will support combustion.	VP: 10.5 atm FRZ: -234°F UEL: NA LEL: NA	Combustibles, strong bases, amines, finely divided metals, reducing agents, alcohols	None available
Perlite 93763-70-3 SO5254000	Expanded perlite [Note: An amorphous material consisting of fused sodium potassium aluminum silicate.]	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Odorless, light-gray to glassy-black solid. [Note: Expanded perlite is a fluffy, white particulate.]	MW: varies BP: ? Sol: <1% FI.P: NA IP: NA Sp.Gr: 2.2-2.4 (crude) 0.05-0.3 (expanded) Noncombustible Solid	VP: 0 mm (approx) MLT: >2000°F UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Petroleum distillates (naphtha) 8002-05-9 SE7449000 1255 128	Aliphatic petroleum naphtha, Petroleum naphtha, Rubber solvent 1 ppm = 4.05 mg/m^3 (approx)	NIOSH 350 mg/m^3 C 1800 mg/m^3 [15-min] OSHA† 500 ppm (2000 mg/m^3)	1100 ppm [10%LEL]	Colorless liquid with a gasoline- or kerosene-like odor. [Note: A mixture of paraffins (C_5 to C_{12}) that may contain a small amount of aromatic hydrocarbons.]	MW: 99 (approx) BP: 86-460°F Sol: Insoluble FI.P: -40 to -86°F IP: ? Sp.Gr: 0.63-0.66 Flammable Liquid	VP: 40 mm (approx) FRZ: -99°F UEL: 5.9% LEL: 1.1%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1550, 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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Perchloromethyl mercaptan]	NIOSH/OSHA 1 ppm: CCROV*/SA* 2.5 ppm: SA:CF*/PAPROV* 5 ppm: CCRFOV/GMFOV/PAPRTOV*/ SAT:CF*/SCBAF/SAF 10 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; lac; cough, dysp, deep breath pain, coarse rales; vomit; pallor, tacar; acidosis; anuria; liver; kidney damage	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: N.R. Change: N.R. Provide: Frostbite [Perchloryl fluoride]	NIOSH/OSHA 30 ppm: SA 75 ppm: SA:CF* 100 ppm: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS*/SCBAE	Inh Con (liq)	Irrit resp sys; liq: frostbite; in animals: methemo; cyan; weak, dizz, head; pulm edema; pneuitis; anoxia	Eye: Frostbite Skin: Frostbite Breath: Resp support		Skin, resp sys, blood
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Perlite]	TBAL	Inh Con	Irrit eyes, skin, throat, upper resp sys	Eye: Irr immed Breath: Fresh air		Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Petroleum distillates (naphtha)]	NIOSH 850 ppm: SA 1100 ppm: SA:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, nose, throat; dizz, drow, head, nau; dry cracked skin; chemical pneu (aspir liq)	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical Attention immed		Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Phenol C_6H_5OH 108-95-2 SJ3325000 1671 153 (solid) 2312 153 (molten) 2821 153 (solution)	Carbolic acid, Hydroxybenzene, Monohydroxybenzene, Phenyl alcohol, Phenyl hydroxide 1 ppm = 3.85 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, acrid odor. [Note: Phenol liquefies by mixing with about 8% water.]	MW: 94.1 BP: 359°F Sol(77°F): 9% FI.P: 175°F IP: 8.50 eV Sp.Gr: 1.06 Combustible Solid	VP: 0.4 mm MLT: 109°F UEL: 8.6% LEL: 1.8%	Strong oxidizers, calcium hypochlorite, aluminum chloride, acids	XAD-7; Methanol; GC/FID; IV [#2546, Cresols and Phenol]
Phenothiazine $S(C_6H_4)_2NH$ 92-84-2 SN5075000	Dibenzothiazine, Fenothiazine, Thiodiphenylamine	NIOSH 5 mg/m^3 [skin] OSHA† none	N.D.	Grayish-green to greenish-yellow solid. [insecticide]	MW: 199.3 BP: 700°F Sol: Insoluble FI.P: ? IP: ? Sp.Gr: ? Combustible Solid, but not a high fire risk.	VP: 0 mm (approx) MLT: 365°F UEL: ? LEL: ?	None reported	None available
p-Phenylene diamine $C_6H_4(NH_2)_2$ 106-50-3 SS8050000 1673 153	4-Aminoaniline; 1,4-Benzenediamine; p-Diaminobenzene; 1,4-Diaminobenzene; 1,4-Phenylene diamine	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(75°F): 4% FI.P: 312°F IP: 6.89 eV Sp.Gr: ? Combustible Solid	VP: <1 mm MLT: 295°F UEL: ? LEL: ?	Strong oxidizers	Filter*; EDTA; HPLC/UVD; OSHA [#87]
Phenyl ether (vapor) $C_6H_5OC_6H_5$ 101-84-8 KN8970000	Diphenyl ether, Diphenyl oxide, Phenoxybenzene, Phenyl oxide 1 ppm = 6.96 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 FI.P: 239°F IP: 8.09 eV Sp.Gr: 1.08 Combustible Solid Class IIIB Combustible Liquid	VP(77°F): 0.02 mm MLT: 82°F UEL: 6.0% LEL: 0.7%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1617]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Phenol]	NIOSH/OSHA 50 ppm: CCRO/DM/SA 125 ppm: SA:CF/PAPRO/DM 250 ppm: CCRFO/VHiE/GMFO/VHiE/PAPRTO/VHiE/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFO/VHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; anor, low-wgt; weak, musc ache, pain; dark urine; cyan; liver, kidney damage; skin burns; derm; ochronosis; tremor, convuls, twitch	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam/Daily Remove: When wet or contam Change: Daily [Phenothiazine]	TBAL	Inh Abs Ing Con	Itching, irrit, reddening skin; hepatitis, hemolytic anemia, abdom cramps, tacar; kidney damage; skin photo sens	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Skin, CVS, liver, kidneys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily [p-Phenylene diamine]	NIOSH/OSHA 2.5 mg/m^3: SA:CF^E 5 mg/m^3: SCBAF/SAF 25 mg/m^3: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Abs Ing Con	Irrit pharynx, larynx; bronchial asthma; sens derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Resp sys, skin
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Phenyl ether (vapor)]	NIOSH/OSHA 25 ppm: SA:CF^E/PAPRO/DM^E 50 ppm: CCRFO/VHiE/GMFO/VHiE/SCBAF/SAF 100 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFO/VHiE/SCBAE	Inh Con	Irrit eyes, nose, skin; nau	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support		Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties MW, BP, SOL FLP, IP, Sp, Gr, flammability	 VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Phenyl ether-biphenyl mixture (vapor) $C_6H_5OC_6H_5/C_6H_5C_6H_5$ 8004-13-5 DV1500000	Diphenyl oxide-diphenyl mixture, Dowtherm® A 1 ppm 6.79 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% phenylether & 25% biphenyl.]	MW: 166 (approx) BP: 495°F Sol: Insoluble FlP: 239°F IP: ? Sp.Gr(77°F): 1.06 Class IIIB Combustible Liquid	VP(77°F): 0.08 mm FRZ: 54°F UEL: ? LEL: ?	Strong oxidizers	Si gel; Benzene; GC/FID; IV [#2013]
Phenyl glycidyl ether $C_9H_{10}O_2$ 122-60-1 TZ3675000	1,2-Epoxy-3-phenoxy propane; Glycidyl phenyl ether; PGE; Phenyl 2,3-epoxypropyl ether 1 ppm = 6.14 mg/m³	NIOSH Ca See Appendix A C 1 ppm (6 mg/m³) [15-min] OSHA† 10 ppm (60 mg/m³)	Ca [100 ppm]	Colorless liquid. [Note: A solid below 38°F.]	MW: 150.1 BP: 473°F Sol: 0.2% FlP: 248°F IP: ? Sp.Gr: 1.11 Class IIIB Combustible Liquid	VP: 0.01 mm FRZ: 38°F UEL: ? LEL: ?	Strong oxidizers, amines, strong acids, strong bases	Char; CS_2; GC/FID; IV [#1619]
Phenylhydrazine $C_6H_5NHNH_2$ 100-63-0 MW8925000 2572 153	Hydrazinobenzene, Monophenylhydrazine 1 ppm = 4.42 mg/m³	NIOSH Ca See Appendix A C 0.14 ppm [skin] (0.6 mg/m³) [2-hr] OSHA† 5 ppm (22 mg/m³) [skin]	Ca [15 ppm]	Colorless to pale-yellow liquid or solid (below 67°F) with a faint, aromatic odor.	MW: 108.1 BP: 470°F (Decomposes) Sol: Slight FlP: 190°F IP: 7.64 eV Sp.Gr: 1.10 Class IIIA Combustible Liquid Combustible Solid	VP(77°F): 0.04 mm FRZ: 67°F UEL: ? LEL: ?	Strong oxidizers, lead dioxide	Bub; Pho-acid; Vis; IV [#3518]
N-Phenyl-ß-naphthyl-amine $C_6H_5NHC_6H_5$ 135-88-6 QM4550000	2-Anilinonaphthalene, ß-Naphthylphenylamine, PBNA, 2-Phenylaminonaphthalene, Phenyl-ß-naphthylamine	NIOSH Ca* See Appendix A [*Note: Since metabolized to ß-Naphthylamine.] OSHA none	Ca [N.D.]	White to yellow crystals or gray to tan flakes or powder. [Note: Commercial product may contain 20-30 ppm of ß-Naphthylamine.]	MW: 219.3 BP: 743°F Sol: Insoluble FlP: ? IP: ? Sp.Gr: 1.24 Combustible Solid	VP: ? MLT: 226°F UEL: ? LEL: ?	Oxidizers	Filter*; Methanol; HPLC/FLD; OSHA [#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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH/OSHA 10 ppm: SA:CF[5]/CCRFOVHiE/GMFOVHiE/PAPROVDM[5]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Con	Irrit eyes, nose, skin; nau	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support	Eyes, skin, resp sys
[Phenyl ether-biphenyl mixture (vapor)]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; skin sens; narco; possible hemato, repro effects; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS, hemato sys, repro sys [in animals: nasal cancer]
[Phenyl glycidyl ether]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: SCBAE	Inh Abs Ing Con	Skin sens, hemolytic anemia, dysp, cyan; jaun; kidney damage; vascular thrombosis; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Blood, resp sys, liver, kidneys, skin [in animals: tumors of the lungs, liver, blood vessels & intestine]
[Phenylhydrazine]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irritation; leucoplakia; acne; hypersensitivity to sunlight; [carc]	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, bladder [bladder cancer]
[N-Phenyl-ß-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: MW, BP, SOL, FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Phenylphosphine $C_6H_5PH_2$ 638-21-1 SZ2100000	Fenylfosfin, PF, Phosphaniline 1 ppm = 4.50 mg/m³	NIOSH C 0.05 ppm (0.25 mg/m³) 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 polyphosphinates are heated above 392°F.]	None available
Phorate $(C_2H_5O)_2P(S)SCH_2SC_2H_5$ 298-02-2 TD9450000 3018 152 (organo-phosphorus pesticide, liquid)	O,O-Diethyl S-(ethylthio)-methylphosphorodithioate; O,O-Diethyl S-ethylthio-methylthiothionophosphate; Thimet, Timet	NIOSH 0.05 mg/m³ ST 0.2 mg/m³ [skin] OSHA† none	N.D.	Clear liquid with a skunk-like odor. [insecticide]	MW: 260.4 BP: ? Sol: 0.005% FLP(oc): 320°F IP: ? Sp.Gr(77°F): 1.16 Class IIIB 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.]	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
Phosdrin® $C_7H_{13}PO_5$ 7786-34-7 GQ5250000 2783 152	2-Carbomethoxy-1-methylvinyl dimethyl phosphate, Mevinphos [Note: Commercial product is a mixture of the cis- & trans isomers.] $(CH_3O)_2P(O)OC(CH_3)=CHCOOCH_3$] 1 ppm = 9.17 mg/m³	NIOSH 0.01 ppm (0.1 mg/m³) ST 0.03 ppm (0.3 mg/m³) [skin] OSHA† 0.1 mg/m³ [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 FLP(oc): 347°F IP: ? Sp.Gr: 1.25 Class IIIB 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.]	OVS-2; Toluene/ Acetone GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
Phosgene $COCl_2$ 75-44-5 SY5600000 1076 125	Carbon oxychloride, Carbonyl chloride, Carbonyl dichloride, Chloroformyl chloride 1 ppm = 4.05 mg/m³	NIOSH 0.1 ppm (0.4 mg/m³) C 0.2 ppm (0.8 mg/m³) [15-min] OSHA 0.1 ppm (0.4 mg/m³)	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: 11.55eV RGasD: 3.48 Sp.Gr: 1.43 (Liquid at 32°F) Nonflammable Gas	VP: 1.6 atm FRZ: -198°F UEL: NA LEL: NA	Moisture, alkalis, ammonia, alcohols, copper [Note: Reacts slowly in water to form hydrochloric acid & carbon dioxide.]	XAD-2'; Toluene; GC/NPD; OSHA [#61]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Phosphine PH_3 7803-51-2 SY7525000 2199 119	Hydrogen phosphide, Phosphorated hydrogen, Phosphorus hydride, Phosphorus trihydride 1 ppm = 1.39 mg/m³	NIOSH 0.3 ppm (0.4 mg/m³) ST 1 ppm (1 mg/m³) OSHA† 0.3 ppm (0.4 mg/m³)	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 FI.P: NA (Gas) IP: 9.96 eV RGasD: 1.18 Flammable Gas	VP: 41.3 atm FRZ: -209°F UEL: ? LEL: 1.79%	Air, oxidizers, chlorine, acids, moisture, halogenated hydrocarbons, copper [Note: May ignite SPONTANEOUSLY on contact with air.]	Beaded carbon*; H_2O_2/ buffer; IC; OSHA [#ID180]
Phosphoric acid H_3PO_4 7664-38-2 TB6300000 1805 154	Orthophosphoric acid, Phosphoric acid (aqueous), White phosphoric acid	NIOSH 1 mg/m³ ST 3 mg/m³ OSHA† 1 mg/m³	1000 mg/m³	Thick, colorless, odorless, crystalline solid. [Note: Often used in an aqueous solution.]	MW: 98.0 BP: 415°F Sol: Miscible FI.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.]	Si gel*; $NaHCO_3$/ Na_2CO_3; IC; IV [#7903, Inorganic Acids]
Phosphorus (yellow) P_4 7723-14-0 TH3500000 1381 136	Elemental phosphorus, White phosphorus	NIOSH/OSHA 0.1 mg/m³	5 mg/m³	White to yellow, soft, waxy solid with acrid fumes in air. [Note: Usually shipped or stored in water.]	MW: 124.0 BP: 536°F Sol: 0.0003% FI.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; IV [#7905]
Phosphorus oxychloride $POCl_3$ 10025-87-3 TH4897000 1810 137	Phosphorus chloride, Phosphorus oxytrichloride, Phosphoryl chloride 1 ppm = 6.27 mg/m³	NIOSH 0.1 ppm (0.6 mg/m³) ST 0.5 ppm (3 mg/m³) 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 FI.P: NA IP: ? Sp.Gr(77°F): 1.65 Noncombustible Liquid, but may set fire to combustible materials.	VP(81°F): 40 mm FRZ: 34°F UEL: NA LEL: NA	Water, combustible materials, carbon disulfide, dimethyl-formamide, metals (except nickel & lead) [Note: Decomposes in water to hydrochloric & phosphoric acids.]	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Phosphorus pentachloride PCl_5 10026-13-8 TB6125000 1806 137	Pentachlorophosphorus, Phosphoric chloride, Phosphorus perchloride	NIOSH/OSHA 1 mg/m^3	70 mg/m^3	White to pale-yellow, crystalline solid with a pungent, unpleasant odor.	MW: 208.3 BP: Sublimes Sol: Reacts Fl.P: NA IP: ? Sp.Gr: 3.60 Noncombustible Solid	VP(132°F): 1mm MLT: 324°F (Sublimes) UEL: NA LEL: NA	Water, magnesium oxide, chemically-active metals such as sodium & potassium, alkalis, amines [Note: Hydrolyzes in water (even in humid air) to form hydrochloric acid & phosphoric acid. Corrosive to metals.]	Filter/Bub; Reagent; Vis; II(5) [#S257]
Phosphorus pentasulfide P_2S_5/P_4S_{10} 1314-80-3 TH4375000 1340 139	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, crystalline 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 137	Phosphorus chloride 1 ppm = 5.62 mg/m^3	NIOSH 0.2 ppm (1.5 mg/m^3) ST 0.5 ppm (3 mg/m^3) OSHA† 0.5 ppm (3 mg/m^3)	25 ppm	Colorless to yellow, fuming liquid with an odor like hydrochloric acid.	MW: 137.4 BP: 169°F Sol: Reacts Fl.P: NA IP: 9.91 eV Sp.Gr: 1.58 Noncombustible Liquid; however, a strong oxidizer that may ignite combustibles upon contact.	VP: 100 mm FRZ: -170°F UEL: NA LEL: NA	Water, chemically-active metals such as sodium & potassium, aluminum, strong nitric acid, acetic acid, organic matter [Note: Hydrolyzes in water to form hydrochloric acid and phosphoric acid.]	Bub; Reagent; Vis; IV [#6402]
Phthalic anhydride $C_6H_4(CO)_2O$ 85-44-9 TI3150000 2214 156	1,2-Benzenedicarboxylic anhydride; PAN; Phthalic acid anhydride 1 ppm = 6.06 mg/m^3	NIOSH 6 mg/m^3 (1 ppm) OSHA† 12 mg/m^3 (2 ppm)	60 mg/m^3	White solid (flake) or a clear, colorless liquid (molten) with a characteristic, acrid odor.	MW: 148.1 BP: 563°F Sol: 0.6% Fl.P: 305°F IP: 10.00 eV Sp.Gr: 1.53 (Flake) 1.20 (Molten) Combustible Solid	VP: 0.0015 mm MLT: 267°F UEL: 10.5% LEL: 1.7%	Strong oxidizers, water [Note: Converted to phthalic acid in hot water.]	Filter; NH_4OH; 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 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 10 mg/m³: SA* 25 mg/m³: SA:CF* 50 mg/m³: SCBAF/SAF 70 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; bron; derm	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
[Phosphorus pentachloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 10 mg/m³: SA* 25 mg/m³: SA:CF* 50 mg/m³: SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; apnea; coma; convuls; conj pain, lac, photo, kerato-conj, corn vesic; dizz; head; ftg; irrity, insom; GI dist	Eye: Irr immed Skin: Dust off solid; water flush Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
[Phosphorus pentasulfide]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH 10 ppm: SCBAF/SAF 25 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; pulm edema; eye, skin burns	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
[Phosphorus trichloride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH 30 mg/m³: DM* 60 mg/m³: DMXSQ*/HiEF/PAPRDM*/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys; conj; nasal ulcer bleeding; bron, bronchial asthma; derm; in animals: liver, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
[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: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
m-Phthalodinitrile $C_6H_4(CN)_2$ 626-17-5 CZ1900000	1,3-Benzenedicarbonitrile; m-Dicyanobenzene; 1,3-Dicyanobenzene; Isophthalodinitrile; m-PDN	NIOSH 5 mg/m³ OSHA† none	N.D.	Needle-like, colorless to white, crystalline, flaky solid with an almond-like odor.	MW: 128.1 BP: Sublimes Sol: Slight FI.P: ? IP: ?	VP: 0.01 mm MLT: 324°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers (e.g., chlorine, bromine, fluorine)	None available
					Sp.Gr: 4.42 Combustible Solid and a severe explosion hazard.			
Picloram $C_6H_3Cl_3O_2N_2$ 1918-02-1 TJ7525000	4-Amino-3,5,6-trichloro-picolinic acid; 4-Amino-3,5,6-trichloro-2-picolinic acid; ATCP; Grazon®; Tordon®	NIOSH See Appendix D OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Colorless to white crystals with a chlorine-like odor. [herbicide]	MW: 241.5 BP: Decomposes Sol: 0.04% FI.P: ? IP: ?	VP(95°F): 0.0000006 mm MLT: 424°F (Decomposes) UEL: ? LEL: ?	Hot concentrated alkali (hydrolyzes)	Filter; none; Grav; IV [Particulates NOR: #500 (total), #600 (resp)]
					Sp.Gr: ? Combustible Solid			
Picric acid $(NO_2)_3C_6H_2OH$ 88-89-1 TJ7875000	Phenol trinitrate; 2,4,6-Trinitrophenol [Note: An OSHA Class A Explosive (1910.109).]	NIOSH 0.1 mg/m³ ST 0.3 mg/m³ [skin] OSHA 0.1 mg/m³ [skin]	75 mg/m³	Yellow, odorless solid. [Note: Usually used as an aqueous solution.]	MW: 229.1 BP: Explodes above 572°F Sol: 1% FI.P: 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]
1344 113 (>10% water)	1 ppm = 9.37 mg/m³				Sp.Gr: 1.76 Combustible Solid			
Pindone $C_9H_5O_2C(O)C(CH_3)_3$ 83-26-1 NK6300000	tert-Butyl valone; 1,3-Dioxo-2-pivaloy-lindane; Pival®; Pivalyl; 2-Pivalyl-1,3-indandione	NIOSH/OSHA 0.1 mg/m³	100 mg/m³	Bright-yellow powder with almost no odor. [rodenticide]	MW: 230.3 BP: Decomposes Sol(77°F): 0.002% FI.P: ? IP: ?	VP: Very low MLT: 230°F UEL: ? LEL: ?	None reported	None available
					Sp.Gr: 1.06			

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
			Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: [m-Phthalodinitrile]	Prevent skin contact Prevent eye contact Daily When wet or contam Daily	TBAL	Inh Abs Ing Con	Head, nau, conf; in animals: irrit eyes, skin	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CNS
Skin: Eyes: Wash skin: Remove: Change: [Picloram]	Prevent skin contact Prevent eye contact When contam N.R. Daily	TBAL	Inh Ing Con	irrit eyes, skin, resp sys; nau; in animals: liver, kidney changes	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Fresh air Medical attention immed	Eyes, skin, resp sys, liver, kidneys
Skin: Eyes: Wash skin: Remove: Change: [Picric acid]	Prevent skin contact Prevent eye contact When contam/Daily When wet or contam Daily	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA 2.5 mg/m³: SA:CF/PAPRDM 5 mg/m³: HIEF/SAT:CF/PAPRTHiE/SCBAF/SAF 75 mg/m³: 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:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, kidneys, liver, blood
Skin: Eyes: Wash skin: Remove: Change: [Pindone]	N.R. N.R. N.R. N.R. Daily	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA 2.5 mg/m³: SA:CF/PAPRDM 5 mg/m³: HIEF/SAT:CF/PAPRTHiE/SCBAF/SAF 100 mg/m³: 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:	Irr immed Resp support Medical attention immed	Blood prothrombin

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement† method (See Table 1)
Piperazine dihydrochloride $C_4H_{10}N_2 \cdot 2HCl$ 142-64-3 TL4025000	Piperazine hydrochloride [Note: The monochloride, $C_4H_{10}N_2 \cdot HCl$ is also commercially available.]	NIOSH 5 mg/m³ OSHA† none	N.D.	White to cream-colored needles or powder.	MW: 159.1 BP: ? Sol: 41% Fl.P: ? IP: ? Sp.Gr: ? 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 $CaSO_4 \cdot 0.5H_2O$ 26499-65-0 TP0700000	Calcium sulfate hemihydrate, Dried calcium sulfate, Gypsum hemihydrate, Hemihydrate gypsum [Note: Plaster of Paris is the hemihydrate form of Calcium Sulfate & Gypsum is the dihydrate form.]	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (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; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Platinum Pt 7440-06-4 TP2160000	Platinum black, Platinum metal, Platinum sponge	NIOSH 1 mg/m³ 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: 21.45 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; IV [#7300, Elements]
Platinum (soluble salts, as Pt)	Synonyms vary depending upon the specific soluble platinum salt.	NIOSH/OSHA 0.002 mg/m³	4 mg/m³ (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; GFAAS; III(7) [#S191]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUCC) (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	TBAL	Inh Abs Ing Con	Irrit eyes, skin, resp sys; skin burns, sens; asthma; GI upset, head, nau, vomit, inco, musc weak	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
[Piperazine dihydrochloride]					
Skin: N.R. **Eyes: N.R.** **Wash skin: N.R.** **Remove: N.R.** Change: **N.R.**	**TBAL**	**Inh** **Ing** **Con**	**Irrit eyes, skin, muc memb, resp sys; cough**	**Eye: Irr immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**
[Plaster **of Paris**]					
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: Daily	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; derm	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Platinum]					
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily**	NIOSH/OSHA 0.05 mg/m³: SA:CF[f] 0.1 mg/m³: HiEF/SCBAF/SAF 4 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	**Inh** **Ing** **Con**	**Irrit eyes, nose; cough, dysp, wheez, cyan; derm, sens skin; lymphocytosis**	**Eye: Irr immed** **Skin: Water flush immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Eyes, skin, resp sys**
[Platinum **(soluble salts, as Pt)**]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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; IV [#0500, Particulates NOR (total)]
Potassium cyanide (as CN) KCN 151-50-8 TS8750000 1680 157 (solution)	Potassium salt of hydrocyanic acid	NIOSH* C 5 mg/m^3 (4.7 ppm) [10-min] OSHA* 5 mg/m^3 [*Note: The REL and PEL also apply to other cyanides (as CN) except Hydrogen cyanide.]	25 mg/m^3 (as CN)	White, granular or crystalline solid with a faint, almond-like odor.	MW: 65.1 BP: 2957°F Sol(77°F): 72% Fl.P: NA IP: NA Sp.Gr: 1.55 Noncombustible Solid, but contact with acids releases highly flammable hydrogen cyanide.	VP: 0 mm (approx) MLT: 1173°F UEL: NA LEL: NA	Strong oxidizers (such as acids, acid salts, chlorates & nitrates) [Note: Absorbs moisture from the air forming a syrup.]	Filter/Bub; KOH; ISE; IV [#7904, Cyanides] [[Also #6010, Hydrogen Cyanide.]
Potassium hydroxide KOH 1310-58-3 TT2100000 1813 154 (dry, solid) 1814 154 (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_2O & other substances and generate sufficient heat to ignite combustible materials.	VP(1317°F): 1 mm MLT: 716°F UEL: NA LEL: NA	Acids, water, metals (when wet), halogenated hydrocarbons, maleic anhydride [Note: Heat is generated if KOH comes in contact with H_2O & CO_2 from the air.]	Filter; HCl; Titrate; IV [#7401, Alkaline Dusts]
Propane $CH_3CH_2CH_3$ 74-98-6 TX2275000 1075 115 1978 115	Bottled gas, Dimethyl methane, n-Propane, Propyl hydride 1 ppm = 1.80 mg/m^3	NIOSH/OSHA 1000 ppm (1800 mg/m^3)	2100 ppm [10%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 RGasD: 1.55 Flammable Gas	VP(70°F): 8.4 atm FRZ: -306°F UEL: 9.5% LEL: 2.1%	Strong oxidizers	Combustible s gas meter; none; none; II(2) [#S87]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Portland cement]	NIOSH 50 mg/m³: D 100 mg/m³: DXSQ/SA 250 mg/m³: SA:CF/PAPRD 500 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 5000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, nose; cough, expectoration; exertional dysp, wheez, chronic bron; derm	Eye: Irr immed Skin: Soap wash prompt Breath: Fresh air Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench** [Potassium **cyanide (as CN)**]	NIOSH/OSHA 25 mg/m³: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFSHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, upper resp sys; asphy; weak, head, conf, nau, vomit; incr rate resp; slow gasping resp; thyroid, blood changes	Eye: Irr immed Skin: Soap wash immed Resp: support Medical attention immed		Eyes, skin, resp sys, CVS, CNS, thyroid, blood
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Potassium hydroxide]	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; cough, sneez; eye, skin burns; vomit, diarr	Eye: Irr immed Skin: Water flush immed Resp: support Medical attention immed		Eyes, skin, resp sys
Skin: **Frostbite** Eyes: **Frostbite** Wash skin: **N.R.** Remove: **When wet (flamm)** Change: **N.R.** Provide: **Frostbite** [Propane]	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: Frostbite** **Skin: Frostbite** **Breath: Resp support**		**CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Propane sultone $C_3H_6O_3S$ 1120-71-4 RP5425000	3-Hydroxy-1-propanesulphonic acid sultone; 1,3-Propane sultone	NIOSH Ca See Appendix A OSHA none	Ca [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% Fl.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	3-Mercaptopropane, Propane-1-thiol, Propyl mercaptan, n-Propyl mercaptan	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: 153°F Sol: Slight Fl.P: -5°F IP: 9.195 eV Sp.Gr: 0.84 Class IB Flammable Liquid	VP(77°F): 155mm FRZ: -172°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals, calcium hypochlorite	None available
2402 130	1 ppm = 3.12 mg/m^3							
Propargyl alcohol $HC{\equiv}CCH_2OH$ 107-19-7 UK5075000	1-Propyn-3-ol; 2-Propyn-1-ol; 2-Propynyl alcohol	NIOSH 1 ppm (2 mg/m^3) [skin] OSHA† none	N.D.	Colorless to straw-colored liquid with a mild, geranium odor.	MW: 56.1 BP: 237°F Sol: Miscible Fl.P(oc): 97°F IP: 10.51 eV Sp.Gr: 0.97 Class IC Flammable Liquid	VP: 12 mm FRZ: -62°F UEL: ? LEL: ?	Phosphorus pentoxide, oxidizers	Char(pet)*; Toluene; GC/ECD; OSHA [#97]
1986 131	1 ppm = 2.29 mg/m^3							
ß-Propiolactone $C_3H_4O_2$ 57-57-8 RQ7350000	BPL; Hydroacrylic acid, ß-lactone; 3-Hydroxy-ß-lactone; 3-Hydroxy-propionic acid; ß-Lactone; 2-Oxetanone; 3-Propiolacetone	NIOSH Ca See Appendix A OSHA [1910.1013] See Appendix B	Ca [N.D.]	Colorless liquid with a slightly sweet odor.	MW: 72.1 BP: 323°F (Decomposes) Sol: 37% Fl.P: 165°F IP: ? Sp.Gr: 1.15 Class IIIA Combustible Liquid	VP(77°F): 3 mm FRZ: -28°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 Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVH/E/SCBAE	Inh Abs Ing Con	In animals: irrit eyes, skin, muc memb; [carc]	Eye: Skin: Irr immed Breath: Water flush immed Swallow: Resp support Medical attention immed	Eyes, skin, resp sys [in animals: skin tumors, leukemia, gliomas]
[Propane sultone]					
Skin: N.R. Eyes: **Prevent eye contact** Wash skin: N.R. Remove: **When wet (flamm)** Change: N.R. Provide: **Eyewash**	NIOSH 5 ppm: CCROV/SA 12.5 ppm: SA:CF/PAPROV 25 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat, resp sys; head, nau, dizz, cyan; in animals: liver, kidney damage	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, blood, liver, kidneys
[1-Propanethiol]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit skin, muc memb; CNS depres; in animals: liver, kidney damage	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Skin, resp sys, CNS, liver, kidneys
[Propargyl alcohol]					
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam/Daily** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench**	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	**Inh** **Abs** **Ing** **Con**	**Skin irrit, blistering, burns; corn opac; frequent urination; dysuria; hema; [carc]**	**Eye: Irr immed** **Skin: Soap wash immed** **Breath: Resp support** **Swallow: Medical attention immed**	**Kidneys, skin, lungs, eyes [in animals: tumors of the liver, skin & stomach]**
[β-Propiolactone]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Propionic acid CH_3CH_2COOH 79-09-4 UE5950000 1848 132	Carboxyethane, Ethanecarboxylic acid, Ethylformic acid, Metacetonic acid, Methyl acetic acid, Propanoic acid 1 ppm = 3.03 mg/m³	NIOSH 10 ppm (30 mg/m³) ST 15 ppm (45 mg/m³) OSHA† none	N.D.	Colorless, oily liquid with a pungent, disagreeable, rancid odor. [Note: A solid below 5°F.]	MW: 74.1 BP: 286°F Sol: Miscible Fl.P: 126°F IP: 10.24 eV Sp.Gr: 0.99 Class II Combustible Liquid	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
Propionitrile CH_3CH_2CN 107-12-0 UF9625000 2404 131	Cyanoethane, Ethyl cyanide, Propanenitrile, Propionic nitrile, Propiononitrile 1 ppm = 2.25 mg/m³	NIOSH 6 ppm (14 mg/m³) OSHA none	N.D.	Colorless liquid with a pleasant, sweetish, ethereal odor. [Note: Forms cyanide in the body.]	MW: 55.1 BP: 207°F Sol: 11.9% Fl.P: 36°F IP: 11.84 eV Sp.Gr: 0.78 Class IB Flammable Liquid	VP: 35 mm FRZ: -133°F UEL: ? LEL: 3.1%	Strong oxidizers & reducing agents, strong acids & bases [Note: Hydrogen cyanide is produced when propionitrile is heated to decomposition.]	Char; Benzene; GC/FID; IV [Adapt #1606]
Propoxur $CH_3NHCOOC_6H_4OCH(CH_3)_2$ 114-26-1 FC3150000	Aprocarb®, Baygon®, o-Isopropoxyphenyl-N-methylcarbamate, N-Methyl-2-isopropoxyphenyl-carbamate	NIOSH 0.5 mg/m³ OSHA† none	N.D.	White to tan, crystalline powder with a faint, characteristic odor. [insecticide]	MW: 209.3 BP: Decomposes Sol: 0.2% Fl.P: >300°F IP: ? Sp.Gr: ? Class IIIB Combustible Liquid	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
n-Propyl acetate $CH_3COOCH_2CH_2CH_3$ 109-60-4 AJ3675000 1276 129	Propylacetate, n-Propyl ester of acetic acid 1 ppm = 4.18 mg/m³	NIOSH 200 ppm (840 mg/m³) ST 250 ppm (1050 mg/m³) OSHA† 200 ppm (840 mg/m³)	1700 ppm	Colorless liquid with a mild, fruity odor.	MW: 102.2 BP: 215°F Sol: 2% Fl.P: 55°F IP: 10.04 eV Sp.Gr: 0.84 Class IB Flammable Liquid	VP: 25 mm FRZ: -134°F UEL: 8% LEL(100°F): 1.7%	Nitrates; strong oxidizers, alkalis & acids	Char; CS_2; GC/FID; IV [#1450, Esters I]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
n-Propyl alcohol $CH_3CH_2CH_2OH$ 71-23-8 UH8225000 1274 129	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol 1 ppm = 2.46 mg/m^3	NIOSH/OSHA 200 ppm (500 mg/m^3) ST 250 ppm (625 mg/m^3) [skin] OSHA† 200 ppm (500 mg/m^3)	800 ppm	Colorless liquid with a mild, alcohol-like odor.	MW: 60.1 BP: 207°F Sol: Miscible FLP: 72°F IP: 10.15eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 15mm FRZ: -196°F UEL: 13.7% LEL: 2.2%	Strong oxidizers	Char; 2-Propanol/CS$_2$; GC/FID; IV [#1401, Alcohols II]
Propylene dichloride $CH_3CHClCH_2Cl$ 78-87-5 TX9625000 1279 130	Dichloro-1,2-propane; 1,2-Dichloropropane 1 ppm = 4.62 mg/m^3	NIOSH Ca See Appendix A OSHA† 75 ppm (350 mg/m^3)	Ca [400 ppm]	Colorless liquid with a chloroform-like odor. [pesticide]	MW: 113.0 BP: 206°F Sol: 0.3% FLP: 60°F IP: 10.87 eV Sp.Gr: 1.16 Class IB Flammable Liquid	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; IV [#1013, 1,2-Di-chloro-propane]
Propylene glycol dinitrate $CH_2CNO_2OHCHNO_2OH$ 6423-43-4 TY6300000	PGDN; Propylene glycol-1,2-dinitrate; 1,2-Propylene glycol dinitrate 1 ppm = 6.79 mg/m^3	NIOSH 0.05 ppm (0.3 mg/m^3) [skin] OSHA† none	N.D.	Colorless liquid with a disagreeable odor. [Note: A solid below 18°F.]	MW: 166.1 BP: ? Sol: 0.1% FLP: ? IP: ? Sp.Gr(77°F): 1.23 Combustible Liquid	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
Propylene glycol monomethyl ether $CH_3OCH_2CHCH_3$ 107-98-2 UB7700000	Dowtherm® 209, 1-Methoxy-2-hydroxypropane, 1-Methoxy-2-propanol, 2-Methoxy-1-methylethanol, Propylene glycol methyl ether 1 ppm = 3.69 mg/m^3	NIOSH 100 ppm (360 mg/m^3) ST 150 ppm (540 mg/m^3) OSHA† none	N.D.	Clear, colorless liquid with a mild, ethereal odor.	MW: 90.1 BP: 248°F Sol: Miscible FLP: 97°F IP: ? Sp.Gr: 0.96 Class IC Flammable Liquid	VP(77°F): 12mm FRZ: -139°F (Sets to glass) UEL(calc): 13.8% LEL(calc.): 16%	Oxidizers, strong acids [Note: Hygroscopic (i.e. absorbs moisture from the air). May slowly form reactive peroxides during prolonged 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 Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [n-Propyl alcohol]	NIOSH/OSHA 800 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; dry cracking skin; drow, head; ataxia, GI pain; abdom cramps, nau, vomit, vomit, diarr; in animals: narco	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, GI tract, CNS
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet (flamm)** **Change: N.R.** **Provide: Eyewash, Quick drench** **[Propylene dichloride]**	**NIOSH** **k: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, skin, resp sys; drow, li-head; liver, kidney damage; in animals: CNS depres; [carc]**	**Eye: Irr immed** **Skin: Soap wash prompt** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, liver, kidneys, CNS [in animals: liver & mammary gland tumors]**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: N.R. Remove: N.R. Change: N.R. [Propylene glycol dinitrate]	TBAL	Inh Abs Ing Con	Irrit eyes; conj; methemo; head, impaired balance, vis dist; in animals: liver, kidney damage	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, CNS, blood, liver, kidneys
Skin: N.R. **Eyes: Prevent eye contact** **Wash skin: N.R.** **Remove: When wet (flamm)** **Change: N.R.** **[Propylene glycol monomethyl ether]**	**TBAL**	**Inh** **Ing** **Con**	**Irrit eyes, skin, nose, throat; head, nau, li-head, drow, inco; vomit, diarr**	**Eye: Irr immed** **Skin: Water wash** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Propylene imine C_3H_7N 75-55-8 CM8050000 1921 131P (inhibited)	2-Methylaziridine; 2-Methylethyleneimine, Propyleneimine, Propylene imine (inhibited), Propylenimine 1 ppm = 2.34 mg/m³	NIOSH Ca See Appendix A 2 ppm (5 mg/m³) [skin] OSHA 2 ppm (5 mg/m³) [skin]	Ca [100 ppm]	Colorless, oily liquid with an ammonia-like odor.	MW: 57.1 BP: 152°F Sol: Miscible FI.P: 25°F IP: 9.00 eV Sp.Gr: 0.80 Class IB Flammable Liquid	VP: 112 mm FRZ: -85°F UEL: ? LEL: ?	Acids, strong oxidizers, water, carbonyl compounds, quinones, sulfonyl halides [Note: Subject to violent polymerization in contact with acids. Hydrolyzes in water to form methylethanolamine.]	None available
Propylene oxide C_3H_6O 75-56-9 TZ2975000 1280 127P	1,2-Epoxy propane; Methyl ethylene oxide; Methyloxirane; Propene oxide; 1,2-Propylene oxide 1 ppm = 2.38 mg/m³	NIOSH Ca See Appendix A OSHA† 100 ppm (240 mg/m³)	Ca [400 ppm]	Colorless liquid with a benzene-like odor. [Note: A gas above 94°F.]	MW: 58.1 BP: 94°F Sol: 41% FI.P: -35°F IP: 9.81 eV Sp.Gr: 0.83 Class IA Flammable Liquid	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_2; GC/FID; IV [#1612]
n-Propyl nitrate $CH_3CH_2CH_2ONO_2$ 627-13-4 UK0350000 1865 131	Propyl ester of nitric acid 1 ppm = 4.30 mg/m³	NIOSH 25 ppm (105 mg/m³) ST 40 ppm (170 mg/m³) OSHA† 25 ppm (110 mg/m³)	500 ppm	Colorless to straw-colored liquid with an ether-like odor.	MW: 105.1 BP: 231°F Sol: Slight FI.P: 68°F IP: 11.07 eV Sp.Gr: 1.07 Class IB Flammable Liquid	VP: 18 mm FRZ: -148°F UEL: 100% LEL: 2%	Strong oxidizers, combustible materials [Note: Forms explosive mixtures with combustible materials.]	Char; CS_2; GC/FID; II(3) [#S227]
Pyrethrum $C_{21}H_{28}O_3/C_{21}H_{28}O_5$ $C_{21}H_{30}O_3/C_{21}H_{30}O_5$ $C_{22}H_{30}O_3/C_{22}H_{30}O_5$ 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/m³	5000 mg/m³	Brown, viscous oil or solid. [insecticide]	MW: 316-374 BP: ? Sol: Insoluble FI.P: 180-190°F IP: ? Sp.Gr: 1 (approx) Class IIIA Combustible Liquid	VP: Low MLT: ? UEL: ? LEL: ?	Strong oxidizers	Filter; CH_3CN; HPLC/UVD; IV [#5008]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 [Propylene imine]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Abs Ing Con	Eye, skin burns; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin [in animals: nasal tumors]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Quick drench [Propylene oxide]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; blisters, burns; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys [in animals: nasal tumors]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [n-Propyl nitrate]	NIOSH/OSHA 250 ppm: SA 500 ppm: SA:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS+/SCBAE	Inh Ing Con	In animals: irrit eyes, skin; methemo, anoxia, cyan; dysp, weak, dizz, head	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, blood
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Pyrethrum]	NIOSH/OSHA 50 mg/m³: CCROVDMFu*/SA* 125 mg/m³: SA:CF*/PAPROVDMFu* 250 mg/m³: CCRFOVHiE/PAPRTOVHiE*/SCBAF/SAF 5000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Erythema, derm, papules, pruritus; rhin; sneez; asthma	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Resp sys, skin, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Pyridine C_5H_5N 110-86-1 UR8400000 1282 129	Azabenzene, Azine 1 ppm = 3.24 mg/m³	NIOSH/OSHA 5 ppm (15 mg/m³)	1000 ppm	Colorless to yellow liquid with a nauseating, fish-like odor.	MW: 79.1 BP: 240°F Sol: Miscible Fl.P: 68°F IP: 9.27 eV Sp.Gr: 0.98 Class IB Flammable Liquid	VP: 16 mm FRZ: -44°F UEL: 12.4% UEL: 1.8%	Strong oxidizers, strong acids	Char; CH_2Cl_2; GC/FID; IV [#1613]
Quinone OC_6H_4O 106-51-4 DK2625000 2587 153	1,4-Benzoquinone; p-Benzoquinone; 1,4-Cyclohexadiene dioxide; p-Quinone 1 ppm = 4.42 mg/m³	NIOSH/OSHA 0.4 mg/m³ (0.1 ppm)	100 mg/m³	Pale-yellow solid with an acrid, chlorine-like odor.	MW: 108.1 BP: Sublimes Sol: Slight Fl.P: 100-200°F IP: 9.68 eV Sp.Gr: 1.32 Combustible Solid	VP(77°F): 0.1 mm MLT: 240°F UEL: ? LEL: ?	Strong oxidizers	XAD-2; Ethanol/ Hexane; HPLC/UVD; II(4) [#S181]
Resorcinol $C_6H_4(OH)_2$ 108-46-3 VG9625000 2876 153	1,3-Benzenediol; m-Benzenediol; 1,3-Dihydroxybenzene; m-Dihydroxybenzene; 3-Hydroxyphenol; m-Hydroxyphenol 1 ppm = 4.50 mg/m³	NIOSH 10 ppm (45 mg/m³) ST 20 ppm (90 mg/m³) OSHA† none	N.D.	White needles, plates, crystals, flakes, or powder with a faint odor. [Note: Turns pink on exposure to air or light, or contact with iron.]	MW: 110.1 BP: 531°F Sol: 110% Fl.P: 261°F IP: 8.63 eV Sp.Gr: 1.27 Class IIIB Combustible Liquid, but may be difficult to ignite.	VP(77°F): 0.0002 mm MLT: 228°F UEL: ? LEL: (392°F): 1.4%	Acetanilide, albumin, alkalis, antipyrine, camphor, ferric salts, menthol, spirit nitrous ether, strong oxidizers & bases [Note: Hygroscopic (i.e., absorbs moisture from the air).]	None available
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/m³	100 mg/m³ (as Rh)	Metal: White, hard, ductile, malleable solid with a bluish-gray luster.	MW: 102.9 BP: 6741°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 12.41 (Metal) Metal: Noncombustible Solid in bulk form, but flammable as dust or powder.	VP: 0 mm (approx) MLT: 3571°F UEL: NA LEL: NA	Chlorine trifluoride, Oxygen difluoride	Filter; Acid; AAS; II(3) [#S188]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Health hazards: Symptoms (See Table 5)	Health hazards: First aid (See Table 6)	Health hazards: 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 [Pyridine]	NIOSH/OSHA 125 ppm: SA:CF[E]/PAPROV[E] 250 ppm: CCRFOV/GMFOV/PAPRTOV[E]/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, insom; nau, anor; derm; liver, kidney damage	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, CNS, liver, kidneys, GI tract
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash, Quick drench [Quinone]	NIOSH/OSHA 10 mg/m³: SA:CF[E] 20 mg/m³: SCBAF/SAF 100 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Eye irrit, conj; kera; skin irrit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash [Resorcinol]	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat, upper resp sys; methemo, cyan, convuls; restless, bluish skin, incr heart rate, dysp; dizz, drow, hypothermia, hemog; spleen, kidney, liver changes; derm	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CVS, CNS, blood, spleen, liver, kidneys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Rhodium (metal fume and insoluble compounds, as Rh)]	NIOSH/OSHA 0.5 mg/m³: DM^ 1 mg/m³: DMXSQ^/SA 2.5 mg/m³: SA:CF/PAPRDMFu 5 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 100 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Possible resp sens	Breath: Resp support Swallow: Medical attention immed	Resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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; GFAAS; II(3) [#S189]
Ronnel $(CH_3O)_2P(S)OC_6H_2Cl_3$ 299-84-3 TG0525000	O,O-Dimethyl O-(2,4,5-trichlorophenyl) phosphorothioate; Fenchlorophos	NIOSH 10 mg/m^3 OSHA† 15 mg/m^3	300 mg/m^3	White to light tan, crystalline solid. [insecticide] [Note: A liquid above 106°F.]	MW: 321.6 BP: Decomposes Sol(77°F): 0.004% Fl.P: NA IP: ? Sp.Gr: 1.49 Noncombustible Solid	VP(77°F): 0.0008 mm MLT: 106°F UEL: NA LEL: NA	Strong oxidizers	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organophosphorus Pesticides]
Rosin core solder, pyrolysis products (as formaldehyde)	Rosin flux pyrolysis products, Rosin core soldering flux pyrolysis products	NIOSH* 0.1 mg/m^3 [*Note: "Ca" in the presence of formaldehyde, acetaldehyde, or malonaldehyde. See Appendices A & C (Aldehydes).] OSHA† none	N.D.	Pyrolysis products of rosin core solder include acetone, aliphatic aldehydes, methyl alcohol, methane, ethane, various abietic acids (the major components of rosin), CO & CO_2.	Properties vary depending upon the specific rosin core solder being used.		Varies	Filter/ Imp(2); none; Vis; IV [#3500, Formaldehyde] [Also #2541]
Rotenone $C_{23}H_{22}O_6$ 83-79-4 DJ2800000	1,2,12,12a-Tetrahydro-8,9-dimethoxy-2-(1-methylethenyl)-[1]benzopyrano [3,4-b]furo[2,3-h][1] benzopyran-6(6aH)-one	NIOSH/OSHA 5 mg/m^3	2500 mg/m^3	Colorless to red, odorless, crystalline solid. [insecticide]	MW: 394.4 BP: Decomposes Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.27 Combustible Solid	VP: <0.00004 mm MLT: 330°F UEL: ? LEL: ?	Strong oxidizers, alkalis	Filter; CH_3CN; HPLC/UVD; IV [#5007]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards: Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Rhodium (soluble compounds, as Rh)]	NIOSH/OSHA 0.010 mg/m³: HiE*/SA* 0.025 mg/m³: SA:CF*/PAPRHiE* 0.050 mg/m³: HiEF/PAPRTHiE*/SCBAF/SAF 2 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	In animals: irrit eyes; CNS damage	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed	Eyes, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Ronnel]	NIOSH 100 mg/m³: CCROVDMFu/SA 250 mg/m³: SA:CF/PAPROVDMFu 300 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	In animals: irrit eyes; chol inhibition; liver, kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, liver, kidneys, blood plasma
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Rosin core solder, pyrolysis products (as formaldehyde)]	TBAL In presence of Formaldehyde, Acetaldehyde, or Malonaldehyde: NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh	Irrit eyes, nose, throat, upper resp sys	Eye: Irr immed Breath: Resp support	Eyes, resp sys [nasal cancer; thyroid gland tumors in animals (in presence of Formaldehyde, Acetaldehyde, or Malonaldehyde)]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Rotenone]	NIOSH/OSHA 50 mg/m³: CCROVDMFu/SA 125 mg/m³: SA:CF/PAPROVDMFu 250 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; numb muc memb; nau, vomit, abdom pain; musc tremor, inco, clonic convuls, stupor	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Rouge Fe_2O_3 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: ? Sol: Insoluble FI.P: NA IP: NA Sp.Gr: 5.24 Noncombustible Solid	VP: 0 mm (approx) MLT: 2849°F UEL: NA LEL: NA	Calcium hypochlorite, carbon monoxide, hydrogen peroxide	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Selenium Se 7782-49-2 VS7700000 2658 152 (powder)	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 FI.P: NA IP: NA Sp.Gr: 4.28 Combustible Solid	VP: 0 mm (approx) MLT: 392°F UEL: NA LEL: NA	Acids, strong oxidizers, chromium trioxide, potassium bromate, cadmium	Filter; Acid; ICP; IV [#7300, Elements] [Also II(7) #S190]
Selenium hexafluoride SeF_6 7783-79-1 VS9450000 2194 125	Selenium fluoride 1 ppm = 7.89 mg/m^3	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 FI.P: NA IP: ? RGasD: 6.66 Nonflammable Gas	VP: >1 atm FRZ: -59°F UEL: NA LEL: NA	Water [Note: Hydrolyzes very slowly in cold water.]	None available
Silica, amorphous SiO_2 7631-86-9 VV7310000	Diatomaceous earth, Diatomaceous silica, Diatomite, Precipitated amorphous silica, Silica gel, Silicon dioxide (amorphous)	NIOSH 6 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 FI.P: NA IP: NA Sp.Gr: 2.20 Noncombustible Solid	VP: 0 mm (approx) MLT: 3110°F UEL: NA LEL: NA	Fluorine, oxygen difluoride, chlorine trifluoride	Filter; LTA; XRD; IV [#7501]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Rouge]	TBAL	Inh Con	Irrit eyes, skin, resp sys	Eye: Breath:	Irr immed Fresh air	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Quick drench [Selenium]	NIOSH/OSHA 1 mg/m^3: DM**/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, cirr; kidney, spleen damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys, blood, spleen
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Selenium hexafluoride]	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 irrit, edema	Breath:	Resp support	Resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Silica, amorphous]	NIOSH 30 mg/m^3: DM 60 mg/m^3: DMXSQ/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: Breath:	Irr immed Fresh air	Eyes, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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: 50 mg/m^3 (quartz, tripoli) 25 mg/m^3 (cristobalite, tridymite)	Colorless, odorless solid. [Note: A component of many mineral dusts.]	MW: 60.1 BP: 4046°F Sol: Insoluble FI.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; IV [#7500] [Also #7601, #7602]
Silicon Si 7440-21-3 VW0400000 1346 170 (amorphous powder)	Elemental silicon [Note: Does not occur free in nature, but is found in silicon dioxide (silica) & in various silicates.]	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Black to gray, lustrous, needle-like crystals. [Note: The amorphous form is a dark-brown powder.]	MW: 28.1 BP: 4271°F Sol: Insoluble FI.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: 160 g/m^3	Chlorine, fluorine, oxidizers, calcium, cesium carbide, alkaline carbonates	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Silicon carbide SiC 409-21-2 VW0450000	Carbon silicide, Carborundum®, Silicon monocarbide	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Yellow to green to bluish-black, iridescent crystals.	MW: 40.1 BP: Sublimes Sol: Insoluble FI.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; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Silicon tetrahydride SiH_4 7803-62-5 VV1400000 2203 116	Monosilane, Silane, Silicane 1 ppm = 1.31 mg/m^3	NIOSH 5 ppm (7 mg/m^3) OSHA† none	N.D.	Colorless gas with a repulsive odor.	MW: 32.1 BP: -169°F Sol: Decomposes FI.P: NA (Gas) IP: ? RGasD: 1.11 Flammable Gas (may ignite SPONTANEOUSLY in air).	VP: >1 atm FRZ: -301°F UEL: ? LEL: ?	Halogens (bromine, chlorine, carbonyl chloride, antimony pentachloride, tin(IV) chloride), water	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Silica, crystalline (as respirable dust)]	NIOSH 0.5 mg/m³: HIE 1.25 mg/m³: PAPRHIE/SA:CF 2.5 mg/m³: HIEF/PAPRTHIE 25 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Cough, dysp, wheez; decr pulm func, progressive resp symptoms (silicosis);	Eye: Irr immed Breath: Fresh air irrit eyes; [carc]		Eyes, resp sys [in animals: lung cancer]
Skin: N.R. Eyes: Prevent eye contact Wash skin: N.R. Remove: N.R. Change: N.R. [Silicon]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; cough	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Silicon carbide]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; cough	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Silicon tetrahydride]	TBAL	Inh	Irrit eyes, skin, muc memb; nau, head	Breath:	Resp support	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Silver (metal dust and soluble compounds, as Ag) Ag (Metal) 7440-22-4 (Metal) VW3500000 (Metal)	Silver metal: Argentum Synonyms of soluble silver compounds such as Silver nitrate ($AgNO_3$) vary depending upon the specific compound.	NIOSH/OSHA 0.01 mg/m^3	10 mg/m^3 (as Ag)	Metal: White, lustrous solid.	MW: 107.9 BP: 3632°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 10.49 (Metal) Metal: Noncombustible Solid, but flammable in form of dust or powder.	VP: 0 mm (approx) MLT: 1761°F UEL: NA LEL: NA	Acetylene, ammonia, hydrogen peroxide, bromoazide, chlorine trifluoride, ethyleneimine, oxalic acid, tartaric acid	Filter; Acid; ICP; IV [#7300, Elements]
Soapstone (containing less than 1% quartz) $3MgO\text{-}4SiO_2\text{-}H_2O$ 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 Fl.P: NA IP: NA Sp.Gr: 2.7-2.8 Noncombustible Solid	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
Sodium aluminum fluoride (as F) Na_3AlF_6 15096-52-3 WA9625000	Cryocide, Cryodust, Cryolite, Sodium hexafluoroaluminate	NIOSH*/OSHA* 2.5 mg/m^3 [*Note: The REL and PEL also apply to other inorganic, solid fluorides (as F).]	250 mg/m^3 (as F)	Colorless to dark, odorless solid. [pesticide] [Note: Loses color on heating.]	MW: 209.9 BP: Decomposes Sol: 0.04% Fl.P: NA IP: NA Sp.Gr: 2.90 Noncombustible Solid	VP: 0 mm (approx) MLT: 1832°F UEL: NA LEL: NA	Strong oxidizers	Pad*/pre-Filter; NaOH; ISE; IV [#7902, Fluorides]
Sodium azide NaN_3 26628-22-8 VY8050000 1687 153	Azide, Azium, Sodium salt of hydrazoic acid	NIOSH C 0.1 ppm (as HN_3) [skin] C 0.3 mg/m^3 (as NaN_3) [skin] OSHA† none	N.D.	Colorless to white, odorless, crystalline solid. [pesticide] [Note: Forms hydrazoic acid (HN_3) in water.]	MW: 65.0 BP: Decomposes Sol(63°F): 42% Fl.P: ? IP: 11.70 eV Sp.Gr: 1.85 Combustible Solid (if heated above 572°F).	VP: ? MLT: 527°F (Decomposes) UEL: ? LEL: ?	Acids, metals, water	Filter/ Si gel* $NaHCO_3$/ Na_2CO_3; IC/UV-vis; OSHA [#ID121]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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)
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam ($AgNO_3$) hange: Daily rovide: Eyewash	NIOSH/OSHA 0.25 mg/m³: SA:CF/PAPRHIE[E] 0.5 mg/m³: HIEF/SCBAF/SAF 10 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Blue-gray eyes, nasal septum, throat, skin; irrit, ulceration skin; GI dist	Eye: Skin: Breath: Swallow:	Irr immed Water flush Resp support Medical attention immed	Nasal septum, skin, eyes
Silver (metal dust and soluble compounds, as Ag)]						
kin: N.R. yes: N.R. Vash skin: N.R. emove: N.R. hange: N.R.	NIOSH 30 mg/m³: DM 60 mg/m³: DMXSQ/SA 150 mg/m³: PAPRDM 300 mg/m³: HIEF/SAT:CF*/PAPRTHIE*/SCBAF/SAF 3000 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Pneumoconiosis: cough, dysp; digital clubbing; cyan; basal crackles, cor pulmonale	Eye: Breath:	Irr immed Resp support	Resp sys, CVS
Soapstone (containing less than 1% quartz)]						
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: Daily	NIOSH/OSHA 12.5 mg/m³: DM 25 mg/m³: DMXSQ*/SA* 62.5 mg/m³: SA:CF*/PAPRDM*+ 125 mg/m³: HIEF+/SCBAF/SAF 250 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF+/SCBAE	Inh Ing Con	Irrit eyes, resp sys; nau, abdom pain, diarr; salv, thirst, sweat; stiff spine; derm; calcification of ligaments of ribs, pelvis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Fresh air Medical attention immed	Eyes, skin, resp sys, CNS, skeleton, kidneys
Sodium aluminum fluoride (as F)]	+Note: May need acid gas sorbent					
kin: Prevent skin contact yes: Prevent eye contact Vash skin: When contam emove: When wet or contam hange: Daily rovide: Eyewash, Quick drench	TBAL	Inh Abs Ing Con	Irrit eyes, skin; head, dizz, weak, blurred vision; dysp; low BP, bradycardia; kidney changes	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, CNS, CVS, kidneys
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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Sodium bisulfite $NaHSO_3$ 7631-90-5 VZ2000000 2693 154 (solution)	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% Fl.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; Grav; IV [#0500, Particulates NOR (total)]
Sodium cyanide (as CN) NaCN 143-33-9 VZ7530000 1689 157	Sodium salt of hydrocyanic acid	NIOSH* C 5 mg/m^3 (4.7 ppm) [10-min] OSHA* 5 mg/m^3 [*Note: The REL and PEL also apply to other cyanides (as CN) except Hydrogen cyanide.]	25 mg/m^3 (as CN)	White, granular or crystalline solid with a faint, almond-like odor.	MW: 49.0 BP: 2725°F Sol(77°F): 58% Fl.P: NA IP: NA 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; IV [#7904, Cyanides] [Also #6010, Hydrogen Cyanide.]
Sodium fluoride (as F) NaF 7681-49-4 WB0350000 1690 154	Floridine, Sodium monofluoride	NIOSH/OSHA 2.5 mg/m^3 [*Note: The REL and PEL also apply to other inorganic, solid fluorides (as F).]	250 mg/m^3 (as F)	Odorless, white powder or colorless crystals. [pesticide] [Note: Pesticide grade is often dyed blue.]	MW: 42.0 BP: 3099°F Sol: 4% Fl.P: NA IP: NA Sp.Gr: 2.78 Noncombustible Solid	VP: 0 mm (approx) MLT: 1819°F UEL: NA LEL: NA	Strong oxidizers	Pad*/pre-Filter; NaOH; ISE; IV [#7902, Fluorides] [Also #7906]
Sodium fluoroacetate FCH_2COONa 62-74-8 AH9100000 2629 151	SFA, Sodium monofluoroacetate	NIOSH 0.05 mg/m^3 ST 0.15 mg/m^3 [skin] OSHA† 0.05 mg/m^3 [skin]	2.5 mg/m^3	Fluffy, colorless to white (sometimes dyed black), odorless powder. [rodenticide] [Note: A liquid above 95°F.]	MW: 100.0 BP: Decomposes Sol: Miscible Fl.P: NA IP: ? Sp.Gr: ? Noncombustible Solid	VP: Low MLT: 392°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 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Sodium bisulfite]	TBAL	Inh Ing Con	Irrit eyes, skin, muc memb	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench** [Sodium **cyanide (as CN)**]	NIOSH/OSHA 25 mg/m^3: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/HIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; asphy; weak, head, conf; nau, vomit; incr resp rate; slow gasping respiration; thyroid, blood changes	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, CVS, CNS, thyroid, blood
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Sodium fluoride (as F)]	NIOSH/OSHA 12.5 mg/m^3: DM 25 mg/m^3: DMXSQ*/SA* 62.5 mg/m^3: SA:CF*/PAPRDM*+ 125 mg/m^3: HIEF+/SCBAF/SAF 250 mg/m^3: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF+/SCBAE +Note: May need acid gas sorbent	Inh Ing Con	Irrit eyes, resp sys; nau, abdom pain, diarr; saliv, thirst, sweat; stiff spine; derm; calcification of ligaments of ribs, pelvis	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Fresh air Medical attention immed	Eyes, skin, resp sys, CNS, skeleton, kidneys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Quick drench** [Sodium **fluoroacetate**]	NIOSH/OSHA 0.25 mg/m^3: DM 0.5 mg/m^3: DMXSQ/SA 1.25 mg/m^3: SA:CF/PAPRDM 2.5 mg/m^3: HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	**Inh** **Abs** **Ing** **Con**	**Vomit; appre, auditory halu; facial pares; twitch face musc; pulsus altenans, ectopic heartbeat, tacar, ventfib; pulm edema; nystagmus; convuls; liver, kidney damage**	**Eye:** **Skin:** **Breath:** **Swallow:**	**Irr immed** **Water flush immed** **Resp support** **Medical attention immed**	**Resp sys, CVS, liver, kidneys, CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Sodium hydroxide NaOH 1310-73-2 WB4900000 1823 154 (solid) 1824 154 (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; IV [#7401, Alkaline Dusts]
Sodium metabisulfite $Na_2S_2O_5$ 7681-57-4 UX8225000	Disodium pyrosulfite, Sodium metabisulphite, Sodium pyrosulfite	NIOSH 5 mg/m^3 OSHA† none	N.D.	White to yellowish crystals or powder with an odor of sulfur dioxide.	MW: 190.1 BP: Decomposes Sol: 54% 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; IV [#0500, Particulates NOR (total)]
Starch $(C_6H_{10}O_5)_n$ 9005-25-8 GM5090000	Corn starch, Rice starch, Sorghum gum, α-Starch, Starch gum, Tapioca starch	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Fine, white, odorless powder. [Note: A carbohydrate polymer composed of 25% amylose & 75% amylpectin.]	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; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Stibine SbH_3 7803-52-3 WJ0700000 2676 119	Antimony hydride, Antimony trihydride, Hydrogen antimonide 1 ppm = 5.10 mg/m^3	NIOSH/OSHA 0.1 ppm (0.5 mg/m^3)	5 ppm	Colorless gas with a disagreeable odor like hydrogen sulfide.	MW: 124.8 BP: -1°F Sol: Slight FLP: NA (Gas) IP: 9.51 eV RGasD: 4.31 Flammable Gas	VP: >1 atm FRZ: -126°F UEL: ? LEL: ?	Acids, halogenated hydrocarbons, oxidizers, moisture, chlorine, ozone, ammonia	Si gel*; HCl; Vis; IV [#6008]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL / Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ / UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Stoddard solvent 8052-41-3 WJ8925000 1268 128 (petroleum distillate)	Dry cleaning safety solvent, Mineral spirits, Petroleum solvent, Spotting naphtha [Note: A refined petroleum solvent with a flash point of 102-110°F, boiling point of 309-396°F, and containing >65% C_{10} or higher hydrocarbons.]	NIOSH 350 mg/m^3 C 1800 mg/m^3 [15-min] OSHA† 500 ppm (2900 mg/m^3)	20,000 mg/m^3	Colorless liquid with a kerosene-like odor.	MW: Varies BP: 309-396°F Sol: Insoluble Fl.P: 102-110°F IP: ? Sp.Gr: 0.78 Class II Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; IV [#1550, Naphthas]
Strychnine $C_{21}H_{22}N_2O_2$ 57-24-9 WL2275000 1692 151	Nux vomica, Strynchnos	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% Fl.P: ? IP: ? Sp.Gr: 1.36 Combustible Solid, but difficult to ignite.	VP: Low MLT: 514°F UEL: ? LEL: ?	Strong oxidizers	Filter; Reagent; HPLC/UVD; IV [#5016]
Styrene $C_6H_5CH{=}CH_2$ 100-42-5 WL3675000 2055 128 (inhibited)	Ethenyl benzene, Phenylethylene, Styrene monomer, Styrol, Vinyl benzene 1 ppm = 4.26 mg/m^3	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% Fl.P: 88°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_2; GC/FID; IV [#1501, Aromatic Hydro-carbons]
Subtilisins 1395-21-7 (BPN) 9014-01-1 (Carlsburg) CO9450000 (BPN) CO9550000 (Carlsburg)	Bacillus subtilis, Bacillus subtilis BPN, Bacillus subtilis Carlsburg, Proteolytic enzymes, Subtilisin BPN, Subtilisin Carlsburg [Note: Commercial proteolytic enzymes are used in laundry detergents.]	NIOSH ST 0.00006 mg/m^3 [60-min] OSHA† none	N.D.	Light-colored, free-flowing powders. [Note: A protein containing numerous amino acids.]	MW: 28,000 (approx) BP: ? Sol: ? Fl.P: NA IP: NA Sp.Gr: ?	VP: 0 mm (approx) MLT: ? UEL: NA LEL: NA	None reported	None available

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Stoddard solvent]	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 (aspir liq); in animals: kidney damage	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, kidneys
Skin: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: N.R. Change: Daily [Strychnine]	NIOSH/OSHA 0.75 mg/m^3: DM 1.5 mg/m^3: DMXSQ/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, appre, incr acuity of perception; incr reflex excitability; cyan; tetanic convuls with opisthotonos	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. [Styrene]	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, flg, dizz, conf, mal, drow, weak, unsteady gait; narco; defatting derm; possible liver inj, repro effects	Eye: Irr immed Skin: Water flush Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, liver, repro sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Subtilisins]	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys; resp sens (enzyme asthma); sweat, head, chest pain, flu-like symptoms, cough, breathlessness, wheez	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Succinonitrile $NCCH_2CH_2CN$ 110-61-2 WN3850000	Butanedinitrile; 1,2-Dicyanoethane; Dinile; Ethylene cyanide; Ethylene dicyanide; Succinic dinitrile 1 ppm = 3.28 mg/m^3	NIOSH 6 ppm (20 mg/m^3) OSHA none	N.D.	Colorless, waxy solid. [Note: Forms cyanide in the body.]	MW: 80.1 BP: 509°F Sol: 13% Fl.P: 270°F IP: ? Sp.Gr: 0.99 Combustible Solid	VP(212°F): 2 mm MLT: 134°F UEL: ? LEL: ?	Oxidizers	Char; Toluene; GC/FID; NIOSH Nitriles Crit. Doc.
Sucrose $C_{12}H_{22}O_{11}$ 57-50-1 WN6500000	Beet sugar, Cane sugar, Confectioner's sugar, Granulated sugar, Rock candy, Saccarose, Sugar, Table sugar	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Hard, white, odorless crystals, lumps, or powder. [Note: May have a characteristic, caramel odor when heated.]	MW: 342.3 BP: Decomposes Sol: 200% Fl.P: NA IP: NA Sp.Gr: 1.59 Noncombustible Solid, but fine airborne dust may explode.	VP: 0 mm (approx) MLT: 320-367°F (Decomposes) UEL: NA LEL: NA MEC: 45 g/m^3	Oxidizers, sulfuric acid, nitric acid	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]
Sulfur dioxide SO_2 7446-09-5 WS4550000 1079 125	Sulfurous acid anhydride, Sulfurous oxide, Sulfur oxide 1 ppm = 2.62 mg/m^3	NIOSH 2 ppm (5 mg/m^3) ST 5 ppm (13 mg/m^3) OSHA† 5 ppm (13 mg/m^3)	100 ppm	Colorless gas with a characteristic, irritating, pungent odor. [Note: A liquid below 14°F. Shipped as a liquefied compressed gas.]	MW: 64.1 BP: 14°F Sol: 10% Fl.P: NA IP: 12.30 eV RGasD: 2.26 Nonflammable Gas	VP: 3.2 atm FRZ: -104°F UEL: NA LEL: NA	Powdered alkali metals (such as sodium & potassium), water, ammonia, zinc, aluminum, brass, copper [Note: Reacts with water to form sulfurous acid (H_2SO_3).]	Filter/pad*; $NaHCO_3$/Na_2CO_3; IC; IV [#6004]
Sulfur hexafluoride SF_6 2551-62-4 WS4900000 1080 126	Sulfur fluoride [Note: May contain highly toxic sulfur pentafluoride as an impurity.] 1 ppm = 5.98 mg/m^3	NIOSH/OSHA 1000 ppm (6000 mg/m^3)	N.D.	Colorless, odorless gas. [Note: Shipped as a liquefied compressed gas. Condenses directly to a solid upon cooling.]	MW: 146.1 BP: Sublimes Sol(77°F): 0.003% Fl.P: NA IP: 19.30 eV RGasD: 5.11 Nonflammable Gas	VP: 21.5 atm FRZ: -83°F (Sublimes) UEL: NA LEL: NA	Disilane	Bag; none; GC portable; IV [#6602]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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 60 ppm: SA 150 ppm: SA:CF 250 ppm: SCBAF/SAF §: 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:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, CVS
[Succinonitrile]							
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:**	**N.R.** **N.R.** **N.R.** **N.R.** **N.R.**	**TBAL**	**Inh** **Con**	**Irrit eyes, skin, upper resp sys; cough**	**Eye:** **Breath:**	**Irr immed** **Fresh air**	**Eyes, resp sys**
[Sucrose]							
Skin: Eyes: Wash skin: Remove: Change: Provide:	Frostbite Frostbite N.R. When wet or contam (liq) N.R. Frostbite	NIOSH 20 ppm: CCRS*/SA* 50 ppm: SA:CF*/PAPRS* 100 ppm: CCRFS/GMFS/PAPRTS*/SAT:CF*/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh Con	Irrit eyes, nose, throat; rhin; choking, cough; reflex bronchoconstriction; liq: frostbite	Eye: Skin: Breath:	Frostbite Frostbite Resp support	Eyes, skin, resp sys
[Sulfur dioxide]							
Skin: **Eyes:** **Wash skin:** **Remove:** **Change:** **Provide:**	**Frostbite** **Frostbite** **N.R.** **N.R.** **N.R.** **Frostbite**	**TBAL**	**Inh**	**Asphy: incr breath rate, pulse rate; slight musc inco, emotional upset; ftg, nau, vomit, convuls**	**Eye:** **Skin:** **Breath:**	**Frostbite** **Frostbite** **Resp support**	**Resp sys**
[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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Sulfuric acid H_2SO_4 7664-93-9 WS5600000 1830 137 1831 137 (fuming) 1832 137 (spent)	Battery acid, Hydrogen sulfate, Oil of vitriol, 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 Fl.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.]	Si gel*; $NaHCO_3$/ Na_2CO_3; IC; IV [#7903, Inorganic Acids]
Sulfur monochloride S_2Cl_2 10025-67-9 WS4300000 1828 137	Sulfur chloride, Sulfur subchloride, Thiosulfurous dichloride 1 ppm = 5.52 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 Fl.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 phosphorous, organics, water [Note: Decomposes violently in water to form hydrochloric acid, sulfur dioxide, sulfur, sulfite, thiosulfate, and hydrogen sulfide. Corrosive to metals.]	None available
Sulfur pentafluoride S_2F_{10} 5714-22-7 WS4480000	Disulfur decafluoride, Sulfur decafluoride 1 ppm = 10.39 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 Fl.P: NA IP: ? Sp.Gr(32°F): 2.08 RGasD: 8.77 Noncombustible Liquid Nonflammable Gas	VP: 561 mm FRZ: -134°F UEL: NA LEL: NA	None reported	None available
Sulfur tetrafluoride SF_4 7783-60-0 WT4800000 2418 125	Tetrafluorosulfurane 1 ppm = 4.42 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: 108.1 BP: -41°F Sol: Reacts Fl.P: NA IP: 12.63 eV RGasD: 3.78 Nonflammable Gas	VP(70°F): 10.5 atm FRZ: -185°F UEL: NA LEL: NA	Moisture, concentrated sulfuric acid, dioxygen difluoride [Note: Readily hydrolyzed by moisture, forming hydrofluoric acid & thionyl fluoride.]	Bub; NaOH; IC OSHA [#ID110]

Personal protection and sanitation (See Table 3)		Recommendations for respirator selection — 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)
kin:	Prevent skin contact	NIOSH/OSHA	Inh	Irrit eyes, skin, nose,	Eye:	Irrimmed	Eyes, skin, resp sys,
yes:	Prevent eye contact	15 mg/m³: SA:CF[f]/PAPRAGHIE[f]/	Ing	throat; pulm edema, bron;	Skin:	Water flush immed	teeth
Vash skin:	When contam	CCRFAGHIE/GMFAGHIE/	Con	emphy; conj; stomatis;	Breath:	Resp support	
emove:	When wet or contam	SCBAF/SAF		dental erosion; trachbronc;	Swallow:	Medical attention	
hange:	N.R.	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA		eye, skin burns; derm		immed	
rovide:	Eyewash (>1%), Quick drench (>1%)	Escape: GMFAGHIE/SCBAE					
Sulfuric acid]							
kin:	**Prevent skin contact**	NIOSH/OSHA	**Inh**	**Irrit eyes, skin, muc memb;**	**Eye:**	**Irrimmed**	**Eyes, skin, resp sys**
yes:	**Prevent eye contact**	**5 ppm: CCRFS/GMFS/PAPRS[f]/**	**Ing**	**lac; cough; eye, skin burns;**	**Skin:**	**Water flush immed**	
Vash skin:	**When contam**	**SCBAF/SAF**	**Con**	**pulm edema**	**Breath:**	**Resp support**	
emove:	**When wet or contam**	**§: SCBAF:PD,PP/SAF:PD,PP:ASCBA**			**Swallow:**	**Medical attention**	
hange:	**N.R.**	**Escape: GMFS/SCBAE**				**immed**	
rovide:	**Eyewash, Quick drench**						
Sulfur monochloride]							
kin:	Prevent skin contact	NIOSH	Inh	Irrit eyes, skin, resp sys;	Eye:	Irrimmed	Eyes, skin, resp sys,
yes:	Prevent eye contact	0.1 ppm: SA	Ing	in animals: pulm edema,	Skin:	Soap wash immed	CNS
Vash skin:	N.R.	0.25 ppm: SA:CF	Con	hemorr	Breath:	Resp support	
emove:	When wet or contam	0.5 ppm: SAT:CF/SCBAF/SAF			Swallow:	Medical attention	
hange:	N.R.	1 ppm: SA:PD,PP				immed	
rovide:	Eyewash, Quick drench	§: SCBAF:PD,PP/SAF:PD,PP:ASCBA					
		Escape: GMFAG/SCBAE					
Sulfur pentafluoride]							
kin:	**Frostbite**	**TBAL**	**Inh**	**Irrit eyes, muc memb; eye,**	**Eye:**	**Frostbite**	**Eyes, skin, resp sys**
yes:	**Frostbite**		**Con**	**skin burns (from SF_4**	**Skin:**	**Frostbite**	
Vash skin:	**N.R.**			**releasing hydrofluoric**	**Breath:**	**Resp support**	
emove:	**N.R.**			**acid on exposure to**			
hange:	**N.R.**			**moisture); liq: frostbite;**			
rovide:	**Frostbite**			**in animals: dysp, weak,**			
				rhin			
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: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Sulfuryl fluoride SO_2F_2 2699-79-8 WT5075000 2191 123	Sulfur difluoride dioxide, Vikane® 1 ppm = 4.18 mg/m³	NIOSH 5 ppm (20 mg/m³) ST 10 ppm (40 mg/m³) OSHA† 5 ppm (20 mg/m³)	200 ppm	Colorless, odorless gas. [insecticide/ fumigant] [Note: Shipped as a liquefied compressed gas.]	MW: 102.1 BP: -68°F Sol(32°F): 0.2% FLP: NA IP: 13.04 eV RGasD: 3.72 Nonflammable Gas	VP(70°F): 15.8 atm FRZ: -212°F UEL: NA LEL: NA	None reported	Char; NaOH; IC; Iv [#6012]
Sulprofos $C_{12}H_{19}O_2PS_3$ 35400-43-2 TE4165000 1 ppm = 13.19 mg/m³	Bolstar®, O-Ethyl O-(4-methylthio)-phenyl S-propyl-phosphorodithioate	NIOSH 1 mg/m³ OSHA† none	N.D.	Tan-colored liquid with a sulfide-like odor.	MW: 322.5 BP: ? Sol: Low FLP: ? IP: ? Sp.Gr: 1.20	VP: <8 mm FRZ: ? UEL: ? LEL: ?	None reported	OVS-2; Toluene/ Acetone; GC/FPD; IV [#5600, Organo-phosphorus Pesticides]
2,4,5-T $Cl_3C_6H_2OCH_2COOH$ 93-76-5 AJ8400000 2765 152	2,4,5-Trichlorophenoxyacetic acid	NIOSH/OSHA 10 mg/m³	250 mg/m³	Colorless to tan, odorless, crystalline solid. [herbicide]	MW: 255.5 BP: Decomposes Sol(77°F): 0.03% FLP: ? IP: ? Sp.Gr: 1.80 Combustible Solid, but burns with difficulty.	VP: <1 x 10^{-7} mm MLT: 307°F UEL: ? LEL: ?	None reported	Filter; Methanol; HPLC/UVD; IV [#5001]
Talc (containing no asbestos and less than 1% quartz) $Mg_3Si_4O_{10}(OH)_2$ 14807-96-6 WW2710000	Hydrous magnesium silicate, Steatite talc	NIOSH 2 mg/m³ (resp) OSHA† 20 mppcf	1000 mg/m³	Odorless, white powder.	MW: Varies BP: ? Sol: Insoluble FLP: NA IP: NA Sp.Gr: 2.70-2.80 Noncombustible Solid	VP: 0 mm (approx) MLT: 1652-1832°F UEL: NA LEL: NA	None reported	Filter; LTA; XRD; III [P&CAM #355]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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)
kin: Frostbite yes: Frostbite /ash skin: N.R. emove: N.R. hange: N.R. rovide: 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, pares; liq: frostbite; in animals: narco, tremor, convuls; pulm edema; kidney inj	Eye: Frostbite Skin: Frostbite Breath: Resp support		Eyes, skin, resp sys, CNS, kidneys
ulfuryl fluoride]						
kin: **Prevent skin contact** yes: **N.R.** /ash skin: **When contam** emove: **When wet or contam** hange: **N.R.**	TBAL	Inh Ing	Nau, vomit, abdom cramps, diarr; salv; head, gidd, verti, weak; rhin, chest tight; blurred vision, miosis; card irreg; musc fasc; dysp	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, CNS, CVS, blood chol
ulprofos]						
kin: N.R. yes: N.R. /ash skin: N.R. emove: N.R. hange: N.R.	NIOSH/OSHA 50 mg/m^3: DM 100 mg/m^3: DMXSQ/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: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Skin, liver, GI tract
,4,5-T]						
kin: **N.R.** yes: **N.R.** /ash skin: **N.R.** emove: **N.R.** hange: **N.R.**	**NIOSH** **10 mg/m^3: DM** **20 mg/m^3: DMXSQ/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, irrit eyes	Eye: Irr immed Breath: Fresh air		Eyes, resp sys, CVS
alc (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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tantalum (metal and oxide dust, as Ta) Ta (Metal) 7440-25-7 (Metal) WW5505000 (Metal)	Tantalum metal: Tantalum-181 Synonyms of other tantalum dusts (including oxide dusts) vary depending upon the specific compound.	NIOSH 5 mg/m^3 ST 10 mg/m^3 OSHA 5 mg/m^3	2500 mg/m^3 (as Ta)	Metal: Steel-blue to gray solid or black, odorless powder.	MW: 180.9 BP: 9797°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 16.65 (Metal) 14.40 (Powder) Metal: Combustible Solid; powder ignites SPONTANEOUSLY in air.	VP: 0 mm (approx) MLT: 5425°F UEL: NA LEL: NA MEC: <200 g/m^3	Strong oxidizers, bromine trifluoride, fluorine	Filter; none; Grav; IV [#0500, Particulates NOR (total)]
TEDP $[(CH_3CH_2O)_2PS]_2O$ 3689-24-5 XN4375000 1704 153	Bladafum®, Dithion, Sulfotep, Tetraethyl dithiono-pyrophosphate, Tetraethyl dithiopyro-phosphate, Thiotepp® 1 ppm = 13.18 mg/m^3	NIOSH/OSHA 0.2 mg/m^3 [skin]	10 mg/m^3	Pale-yellow liquid with a garlic-like odor. [Note: A pesticide that may be absorbed on a solid carrier or mixed in a more flammable liquid.]	MW: 322.3 BP: Decomposes Sol: 0.0007% Fl.P: ? IP: ? Sp.Gr(77°F): 1.20 Combustible Liquid	VP: 0.0002 mm FRZ: ? UEL: ? LEL: ?	Strong oxidizers, iron [Note: Corrosive to iron.]	None available
Tellurium Te 13494-80-9 WY2625000	Aurum paradoxum, Metallum problematum	NIOSH*/OSHA* 0.1 mg/m^3 [*Note: The REL and PEL also apply to other tellurium compounds (as Te) except Tellurium hexafluoride, and Bismuth telluride.]	25 mg/m^3 (as Te)	Odorless, dark-gray to brown, amorphous powder or grayish-white, brittle solid.	MW: 127.6 BP: 1814°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 6.24 Combustible Solid	VP: 0 mm (approx) MLT: 842°F UEL: NA LEL: NA	Oxidizers, chlorine, cadmium	Filter; Acid; ICP; IV [#7300, Elements]
Tellurium hexafluoride TeF_6 7783-80-4 WY2800000 2195 125	Tellurium fluoride 1 ppm = 9.88 mg/m^3	NIOSH/OSHA 0.02 ppm (0.2 mg/m^3)	1 ppm	Colorless gas with a repulsive odor.	MW: 241.6 BP: Sublimes Sol: Decomposes Fl.P: NA IP: ? RGasD: 8.34 Nonflammable Gas	VP: >1 atm FRZ: -36°F (Sublimes) UEL: NA LEL: NA	Water [Note: Hydrolyzes slowly in water to telluric acid.]	Char; NaOH; FAAS; 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 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Tantalum (metal and oxide dust, as Ta)]	NIOSH/OSHA 25 mg/m³: DM^ 50 mg/m³: DMXSQ^/DMFu/SA 125 mg/m³: SA:CF/PAPRDM^ 250 mg/m³: HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 2500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes, skin; in animals: pulm irrit	Eye: Breath:	Irr immed Resp support	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench TEDP]	NIOSH/OSHA 2 mg/m³: SA 5 mg/m³: SA:CF 10 mg/m³: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMF0VHIE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; eye pain, blurred vision, lac; rhin; head; cyan; anor, nau, vomit, diarr; local sweat, weak, twitch, para, Cheyne-Stokes respiration, 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
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Tellurium]	NIOSH/OSHA 0.5 mg/m³: DM^ 1 mg/m³: DMXSQ^/DMFu/SA 2.5 mg/m³: SA:CF/PAPRDM^ 5 mg/m³: HIEF/SAT:CF/PAPRTHIE/ SCBAF/SAF 25 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Ing Con	Garlic breath, sweat; dry mouth, metallic taste; som; anor, nau, no sweat; derm; in animals: CNS, red blood cell effects	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Skin, CNS, blood
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Tellurium hexafluoride]	NIOSH/OSHA 0.2 ppm: SA 0.5 ppm: SA:CF 1 ppm: SAT:CF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS/SCBAE	Inh	Head; dysp; garlic breath; in animals: pulm edema	Breath:	Resp support	Resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Temephos $S[C_6H_4OP(S)(OCH_3)_2]_2$ 3383-96-8 TF6890000	Abate®; Temefos; O,O,O'O'-Tetramethyl O,O'-thiodi-p-phenylene phosphorothioate	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, crystalline solid or liquid (above 87°F). [insecticide] [Note: Technical grade is a viscous, brown liquid.]	MW: 466.5 BP: 248-257°F (Decomposes) Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.32 Combustible Solid	VP(77°F): 0.00000007 mm MLT: 87°F UEL: ? LEL: ?	None reported	Filter; none; Grav; IV [Particulates a NOR: #0500 (total) #0600 (resp)]
TEPP $[(CH_3CH_2O)_2PO]_2O$ 107-49-3 UX6825000 2783 152 3018 152 (liquid)	Ethyl pyrophosphate, Tetraethyl pyrophosphate, Tetron® 1 ppm = 11.87 mg/m^3	NIOSH/OSHA 0.05 mg/m^3 [skin]	5 mg/m^3	Colorless to amber liquid with a faint, fruity odor. [insecticide] [Note: A solid below 32°F.]	MW: 290.2 BP: Decomposes Sol: Miscible Fl.P: NA IP: ? Sp.Gr: 1.19 Noncombustible Liquid	VP: 0.00015 mm FRZ: 32°F UEL: NA LEL: NA	Strong oxidizers, alkalis, water [Note: Hydrolyzes quickly in water to form pyrophosphoric acid.]	Chrom-102 (2); Toluene; GC/FPD; IV [#2504, Tetraethyl Pyrophos-phate]
o-Terphenyl $C_6H_5C_6H_4C_6H_5$ 84-15-1 WZ6472000	o-Diphenylbenzene; 1,2-Diphenylbenzene; 2-Phenylbiphenyl; 1,2-Terphenyl; ortho-Terphenyl; o-Triphenyl 1 ppm = 9.42 mg/m^3	NIOSH C 5 mg/m^3 (0.5 ppm) OSHA† C 9 mg/m^3 (1 ppm)	500 mg/m^3	Colorless or light-yellow solid.	MW: 230.3 BP: 630°F Sol: Insoluble Fl.P(oc): 325°F IP: 7.99 eV Sp.Gr: 1.1 Combustible Solid	VP: Very low MLT: 136°F UEL: ? LEL: ?	None reported	Filter; CS.; GC/FID; IV [#5021]
m-Terphenyl $C_6H_5C_6H_4C_6H_5$ 92-06-8 WZ6470000	m-Diphenylbenzene; 1,3-Diphenylbenzene; Isodiphenylbenzene; 3-Phenylbiphenyl; 1,3-Terphenyl; meta-Terphenyl; m-Triphenyl 1 ppm = 9.42 mg/m^3	NIOSH C 5 mg/m^3 (0.5 ppm) OSHA† C 9 mg/m^3 (1 ppm)	500 mg/m^3	Yellow solid (needles).	MW: 230.3 BP: 689°F Sol: Insoluble Fl.P(oc): 375°F IP: 8.01 eV Sp.Gr: 1.23 Combustible Solid	VP: Very low MLT: 192°F UEL: ? LEL: ?	None reported	Filter; CS.; GC/FID; IV [#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 5)
Skin: Eyes: Wash skin: Remove: Change: [Temephos]	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; salv; abdom cramps, nau, diarr, vomit	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, resp sys, CNS, CVS, blood chol
Skin: Eyes: Wash skin: Remove: Change: Provide: [TEPP]	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/E/SCBAE	Inh Abs Ing Con	Eye pain, blurred vision, lac; rhin; head, chest tight, cyan; anor, nau, vomit, diarr; weak, twitch, para, Cheyne-Stokes respiration, convuls; low BP, card irreg; sweat	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, resp sys, CNS, CVS, GI tract, blood chol
Skin: Eyes: Wash skin: Remove: Change: Provide: [o-Terphenyl]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m^3: DM[E] 50 mg/m^3: DMXSQ/rSA[E] 125 mg/m^3: SA:CF/PAPRDM[E] 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 immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys
Skin: Eyes: Wash skin: Remove: Change: Provide: [m-Terphenyl]	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m^3: DM[E] 50 mg/m^3: DMXSQ/rSA[E] 125 mg/m^3: SA:CF/PAPRDM[E] 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 immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, liver, kidneys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL, FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
p-Terphenyl $C_6H_5C_6H_4C_6H_5$ 92-94-4 WZ6475000	p-Diphenylbenzene; 1,4-Diphenylbenzene; 4-Phenylbiphenyl; 1,4-Terphenyl; para-Terphenyl; p-Triphenyl 1 ppm = 9.42 mg/m³	NIOSH C 5 mg/m³ (0.5 ppm) OSHA† C 9 mg/m³ (1 ppm)	500 mg/m³	White or light-yellow solid.	MW: 230.3 BP: 761°F Sol: Insoluble FI.P: 405°F IP: 7.78 eV Sp.Gr: 1.23 Combustible Solid	VP: Very low MLT: 415°F UEL: ? LEL: ?	None reported	Filter; CS₂; GC/FID; IV [#5021]
2,3,7,8-Tetrachloro-dibenzo-p-dioxin $C_{12}H_4Cl_4O_2$ 1746-01-6 HP3500000	Dioxin; Dioxine; TCDBD; TCDD; 2,3,7,8-TCDD [Note: Formed during past production of 2,4,5-trichlorophenol, 2,4,5-T & 2(2,4,5-trichlorophenoxy)-propionic acid.]	NIOSH Ca See Appendix A OSHA none	Ca [N.D.]	Colorless to white, crystalline solid. [Note: Exposure may occur through contact at previously contaminated worksites.]	MW: 322.0 BP: Decomposes Sol: 0.00000002% FI.P: ? IP: ? Sp.Gr: ?	VP(77°F): 0.000002 mm MLT: 581°F UEL: ? LEL: ?	UV light (decomposes)	None available
1,1,1,2-Tetrachloro-2,2-difluoroethane CCl_3CClF_2 76-11-9 KI1425000	2,2-Difluoro-1,1,1,2-tetrachloroethane; Freon®112a; Halocarbon 112a; Refrigerant 112a 1 ppm = 8.34 mg/m³	NIOSH/OSHA 500 ppm (4170 mg/m³)	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% FI.P: NA IP: ? Sp.Gr: 1.65 Noncombustible Solid	VP: 40 mm MLT: 105°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium, calcium & sodium; acids	Char; CS₂; GC/FID; IV [#1016]
1,1,2,2-Tetrachloro-1,2-difluoroethane CCl_2FCCl_2F 76-12-0 KI1420000	1,2-Difluoro-1,1,2,2-tetrachloroethane; Freon®112; Halocarbon 112; Refrigerant 112 1 ppm = 8.34 mg/m³	NIOSH/OSHA 500 ppm (4170 mg/m³)	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% FI.P: NA IP: 11.30 eV Sp.Gr: 1.65 Noncombustible Solid	VP: 40 mm MLT: 77°F UEL: NA LEL: NA	Chemically-active metals such as potassium, beryllium, powdered aluminum, zinc, magnesium, calcium & sodium; acids	Char; CS₂; GC/FID; IV [#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 6)		Target organs (See Table 5)
Skin: Eyes: Wash skin: Remove: Change: Provide:	Prevent skin contact Prevent eye contact When contam When wet or contam Daily Eyewash, Quick drench	NIOSH 25 mg/m^3: DM[f] 50 mg/m^3: DMXSQ/SA[f] 125 mg/m^3: SA:CF[f]/PAPRDM[f] 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 immed Water flush immed Resp support Medical attention immed	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 ⅛: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE**	**Inh Abs Ing Con**	**Irrit eyes; allergic derm, chloracne; porphyria; GI dist; possible repro, terato effects; in animals: liver, kidney damage; hemorr; [carc]**	**Eye: Skin: Breath: Swallow:**	**Irr immed Soap flush immed Resp support Medical attention immed**	**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 depres; pulm edema; drow; dysp	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	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; narco	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	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: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1,1,1,2-Tetrachloro-ethane CCl_3CH_2Cl 630-20-6 KI8450000 1702 151	None	NIOSH Handle with caution in the workplace. See Appendix C (Chloroethanes) OSHA none	N.D.	Yellowish-red liquid.	MW: 167.9 BP: 267°F Sol: 0.1% Fl.P: ? IP: ? Sp.Gr: 1.54	VP(77°F): 14mm FRZ: -94°F UEL: ? LEL: ?	Potassium; sodium; dinitrogen tetraoxide; potassium hydroxide; nitrogen tetroxide; sodium potassium alloy; 2,4-dinitrophenyl disulfide	None available
1,1,2,2-Tetrachloro-ethane $CHCl_2CHCl_2$ 79-34-5 KI8575000 1702 151	Acetylene tetrachloride, Symmetrical tetrachloro-ethane 1 ppm = 6.87 mg/m³	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 1 ppm (7 mg/m³) [skin] OSHA† 5 ppm (35 mg/m³) [skin]	Ca [100 ppm]	Colorless to pale-yellow liquid with a pungent, chloroform-like odor.	MW: 167.9 BP: 296°F Sol: 0.3% Fl.P: NA IP: 11.10eV Sp.Gr(77°F): 1.59 Noncombustible Liquid	VP: 5mm 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_2; GC/FID; IV [#1019]
Tetrachloroethylene $Cl_2C{=}CCl_2$ 127-18-4 KX3850000 1897 160	Perchlorethylene, Perchloroethylene, Perk, Tetrachlorethylene 1 ppm = 6.78 mg/m³	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 [150 ppm]	Colorless liquid with a mild, chloroform-like odor.	MW: 165.8 BP: 250°F Sol: 0.02% Fl.P: NA IP: 9.32 eV Sp.Gr: 1.62 Noncombustible Liquid, but decomposes in a fire to hydrogen chloride and phosgene.	VP: 14mm FRZ: -2°F UEL: NA LEL: NA	Strong oxidizers; chemically-active metals such as lithium, beryllium & barium; caustic soda; sodium hydroxide; potash	Char; CS_2; GC/FID; IV [#1003, Haloge-nated Hydro-carbons]
Tetrachloronaphthalene $C_{10}H_4Cl_4$ 1335-88-2 QK3700000	Halowax®, Nibren wax, Seekay wax	NIOSH/OSHA 2 mg/m³ [skin]	Unknown	Colorless to pale-yellow solid with an aromatic odor.	MW: 265.9 BP: 599-680°F Sol: Insoluble Fl.P(oc): 410°F IP: ? Sp.Gr: 1.59-1.65 Combustible Solid	VP: <1mm MLT: 360°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; none; GC/FID; II(2) [#S130]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tetraethyl lead (as Pb) $Pb(C_2H_5)_4$ 78-00-2 TP4550000 1649 131	Lead tetraethyl, TEL, Tetraethylplumbane	NIOSH/OSHA 0.075 mg/m^3 [skin]	40 mg/m^3 (as Pb)	Colorless liquid (unless dyed red, orange, or blue) with a pleasant, sweet odor. [Note: Main usage is in anti-knock additives for gasoline.]	MW: 323.5 BP: 228°F (Decomposes) Sol: 0.00002% Fl.P: 200°F IP: 11.10 eV Sp.Gr: 1.65 Class IIIB Combustible Liquid	VP: 0.2 mm FRZ: -202°F UEL: ? LEL: 1.8%	Strong oxidizers, sulfuryl chloride, rust, potassium permanganate [Note: Decomposes slowly at room temperature and more rapidly at higher temperatures.]	XAD-2; Pentane; GC/PID; IV [#2533]
Tetrahydrofuran C_4H_8O 109-99-9 LU5950000 2056 127	Diethylene oxide; 1,4-Epoxybutane; Tetramethylene oxide; THF 1 ppm = 2.95 mg/m^3	NIOSH 200 ppm (590 mg/m^3) ST 250 ppm (735 mg/m^3) OSHA† 200 ppm (590 mg/m^3)	2000 ppm [10%LEL]	Colorless liquid with an ether-like odor.	MW: 72.1 BP: 151°F Sol: Miscible Fl.P: 6°F IP: 9.45 eV Sp.Gr: 0.89 Class IB Flammable Liquid	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_2; GC/FID; IV [#1609]
Tetramethyl lead (as Pb) $Pb(CH_3)_4$ 75-74-1 TP4725000 1649 131	Lead tetramethyl, Tetramethylplumbane, TML	NIOSH/OSHA 0.075 mg/m^3 [skin]	40 mg/m^3 (as Pb)	Colorless liquid (unless dyed red, orange, or blue) with a fruity odor. [Note: Main usage is in anti-knock additives for gasoline.]	MW: 267.3 BP: 212°F (Decomposes) Sol: 0.002% Fl.P: 100°F IP: 8.50 eV Sp.Gr: 2.00 Class II Combustible Liquid	VP: 23 mm FRZ: -15°F UEL: ? LEL: ?	Strong oxidizers such as sulfuryl chloride or potassium permanganate	XAD-2; Pentane; GC/PID; IV [#2534]
Tetramethyl succinonitrile $(CH_3)_2C(CN)C(CN)(CH_3)_2$ 3333-52-6 WN4025000	Tetramethyl succinodinitrile, TMSN 1 ppm = 5.57 mg/m^3	NIOSH/OSHA 3 mg/m^3 (0.5 ppm) [skin]	5 ppm	Colorless, odorless solid. [Note: Forms cyanide in the body.]	MW: 136.2 BP: Sublimes Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 1.07 Combustible Solid	VP: ? MLT: 338°F (Sublimes) UEL: ? LEL: ?	Strong oxidizers	Char; CS_2; GC/FID; III(3) [#S155]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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 (>0.1%) ☒Eyes: Prevent eye contact ☒Wash skin: When contam (>0.1%) ☒Remove: When wet or contam (>0.1%) ☒Change: Daily ☒Provide: Quick drench (>0.1%)	NIOSH/OSHA 0.75 mg/m³: SA 1.875 mg/m³: SA:CF 3.75 mg/m³: SAT:CF/SCBAF/SAF 40 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insom, lass, anxiety; tremor, hyper-reflexia, spasticity; bradycardia, hypotension, hypothermia, pallor, nau, anor, low-wgt; conf, disorientation, halu, psychosis, mania, convuls, coma; eye irrit	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	CNS, CVS, kidneys, eyes
[Tetraethyl lead (as Pb)]					
☒Skin: Prevent skin contact ☒Eyes: Prevent eye contact ☒Wash skin: When contam ☒Remove: When wet (flemm) ☒Change: N.R.	NIOSH/OSHA 2000 ppm: SA:CF[E]/CCRFOV/GMFOV/PAPROV[E]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys; nau, dizz, head, CNS depres	Eye: Irr immed Skin: Water flush prompt Breath: Resp support Swallow: Medical attention immed	Eyes, resp sys, CNS
[Tetrahydrofuran]					
☒Skin: Prevent skin contact (>0.1%) ☒Eyes: Prevent eye contact ☒Wash skin: When contam (>0.1%) ☒Remove: When wet or contam (>0.1%) ☒Change: Daily ☒Provide: Quick drench (>0.1%)	NIOSH/OSHA 0.75 mg/m³: SA 1.875 mg/m³: SA:CF 3.75 mg/m³: SAT:CF/SCBAF/SAF 40 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Insom, bad dreams, restless, anxious; hypotension; nau, anor; delirium, mania, convuls; coma	Eye: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed	CNS, CVS, kidneys
[Tetramethyl lead (as Pb)]					
☒Skin: Prevent skin contact ☒Eyes: Prevent eye contact ☒Wash skin: When contam ☒Remove: When wet or contam ☒Change: Daily	NIOSH/OSHA 28 mg/m³: SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Head, nau; convuls, coma; liver, kidney, GI effects	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	CNS, liver, kidneys, GI tract
[Tetramethyl succinonitrile]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tetranitromethane $C(NO_2)_4$ 509-14-8 PB4025000 1510 143	Tetan, TNM 1 ppm = 8.02 mg/m^3	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: ? Sp.Gr: 1.62 Combustible Liquid, but difficult to ignite.	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/Ethyl Acetate none; GC/FID IV [#3513]
Tetrasodium pyrophosphate $Na_4P_2O_7$ 7722-88-5 UX7350000	Pyrophosphate, Sodium pyrophosphate, Tetrasodium diphosphate, Tetrasodium pyrophosphate (anhydrous), TSPP	NIOSH 5 mg/m^3 OSHA† none	N.D.	Odorless, white powder or granules. [Note: The decahydrate ($Na_4P_2O_7 \cdot 10H_2O$) is in the form of colorless, transparent crystals.]	MW: 265.9 BP: Decomposes Sol(77°F): 7% Fl.P: NA IP: NA Sp.Gr: 2.45 Noncombustible Solid	VP: 0 mm (approx) MLT: 1810°F UEL: NA LEL: NA	Strong acids	Filter; none; Grav; IV [#0500, Particulates a NOR (total)]
Tetryl $(NO_2)_3C_6H_2N(NO_2)CH_3$ 479-45-8 BY6300000	N-Methyl-N,2,4,6-tetranitroaniline; Nitramine; 2,4,6-Tetryl; 2,4,6-Trinitrophenyl-N-methylnitramine	NIOSH/OSHA 1.5 mg/m^3 [skin]	750 mg/m^3	Colorless to yellow, odorless, crystalline solid.	MW: 287.2 BP: 356-374°F (Explodes) Sol: 0.02% Fl.P: Explodes IP: ? Sp.Gr: 1.57 Combustible Solid (Class A Explosive)	VP: <1 mm MLT: 268°F UEL: ? LEL: ?	Oxidizable materials, hydrazine	Filter; Reagent; Vis; II(3) [#S225]
Thallium (soluble compounds, as Tl) 1707 151 (compounds, n.o.s.)	Synonyms vary depending upon the specific soluble thallium compound.	NIOSH/OSHA 0.1 mg/m^3 [skin]	15 mg/m^3 (as Tl)	Appearance and odor vary depending upon the specific soluble thallium compound.	Properties vary depending upon the specific soluble thallium compound.		Varies	Filter; Acid; ICP; IV [#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 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: Daily Provide: Eyewash	NIOSH/OSHA 4 ppm: SA:CF[E]/CCRFS-[J]/GMFS-[J]/PAPRS-[JE]/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFS-[J]/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; dizz, head; chest pain, dysp; methemo, cyan; skin burns	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, blood, CNS
[Tetranitromethane]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily Provide: Eyewash (soln)	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat; derm	Eye: Irr immed Skin: Water wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys
[Tetrasodium pyrophosphate]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily	NIOSH/OSHA 7.5 mg/m³: DM 15 mg/m³: DMXSQ*/SA* 37.5 mg/m³: SA:CF*/PAPRDM* 75 mg/m³: HIEF/SCBAF/SAF 750 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Sens derm, itch, eryt; edema on nasal folds, cheeks, neck; kera; sneez; anemia; ftg; cough, coryza; irrity; mal, head, lass, insom; nau, vomit; liver, kidney damage	Eye: Skin: Breath: Irr immed Swallow: Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys
[Tetryl]					
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily	NIOSH/OSHA 0.5 mg/m³: DM^ 1 mg/m³: DMXSQ^/SA 2.5 mg/m³: SA:CF/PAPRDM^ 5 mg/m³: HIEF/SAT:CF/PAPRTHIE/SCBAF/SAF 15 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Nau, diarr, abdom pain, vomit; ptosis, strabismus; peri neuritis, tremor; retster tight, chest pain, pulm edema; sez, chorea, psychosis; liver, kidney damage; alopecia; pares legs	Eye: Skin: Breath: Irr immed Swallow: Water flush prompt Resp support Medical attention immed	Eyes, resp sys, CNS, liver, kidneys, GI tract, body hair
[Thallium (soluble compounds, as Tl)]					

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
4,4'-Thiobis(6-tert-butyl-m-cresol) $[CH_3(OH)C_6H_2C(CH_3)_3]_2S$ 96-69-5 GP3150000	4,4'-Thiobis(3-methyl-6-tert-butylphenol); 1,1'-Thiobis(2-methyl-4-hydroxy-5-tert-butylbenzene)	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA† 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	Light-gray to tan powder with a slightly aromatic odor.	MW: 358.6 BP: ? Sol: 0.06% Fl.P: 420°F IP: ? Sp.Gr: 1.10 Combustible Solid	VP: 0.0000006 mm MLT: 302°F UEL: NA LEL: NA	None reported	Filter; none; Grav; IV [Particulates NOR #0500 (total) #0600 (resp)]
Thioglycolic acid $HSCH_2COOH$ 68-11-1 AI5950000 1940 153	Acetyl mercaptan, Mercaptoacetate, Mercaptoacetic acid, 2-Mercaptoacetic acid, 2-Thioglycolic acid, Thiovanic acid 1 ppm = 3.77 mg/m³	NIOSH 1 ppm (4 mg/m³) [skin] OSHA† none	N.D.	Colorless liquid with a strong, disagreeable odor characteristic of mercaptans. [Note: Olfactory fatigue may occur after short exposures.]	MW: 92.1 BP: ? Sol: Miscible Fl.P: >230°F IP: ? Sp.Gr: 1.32 Class IIIB Combustible Liquid	VP(64°F): 10mm FRZ: 2°F UEL: ? LEL: 5.9%	Air, strong oxidizers, bases, active metals (e.g., sodium potassium, magnesium, calcium) [Note: Readily oxidized by air.]	None available
Thionyl chloride $SOCl_2$ 7719-09-7 XM5150000 1836 137	Sulfinyl chloride, Sulfur chloride oxide, Sulfurous dichloride, Sulfurous oxychloride, Thionyl dichloride 1 ppm = 4.87 mg/m³	NIOSH C 1 ppm (5 mg/m³) OSHA† none	N.D.	Colorless to yellow to reddish liquid with a pungent odor like sulfur dioxide. [Note: Fumes form when exposed to moist air.]	MW: 119.0 BP: 169°F Sol: Reacts Fl.P: NA IP: ? Sp.Gr: 1.64 Noncombustible Liquid	VP(70°F): 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 $C_6H_{12}N_2S_4$ 137-26-8 JO1400000 2771 151	bis(Dimethylthiocarbamoyl) disulfide, Tetramethylthiuram disulfide $[(CH_3)_2NC(S)SSC(S)N(CH_3)_2]$	NIOSH/OSHA 5 mg/m³	100 mg/m³	Colorless to yellow, crystalline solid with a characteristic odor. [Note: Commercial pesticide products may be dyed blue.]	MW: 240.4 BP: Decomposes Sol: 0.003% Fl.P: ? IP: ? Sp.Gr: 1.29 Combustible Solid	VP: 0.000008 mm MLT: 312°F UEL: ? LEL: ?	Strong oxidizers, strong acids, oxidizable materials	Filter; CH_3CN; HPLC/UVD; IV [#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: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [4,4'-Thiobis(6-tert-butyl-m-cresol)]	TBAL	Inh Ing Con	Irrit eyes, skin, resp sys	Eye: Breath: Swallow:	Irr immed Fresh air Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Thioglycolic acid]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; lac, corn damage; skin burns, blisters; in animals: weak; gasping respirations; convuls	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Thionyl chloride]	TBAL	Inh Ing Con Con	Irrit eyes, skin, muc memb; eye, skin burns	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: Daily [Thiram]	NIOSH/OSHA 50 mg/m^3: CCROVDMFu*/SA* 100 mg/m^3: SA:CF*/CCRFOVHiE/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 immed Soap wash prompt Resp support Medical attention immed	Eyes, skin, resp sys, CNS

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tin Sn 7440-31-5 XP7320000	Metallic tin, Tin flake, Tin metal, Tin powder	NIOSH*/OSHA* 2 mg/m^3 [*Note: The REL and PEL also apply to other inorganic tin compounds (as Sn) except tin oxides.]	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 Sp.Gr: 7.28 Noncombustible Solid, but powdered form may ignite.	VP: 0 mm (approx) MLT: 449°F UEL: NA LEL: NA	Chlorine, turpentine, acids, alkalis	Filter; Acid; ICP; IV [#7300, Elements]
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; Acetic acid/ CH_3CN; HPLC/GFAAS; ; IV [#5504]
Tin(II) oxide (as Sn) SnO 21651-19-4	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 Sp.Gr: 6.3	VP: 0 mm (approx) MLT(600 mmHg): 1976°F (Decomposes) UEL: NA LEL: NA	None reported	Filter; Acids; ICP; IV [#7300, Elements]
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 Sp.Gr: 6.95	VP: 0 mm (approx) MLT: 2966°F (Decomposes) UEL: ? LEL: ?	Chlorine trifluoride	Filter; Acids; ICP; IV [#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 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Tin]	NIOSH/OSHA 10 mg/m³: DM* 20 mg/m³: DMXSQ**/SA* 50 mg/m³: SA:CF*/PAPRDM** 100 mg/m³: HiEF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ccn	Irrit eyes, skin, resp sys; in animals: vomit, diarr, para with musc twitch	Eye: Skin: Breath: Swallow:	Irr immed Soap wash immed Resp support Medical attention immed	Eyes, skin, resp sys
Recommendations vary depending upon the specific compound. [Tin (organic compounds, as Sn)]	NIOSH/OSHA 1 mg/m³: CCROVDM/SA 2.5 mg/m³: SA:CF/PAPROVDM 5 mg/m³: CCRFOVHiE/GMFOVHiE/PAPRTOVHiE/SAT:CF/SCBAF/SAF 25 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; resp sys; head, verti; psycho-neurologic dist; sore throat, cough; abdom pain, vomit; urine retention; paresis, focal anes; skin burns, pruritus; in animals: hemolysis; hepatic nec; kidney damage	Eye: Skin: Breath: Swallow:	Irr immed Water flush immed Resp support Medical attention immed	Eyes, skin, resp sys, CNS, liver, kidneys, urinary tract, blood
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Tin(II) oxide (as Sn)]	TBAL	Inh Con	Stannosis (benign pneumoconiosis): dysp, decr pulm func	Eye: Breath:	Irr immed Fresh air	Resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Tin(IV) oxide (as Sn)]	TBAL	Inh Con	Stannosis (benign pneumoconiosis): dysp, decr pulm func	Eye: Breath:	Irr immed Fresh air	Resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Titanium dioxide TiO_2 13463-67-7 XR2275000	Rutile, Titanium oxide, Titanium peroxide	NIOSH Ca See Appendix A OSHA† 15 mg/m³	Ca [5000 mg/m³]	White, odorless powder.	MW: 79.9 BP: 4532-5432°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 4.26 Noncombustible Solid	VP: 0 mm (approx) MLT: 3326-3362°F UEL: NA LEL: NA	None reported	Filter; Acid; FAAS; II(3) [#S385]
o-Tolidine $C_{14}H_{16}N_2$ 119-93-7 DD1225000	4,4'-Diamino-3,3'-dimethyl-biphenyl; Diaminoditolyl; 3,3'-Dimethylbenzidine; 3,3'-Dimethyl-4,4'-diphenyl-diamine; 3,3'-Tolidine	NIOSH Ca See Appendix A See Appendix C C 0.02 mg/m³ [60-min] [skin] OSHA See Appendix C	Ca [N.D.]	White to reddish crystals or powder. [Note: Darkens on exposure to air. Often used in paste or wet cake form. Used as a basis for many dyes.]	MW: 212.3 BP: 572°F Sol: 0.1% Fl.P: ? IP: ? Sp.Gr: ? Combustible Solid	VP: ? MLT: 264°F UEL: ? LEL: ?	Strong oxidizers	Filter; Water; HPLC/UVD; IV [#5013, Dyes]
Toluene $C_6H_5CH_3$ 108-88-3 XS5250000 1294 130	Methyl benzene, Methyl benzol, Phenylmethane, Toluol 1 ppm = 3.77 mg/m³	NIOSH 100 ppm (375 mg/m³) ST 150 ppm (560 mg/m³) OSHA† 200 ppm C 300 ppm 500 ppm (10-min max peak)	500 ppm	Colorless liquid with a sweet, pungent, benzene-like odor.	MW: 92.1 BP: 232°F Sol(74°F): 0.07% Fl.P: 40°F IP: 8.82 eV Sp.Gr: 0.87 Class IB Flammable Liquid	VP: 21 mm FRZ: -139°F UEL: 7.1% LEL: 1.1%	Strong oxidizers	Char; CS_2; GC/FID; IV [#1500, Hydro-carbons] [Also #4000, #1501]
Toluenediamine $CH_3C_6H_3(NH_2)_2$ 25376-45-8 95-80-7 (2,4-TDA) XS9445000 XS9625000 (2,4-TDA) 1709 181	Diaminotoluene, Methylphenylene diamine, TDA, Tolylenediamine	NIOSH Ca (all isomers) See Appendix A OSHA none	Ca [N.D.]	Colorless to brown, needle-shaped crystals or powder. [Note: Tends to darken on storage & exposure to air. Properties given are for 2,4-TDA.]	MW: 122.2 BP: 558°F Sol: Soluble Fl.P: 300°F IP: ? Sp.Gr: 1.05 (Liquid at 212°F) Combustible Solid	VP(224°F): 1mm MLT: 210°F UEL: ? LEL: ?	None reported	Imp; Reagent; HPLC/UVD; IV [#5516]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Toluene-2,4-diisocyanate $CH_3C_6H_3(NCO)_2$ 584-84-9 CZ6300000 2078 156	TDI; 2,4-TDI; 2,4-Toluene diisocyanate 1 ppm = 7.13 mg/m³	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: ? Sp.Gr: 1.22 Class IIIB Combustible Liquid	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; IV [#2535]
o-Toluidine $CH_3C_6H_4NH_2$ 95-53-4 XU2975000 1708 153	o-Aminotoluene, 2-Aminotoluene, 1-Methyl-2-aminobenzene, o-Methylaniline, 2-Methylaniline, ortho-Toluidine 1 ppm = 4.38 mg/m³	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 Sp.Gr: 1.01 Class IIIA Combustible Liquid	VP: 0.3 mm FRZ: 6°F UEL: ? LEL: ?	Strong oxidizers, nitric acid, bases	Si gel; Ethanol; GC/FID; IV [#2002, Aromatic Amines]
m-Toluidine $CH_3C_6H_4NH_2$ 108-44-1 XU2800000 1708 153	3-Amino-1-methylbenzene, 1-Aminophenylmethane, m-Aminotoluene, 3-Methylaniline, 3-Methylbenzenamine, 3-Toluidine, m-Tolylamine	NIOSH See Appendix D OSHA† none	N.D.	Colorless to light-yellow liquid with an aromatic, amine-like odor. [Note: Used as a basis for many dyes.]	MW: 107.2 BP: 397°F Sol: 2% FLP: 187°F IP: 7.50 eV Sp.Gr: 0.999 Class IIIA Combustible Liquid	VP(106°F): 1mm FRZ: -23°F UEL: ? LEL: ?	Oxidizers, acids	Si gel; Ethanol; GC/FID; IV [#2002, Aromatic Amines]
p-Toluidine $CH_3C_6H_4NH_2$ 106-49-0 XU3150000 1708 153	4-Aminotoluene, 4-Methylaniline, 4-Methylbenzenamine, 4-Toluidine, Tolylamine	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	White solid with an aromatic odor. [Note: Used as a basis for many dyes.]	MW: 107.2 BP: 393°F Sol: 0.7% FLP: 188°F IP: 7.50 eV Sp.Gr: 1.05 Combustible Solid	VP(108°F): 1mm MLT: 111°F UEL: ? LEL: ?	Oxidizers, acids	Si gel; Ethanol; GC/FID; IV [#2002, Aromatic Amines]

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tributyl phosphate $(CH_3[CH_2]_3O)_3PO$ 126-73-8 TC7700000	Butyl phosphate, TBP, Tributyl ester of phosphoric acid, Tri-n-butyl phosphate 1 ppm = 10.89 mg/m³	NIOSH 0.2 ppm (2.5 mg/m³) OSHA† 5 mg/m³	30 ppm	Colorless to pale-yellow, odorless liquid.	MW: 266.3 BP: 552°F (Decomposes) Sol: 0.6% Fl.P(oc): 295°F IP: ? Sp.Gr: 0.98 Class IIIB Combustible Liquid	VP(77°F): 0.004 mm FRZ: -112°F UEL: ? LEL: ?	Alkalis, oxidizers, water, moist air	Filter; Diethyl ether; GC/FPD; IV [#5034]
Trichloroacetic acid CCl_3COOH 76-03-9 AJ7875000 1839 153 (solid) 2564 153 (solution)	TCA, Trichloroethanoic acid 1 ppm = 6.68 mg/m³	NIOSH 1 ppm (7 mg/m³) OSHA† none	N.D.	Colorless to white, crystalline solid with a sharp, pungent odor.	MW: 163.4 BP: 388°F Sol: Miscible Fl.P: NA IP: ? Sp.Gr: 1.62 Noncombustible Solid	VP(124°F): 1mm MLT: 136°F UEL: NA LEL: NA	Moisture, iron, zinc, aluminum, strong oxidizers [Note: Decomposes on heating to form phosgene & hydrogen chloride. Corrosive to metals.]	None available
1,2,4-Trichlorobenzene $C_6H_3Cl_3$ 120-82-1 DC2100000none 2321 153 (liquid)	unsym-Trichlorobenzene; 1,2,4-Trichlorobenzol 1 ppm = 7.42 mg/m³	NIOSH C 5 ppm (40 mg/m³) OSHA†	N.D.	Colorless liquid or crystalline solid (below 63°F) with an aromatic odor. 2.5%	MW: 181.4 BP: 416°F Sol: 0.003% Fl.P: 222°F IP: ? Sp.Gr: 1.45 Class IIIB 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/ECD; IV [#5517, Poly-chloro-benzenes]
1,1,2-Trichloroethane $CHCl_2CH_2Cl$ 79-00-5 KJ3150000 1 ppm = 5.46 mg/m³	Ethane trichloride, ß-Trichloroethane, Vinyl trichloride	NIOSH Ca See Appendix A See Appendix C (Chloroethanes) 10 ppm (45 mg/m³) [skin] OSHA 10 ppm (45 mg/m³) [skin]	Ca [100 ppm]	Colorless liquid with a sweet, chloroform-like odor.	MW: 133.4 BP: 237°F Sol: 0.4% Fl.P: ? IP: 11.00 eV Sp.Gr: 1.44 Combustible Liquid, forms dense soot.	VP: 19 mm FRZ: -34°F UEL: 15.5% LEL: 6%	Strong oxidizers & caustics; chemically-active metals (such as aluminum, magnesium powders, sodium & potassium)	Char; CS_2; GC/FID; IV [#1003, Haloge-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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Tributyl phosphate]	NIOSH 2 ppm: SA 5 ppm: SA:CF 10 ppm: SCBAF/SAF 30 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHIE/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; head; nau	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **Daily** Provide: **Eyewash, Quick drench** [Trichloroacetic **acid]**	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat, resp sys; cough, dysp, delayed pulm edema; eye, skin burns; derm; salv, vomit, diarr	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, GI tract
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [1,2,4-Trichlorobenzene]	TBAL	Inh Abs Ing Con	Irrit eyes, skin, muc memb; in animals: liver, kidney damage; possible terato effects	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, repro sys
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet or contam** Change: **N.R.** Provide: **Eyewash, Quick drench** [1,1,2-Trichloroethane]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	**Inh** **Abs** **Ing** **Con**	**Irrit eyes, nose; CNS depres, liver, kidney damage; derm; [carc]**	**Eye: Irr immed** **Skin: Soap wash prompt** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, resp sys, CNS, liver, kidneys [in animals: liver cancer]**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Trichloroethylene $ClCH{=}CCl_2$ 79-01-6 KX4550000 1710 160	Ethylene trichloride, TCE, Trichloroethene, Trilene 1 ppm = 5.37 mg/m³	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: 0.1% Fl.P: ? IP: 9.45 eV Sp.Gr: 1.46 Combustible Liquid, but burns with difficulty.	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; IV [#1022]
Trichloronaphthalene $C_{10}H_5Cl_3$ 1321-65-9 QK4025000	Halowax®, Nibren wax, Seekay wax	NIOSH/OSHA 5 mg/m³ [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: ? Sp.Gr: 1.58 Combustible Solid	VP: <1 mm MLT: 199°F UEL: ? LEL: ?	Strong oxidizers	Filter/Bub; none; GC/FID; III(2) [#S128]
1,2,3-Trichloropropane $CH_2ClCHClCH_2Cl$ 96-18-4 TZ9275000	Allyl trichloride, Glycerol trichlorohydrin, Glyceryl trichlorohydrin, Trichlorohydrin 1 ppm = 6.03 mg/m³	NIOSH Ca See Appendix A 10 ppm (60 mg/m³) [skin] OSHA† 50 ppm (300 mg/m³)	Ca [100 ppm]	Colorless liquid with a chloroform-like odor.	MW: 147.4 BP: 314°F Sol: 0.1% Fl.P: 160°F IP: ? Sp.Gr: 1.33 Class IIIA Combustible Liquid	VP: 3 mm FRZ: 6°F UEL(302°F): 12.6% LEL(248°F): 3.2%	Chemically-active metals, strong caustics & oxidizers	Char; CS.; GC/FID; IV [#1003, Haloge-nated Hydro-carbons]
1,1,2-Trichloro-1,2,2-trifluoroethane CCl_2FCClF_2 76-13-1 KJ4000000	Chlorofluorocarbon-113, CFC-113, Freon® 113, Genetron® 113, Halocarbon 113, Refrigerant 113, TTE 1 ppm = 7.67 mg/m³	NIOSH 1000 ppm (7600 mg/m³) ST 1250 ppm (9500 mg/m³) OSHA† 1000 ppm (7600 mg/m³)	2000 ppm	Colorless to water-white liquid with an odor like carbon tetrachloride at high concentra-tions. [Note: A gas above 118°F.]	MW: 187.4 BP: 118°F Sol(77°F): 0.02% Fl.P: ? IP: 11.99 eV Sp.Gr(77°F): 1.56 Noncombustible Liquid at ordinary temperatures, but the gas will ignite and burn weakly at 1256°F.	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; IV [#1020]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin; head, verti; vis dist, ftg, gidd, tremor; som, nau, vomit; derm; card arrhy, pares; liver inj; [carc]	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, heart, liver, CNS [in animals: liver & kidney cancer]
[Trichloroethylene]						
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** **Remove: When wet or contam** **Change: Daily**	NIOSH/OSHA 50 mg/m³: SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Anor, nau; verti; jaun, liver inj	Eye: **Irr immed** Skin: **Soap wash** Breath: **Resp support** Swallow: **Medical attention immed**		Liver
[Trichloronaphthalene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, nose, throat; CNS depres; in animals: liver, kidney inj; [carc]	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, liver, kidneys [in animals: forestomach, liver & mammary gland cancer]
[1,2,3-Trichloropropane]						
Skin: Prevent skin contact **Eyes: Prevent eye contact** **Wash skin: When contam** **Remove: When wet or contam** **Change: 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, narco	Eye: **Irr immed** Skin: **Soap wash prompt** Breath: **Resp support** Swallow: **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: MW, BP, SOL, Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ, UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Triethylamine $(C_2H_5)_3N$ 121-44-8 YEO175000 1296 132	TEA 1 ppm = 4.14 mg/m³	NIOSH See Appendix D OSHA† 25 ppm (100 mg/m³)	200 ppm	Colorless liquid with a strong, ammonia-like odor.	MW: 101.2 BP: 193°F Sol: 2% Fl.P: 20°F IP: 7.50 eV Sp.Gr: 0.73 Class IB Flammable Liquid	VP: 54 mm FRZ: -175°F UEL: 8.0% LEL: 1.2%	Strong oxidizers, strong acids, chlorine, hypochlorite, halogenated compounds	Bub; NaOH; GC/FID; II(3) [#S152]
Trifluorobromomethane $CBrF_3$ 75-63-8 PA5425000 1009 126	Bromotrifluoromethane, Fluorocarbon 1301, Freon® 13B1, Halocarbon 13B1, Halon® 1301, Monobromotrifluoromethane, Refrigerant 13B1, Trifluoromonobromomethane 1 ppm = 6.09 mg/m³	NIOSH/OSHA 1000 ppm (6100 mg/m³)	40,000 ppm	Colorless, odorless gas. [Note: Shipped as a liquefied compressed gas.]	MW: 148.9 BP: -72°F Sol: 0.03% Fl.P: NA IP: 11.78 eV RGasD: 5.14 Nonflammable Gas	VP: >1 atm FRZ: -267°F UEL: NA LEL: NA	Chemically-active metals (such as calcium, powdered aluminum, zinc & magnesium)	Char(2); CH_2Cl_2; GC/FID; IV [#1017]
Trimellitic anhydride $C_9H_4O_5$ 552-30-7 DC2050000	1,2,4-Benzenetricarboxylic anhydride; 4-Carboxyphthalic anhydride; TMA; TMAN; Trimellic acid anhydride [Note: TMA is also a synonym for Trimethylamine.] 1 ppm = 7.86 mg/m³	NIOSH 0.005 ppm (0.04 mg/m³) Should be handled in the workplace as an extremely toxic substance. OSHA† none	N.D.	Colorless solid.	MW: 192.1 BP: ? Sol: ? Fl.P: NA IP: ? Sp.Gr: ? Combustible Solid	VP: 0.000004 mm MLT: 322°F UEL: NA LEL: NA	None reported	Filter; Methanol; GC/FID; IV [#5036]
Trimethylamine $(CH_3)_3N$ 75-50-3 PA0350000 1083 118 (anhydrous) 1297 132 (aqueous soln.)	N,N-Dimethylmethanamine; TMA [Note: May be used in an aqueous solution (typically 25%, 30%, or 40% TMA.] 1 ppm = 2.42 mg/m³	NIOSH 10 ppm (24 mg/m³) ST 15 ppm (36 mg/m³) OSHA† none	N.D.	Colorless gas with a fishy, amine odor. [Note: A liquid below 37°F. Shipped as a liquefied compressed gas.]	MW: 59.1 BP: 37°F Sol(86°F): 48% Fl.P: NA (Gas 20°F (Liq) IP: 7.82 eV RGasD: 2.09 Flammable Gas Class IA Flammable Liquid	VP(70°F): 1454 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

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1,2,3-Trimethylbenzene $C_6H_3(CH_3)_3$ 526-73-8 DC3300000	Hemellitol [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.] 1 ppm = 4.92 mg/m^3	NIOSH 25 ppm (125 mg/m^3) OSHA† none	N.D.	Clear, colorless liquid with a distinctive, aromatic odor.	MW: 120.2 BP: 349°F Sol: Low FI.P: ? IP: 8.48 eV Sp.Gr: 0.89 Flammable Liquid	VP(62°F): 1 mm FRZ: -14°F UEL: 6.6% LEL: 0.8%	Oxidizers, nitric acid	None available
1,2,4-Trimethylbenzene $C_6H_3(CH_3)_3$ 95-63-6 DC3325000	Assymetrical trimethylbenzene, psi-Cumene, Pseudocumene [Note: Hemimellitene is a mixture of the 1,2,3-isomer with up to 10% of related aromatics such as the 1,2,4-isomer.] 1 ppm = 4.92 mg/m^3	NIOSH 25 ppm (125 mg/m^3) OSHA† none	N.D.	Clear, colorless liquid with a distinctive, aromatic odor.	MW: 120.2 BP: 337°F Sol: 0.006% FI.P: 112°F IP: 8.27 eV Sp.Gr: 0.88 Class II Flammable Liquid	VP(56°F): 1 mm FRZ: -77°F UEL: 6.4% LEL: 0.9%	Oxidizers, nitric acid	None available
1,3,5-Trimethylbenzene $C_6H_3(CH_3)_3$ 108-67-8 OX6825000 2325 129	Mesitylene, Symmetrical trimethylbenzene, sym-Trimethylbenzene 1 ppm = 4.92 mg/m^3	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% FI.P: 122°F IP: 8.39 eV Sp.Gr: 0.86 Class II Flammable Liquid	VP: 2 mm FRZ: -49°F UEL: ? LEL: ?	Oxidizers, nitric acid	None available
Trimethyl phosphite $(CH_3O)_3P$ 121-45-9 TH1400000 2329 129	Methyl phosphite, Trimethoxyphosphine 1 ppm = 5.08 mg/m^3	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 FI.P: 82°F IP: ? Sp.Gr: 1.05 Class IC Flammable Liquid	VP(77°F): 24 mm FRZ: -108°F UEL: ? LEL: ?	Magnesium perchlorate, water [Note: Reacts (hydrolyzes) with water.]	None available

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

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
2,4,6-Trinitrotoluene $CH_3C_6H_2(NO_2)_3$ 118-96-7 XU0175000 1356 113 (wet)	1-Methyl-2,4,6-trinitrobenzene; TNT; Trinitrotoluene; sym-Trinitrotoluene; Trinitrotoluol	NIOSH 0.5 mg/m³ [skin] OSHA† 1.5 mg/m³ [skin]	500 mg/m³	Colorless to pale-yellow, odorless solid or crushed flakes.	MW: 227.1 BP: 464°F (Explodes) Sol(77°F): 0.01% Fl.P: ? (Explodes) IP: 10.59 eV Sp.Gr: 1.65 Combustible Solid (Class A Explosive)	VP: 0.0002 mm MLT: 176°F UEL: ? LEL: ?	Strong oxidizers, ammonia, strong alkalis, combustible materials, heat [Note: Rapid heating will result in detonation.]	Tenax GC; Acetone; GC/TEA-EAP; OSHA [#44]
Triorthocresyl phosphate $(CH_3C_6H_4O)_3PO$ 78-30-8 TD0350000 2574 151	TCP, TOCP, Tri-o-cresyl ester of phosphoric acid, Tri-o-cresyl phosphate	NIOSH 0.1 mg/m³ [skin] OSHA† 0.1 mg/m³	40 mg/m³	Colorless to pale-yellow, odorless liquid or solid (below 52°F).	MW: 368.4 BP: 770°F (Decomposes) Sol: Slight Fl.P: 437°F IP: ? Sp.Gr: 1.20 Class IIIB Combustible Liquid	VP(77°F): 0.00002 mm FRZ: 52°F UEL: ? LEL: ?	Oxidizers	Filter; Diethyl ether; GC/FPD; IV [#5037]
Triphenylamine $(C_6H_5)_3N$ 603-34-9 YK2680000	N,N-Diphenylaniline; N,N-Diphenylbenzenamine	NIOSH 5 mg/m³ OSHA† none	N.D.	Colorless solid.	MW: 245.3 BP: 689°F Sol: Insoluble Fl.P: ? IP: 7.60 eV Sp.Gr: 0.77	VP: ? MLT: 261°F UEL: ? LEL: ?	None reported	None available
Triphenyl phosphate $(C_6H_5O)_3PO$ 115-86-6 TC8400000	Phenyl phosphate, TPP, Triphenyl ester of phosphoric acid	NIOSH/OSHA 3 mg/m³	1000 mg/m³	Colorless, crystalline powder with a phenol-like odor.	MW: 326.3 BP: 776°F Sol(129°F): 0.002% Fl.P: 428°F IP: ? Sp.Gr: 1.29 Combustible Solid	VP(380°F): 1mm MLT: 120°F UEL: ? LEL: ?	None reported	Filter; Diethyl ether; GC/FPD; IV [#5038]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily	NIOSH 5 mg/m³: SA* 12.5 mg/m³: SA:CF* 25 mg/m³: SCBAF/SAF 500 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOVHiE/SCBAE	Inh Abs Ing Con	Irrit skin, muc memb; liver damage, jaun; cyan; sneez; 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: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA 2.5 mg/m³: SA:CF/PAPRDM 5 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 40 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Abs Ing Con	GI dist; peri 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
Triorthocresyl phosphate]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: Daily Remove: N.R. Change: 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: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R.	NIOSH/OSHA 15 mg/m³: D 30 mg/m³: HiE/DXSQ/SA 75 mg/m³: SA:CF/PAPRDM 150 mg/m³: HiEF/SAT:CF/PAPRTHiE/SCBAF/SAF 1000 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing	Minor changes in blood enzymes; in animals: musc weak, para	Breath: Swallow:	Resp support Medical attention immed	Blood, PNS
Triphenyl phosphate]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Tungsten W 7440-33-7 YO7175000	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: 183.9 BP: 10,701°F Sol: Insoluble FLP: NA IP: NA Sp.Gr: 19.3 Combustible in the form of finely divided powder, may ignite spontaneously.	VP: 0 mm (approx) MLT: 6170°F UEL: NA LEL: NA	Bromine trifluoride, chlorine trifluoride, fluorine, iodine pentafluoride	Filter; Acid; FAAS; IV [#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; FAAS; IV [#7074]
Tungsten carbide (cemented) WC/Co/Ni/Ti 1: 11107-01-0 2: 12718-69-3 3: 37329-49-0 1: Y07350000 2: Y07525000 3: Y07700000	Cemented tungsten carbide, Cemented WC, Hard metal [Note: The tungsten carbide (WC) content is generally 85-95% & the cobalt content is generally 5-15%.] [1: 85% WC, 15% Co 2: 92% WC, 8% Co 3: 78% WC, 14% Co, 8% Ti]	NIOSH See Appendix C OSHA† See Appendix C	N.D.	A mixture of tungsten carbide, cobalt, and sometimes other metals & metal oxides or carbides.	Properties vary depending upon the specific mixture.		Tungsten carbide: Fluorine, chlorine trifluoride, oxides of nitrogen, lead dioxide	None available
Turpentine $C_{10}H_{16}$ (approx) 8006-64-2 YO8400000 1299 128	Gumspirits, Gum turpentine, Spirits of turpentine, Steam distilled turpentine, Sulfate wood turpentine, Turps, Wood turpentine 1 ppm 5.56 mg/m³ (approx)	NIOSH/OSHA 100 ppm (560 mg/m³)	800 ppm	Colorless liquid with a characteristic odor.	MW: 136(approx) BP: 309-338°F Sol: Insoluble FLP: 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_2; GC/FID; IV [#1551]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards			
		Route	Symptoms (See Table 5)	First aid (See Table 6)	Target organs (See Table 5)
kin: N.R. yes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Tungsten]	NIOSH 50 mg/m³: HiE/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; diffuse pulm fib; loss of appetite, nau, cough; blood changes	Eye: Irr immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed	Eyes, skin, resp sys, blood
Recommendations vary depending upon the specific compound.	NIOSH 10 mg/m³: HiE/SA 25 mg/m³: SA:CF 50 mg/m³: HiEF/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; in animals: CNS disturbances; diarr; resp failure; behavior, body weight, blood changes	Eye: Irr immed Skin: Water wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, GI tract
Tungsten (soluble compounds, as W)]					
kin: Prevent skin contact yes: Prevent eye contact Wash skin: When contam/Daily (Ni) Remove: When wet or contam Change: Daily Tungsten carbide (cemented)]	NIOSH 0.25 mg Co/m³: DM^ 0.5 mg Co/m³: DMXSQ**/DMFu*/SA* 1.25 mg Co/m³: SA:CF*/PAPRDM**/ PAPRDMFu* 2.5 mg Co/m³: HiEF/SCBAF/SAF 20 mg Co/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, resp sys; possible skin sens to cobalt, nickel; diffuse pulm fib; loss of appetite, nau, cough; blood changes Tungsten carbide (cemented) containing NICKEL NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Eye: Irr immed Skin: Soap wash Breath: Fresh air Swallow: Medical attention immed	Eyes, skin, resp sys, blood
kin: Prevent skin contact yes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Turpentine]	NIOSH/OSHA 800 ppm: SA:CF[f]/PAPROV[f]/CCRFOV/ GMFOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, nose, throat; head, verti, convuls; skin sens; hema, album; kidney damage; abdom pain, nau, vomit, diarr; chemical pneu (aspir liq)	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS, kidneys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
1-Undecanethiol $CH_3(CH_2)_{10}SH$ 5332-52-5 1228 131	Undecyl mercaptan 1 ppm = 7.71 mg/m^3	NIOSH C 0.5 ppm (3.9 mg/m^3) [15-min] OSHA none	N.D.	Liquid.	MW: 188.4 BP: 495°F Sol: Insoluble Fl.P: ? IP: ? Sp.Gr: 0.84 Combustible Liquid	VP: ? FRZ: 27°F UEL: ? LEL: ?	Oxidizers, reducing agents, strong acids & bases, alkali metals	None available
Uranium (insoluble compounds, as U) U (Metal) 7440-61-1 (Metal) YR3490000 (Metal) 2979 162 (Metal, pyrophoric)	Uranium metal: Uranium I Synonyms of other insoluble uranium compounds vary depending upon the specific compound.	NIOSH Ca See Appendix A 0.2 mg/m^3 ST 0.6 mg/m^3 OSHA† 0.25 mg/m^3	Ca [10 mg/m^3 (as U)]	Metal: Silver-white, malleable, ductile lustrous solid. [Note: Weakly radioactive.]	MW: 238.0 BP: 6895°F Sol: Insoluble Fl.P: NA IP: NA Sp.Gr: 19.05 (Metal) Metal: Combustible Solid, especially turnings and powder.	VP: 0 mm (approx) MLT: 2097°F UEL: NA LEL: NA MEC: 60 g/m^3	Carbon dioxide, carbon tetrachloride, nitric acid, fluorine [Note: Complete coverage of uranium metal scrap with oil is essential for prevention of fire.]	None available
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. Uranium hexafluoride:		Uranyl nitrate: combustibles water	None available
n-Valeraldehyde $CH_3(CH_2)_3CHO$ 110-62-3 YV3600000 2058 129	Amyl aldehyde, Pentanal, Valeral, Valeraldehyde, Valeric aldehyde 1 ppm = 3.53 mg/m^3	NIOSH 50 ppm (175 mg/m^3) See Appendix C (Aldehydes) OSHA† none	N.D.	Colorless liquid with a strong, acrid, pungent odor.	MW: 86.2 BP: 217°F Sol: Slight Fl.P: 54°F IP: 9.82 eV Sp.Gr: 0.81 Class IB Flammable Liquid	VP: 26 mm FRZ: -133°F UEL: ? LEL: ?	None reported	XAD-2*; Toluene; GC/FID; IV [#2536]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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. -11-Undecanethiol]	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; conf, dizz, head, drow, nau, vomit, weak, convuls	Eye: Irr immed Skin: Soap wash Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys, CNS
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash Uranium (insoluble compounds, as U)]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Derm; kidney damage; blood changes; in animals: lung, lymph node damage Potential for cancer is a result of alpha-emitting properties & radioactive decay products (e.g., radon).	Eye: Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed	Skin, kidneys, bone marrow, lymphatic sys [lung cancer]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam/Daily Remove: When wet or contam Change: Daily Provide: Eyewash (UF_6), Quick drench Uranium (soluble, compounds as U)]	NIOSH ¥: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape(Halides): GMFAGHiE/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; [carc] Potential for cancer is a result of alpha-emitting properties & radioactive decay products (e.g., radon).	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed	Resp sys, blood, liver, kidneys, lymphatics sys, skin, bone marrow [lung cancer]
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench n-Valeraldehyde]	TBAL	Inh Ing Con	Irrit eyes, skin, nose, throat	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Vanadium dust V_2O_5 1314-62-1 YW2450000 2862 151	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide Other synonyms vary depending upon the specific vanadium compound.	NIOSH* C 0.05 mg V/m³ [15-min] [*Note: The REL applies to all vanadium compounds except Vanadium metal & Vanadium carbide (see Ferrovanadium dust).] OSHA† C 0.5 mg V_2O_5/m³ (resp)	35 mg/m³ (as V)	Yellow-orange powder or dark gray, odorless flakes dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.8% FI.P: NA IP: NA Sp.Gr: 3.36 Noncombustible Solid, but may increase intensity of fire when in contact with combustible materials.	VP: 0 mm (approx) MLT: 1274°F UEL: NA LEL: NA	Lithium, chlorine trifluoride	Filter; THF; XRD; IV [#7504] [Also #7300, Elements]
Vanadium fume V_2O_5 1314-62-1 YW2460000 2862 151	Divanadium pentoxide, Vanadic anhydride, Vanadium oxide, Vanadium pentaoxide Other synonyms vary depending upon the specific vanadium compound.	NIOSH* C 0.05 mg V/m³ [15-min] OSHA† C 0.1 mg V_2O_5/m³	35 mg/m³ (as V)	Finely divided particulate dispersed in air.	MW: 181.9 BP: 3182°F (Decomposes) Sol: 0.8% FI.P: NA IP: NA Sp.Gr: 3.36 Noncombustible Solid	VP: 0 mm (approx) MLT: 1274°F UEL: NA LEL: NA	Lithium, chlorine trifluoride	Filter; THF; XRD; IV [#7504] [Also #7300, Elements]
Vegetable oil mist 68956-68-3 YX1850000	Vegetable mist	NIOSH 10 mg/m³ (total) 5 mg/m³ (resp) OSHA 15 mg/m³ (total) 5 mg/m³ (resp)	N.D.	An oil extracted from the seeds, fruit, or nuts of vegetables or other plant matter.	MW: varies BP: ? Sol: Insoluble FI.P: 323-540°F IP: ? Sp.Gr: 0.91-0.95 Combustible Liquid	VP: ? FRZ: ? UEL: ? LEL: ?	None reported	Filter; none; Grav; IV [Particulates NOR; #0500 (total), #0600 (resp)]
Vinyl acetate CH_2=CHOOCCH$_3$ 108-05-4 AK0875000 1301 129P	1-Acetoxyethylene, Ethenyl acetate, Ethenyl ethanoate, VAC, Vinyl acetate monomer, Vinyl ethanoate 1 ppm = 3.52 mg/m³	NIOSH C 4 ppm (15 mg/m³) [15-min] OSHA† none	N.D.	Colorless liquid with a pleasant, fruity odor. [Note: Raw material for many polyvinyl resins.]	MW: 86.1 BP: 162°F Sol: 2% FI.P: 18°F IP: 9.19 eV Sp.Gr: 0.93 Class IB Flammable Liquid	VP: 83 mm FRZ: -136°F UEL: 13.4% LEL: 2.6%	Acids, bases, silica gel, alumina, oxidizers, azo compounds, ozone [Note: Usually contains a stabilizer (e.g., hydroquinone or diphenylamine) to prevent polymerization.]	Carbon mol sieve; CH_2Cl_2/ Methanol; GC/FID; IV [#1453]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. [Vanadium dust]	NIOSH (as V) 0.5 mg/m³: HiE*/SA* 1.25 mg/m³: SA:CF*/PAPRHiE* 2.5 mg/m³: HiEF/PAPRTHiE*/ SCBAF/SAF 35 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheez, bron, dysp	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Vanadium fume]	NIOSH (as V) 0.5 mg/m³: HiE*/SA* 1.25 mg/m³: SA:CF*/PAPRHiE* 2.5 mg/m³: HiEF/PAPRTHiE*/ SCBAF/SAF 35 mg/m³: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, throat; green tongue, metallic taste; cough, fine rales, wheez, bron, dysp; eczema	Breath: Resp support		Eyes, skin, resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Vegetable oil mist]	TBAL	Inh Con	Irrit eyes, skin, resp sys; lac	Eye: Irr immed Breath: Fresh air		Eyes, skin, resp sys
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Vinyl acetate]	NIOSH 40 ppm: CCROV*/SA* 100 ppm: SA:CF*/PAPROV* 200 ppm: CCRFOV/GMFOV/PAPRTOV*/ SCBAF/SAF 4000 ppm: SA:PD,PP* §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, nose, throat; hoarseness, cough; loss of smell; eye burns, skin blisters	Eye: Irr immed Skin: Soap flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Vinyl bromide CH_2=CHBr 593-60-2 KU8400000 1085 116P	Bromoethene, Bromoethylene 1 ppm = 4.38 mg/m^3	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Colorless gas or liquid (below 60°F) with a pleasant odor. [Note: Shipped as a liquefied compressed gas with 0.1% phenol added to prevent polymerization.]	MW: 107.0 BP: 60°F Sol: Insoluble Fl.P: NA (Gas) IP: 9.80 eV RGasD: 3.79 Sp.Gr: 1.49 (Liquid at 60°F) Flammable Gas Class IA Flammable Liquid	VP: 1.4 atm FRZ: -219°F UEL:15% LEL:9%	Strong oxidizers [Note: May polymerize in sunlight.]	Char; Ethanol; GC/FID; IV [#1009]
Vinyl chloride CH_2=CHCl 75-01-4 KU9625000 1086 116P	Chloroethene, Chloroethylene, Ethylene monochloride, Monochloroethene, Monochloroethylene, VC, Vinyl chloride monomer (VCM) 1 ppm = 2.56 mg/m^3	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 concentrations. [Note: Shipped as a liquefied compressed gas.]	MW: 62.5 BP: 7°F Sol(77°F): 01% Fl.P: NA (Gas) IP: 9.99 eV RGasD: 2.21 Flammable Gas	VP: 3.3 atm FRZ: -256°F UEL: 33.0% LEL: 3.6%	Copper, oxidizers, aluminum, peroxides, iron, steel [Note: Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture.]	Char(2); CS_2; GC/FID; IV [#1007]
Vinyl cyclohexene dioxide $C_8H_{12}O_2$ 106-87-6 RN8640000	1-Epoxyethyl-3,4-epoxy-cyclohexane; 4-Vinylcyclohexene diepoxide; 4-Vinyl-1-cyclohexene dioxide 1 ppm = 5.73 mg/m^3	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 Fl.P(oc): 230°F IP: ? Sp.Gr:1.10 Class IIIB Combustible Liquid	VP: 0.1 mm FRZ: -164°F UEL: ? LEL: ?	Alcohols, amines, water [Note: Slowly hydrolyzes in water.]	None available
Vinyl fluoride CH_2=CHF 75-02-5 YZ7351000 1860 116P	Fluoroethene, Fluoroethylene, Monofluoroethylene, Vinyl fluoride monomer 1 ppm = 1.89 mg/m^3	NIOSH 1 ppm C 5 ppm [use 1910.1017] OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Shipped as a liquefied compressed gas.]	MW: 46.1 BP: -98°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.37 eV RGasD: 1.60 Flammable Gas	VP: 25.2 atm FRZ: -257°F UEL:21.7% LEL: 2.6%	None reported [Note: Inhibited with 0.2% terpenes to prevent 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 (liq) Eyes: Prevent eye contact (liq) Wash skin: When contam (liq) Remove: When wet (flamm) Change: N.R. [Vinyl bromide]	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: Irr immed (liq) Skin: Water flush immed (liq) Breath: Resp support Swallow: Medical attention immed (liq)		Eyes, skin, CNS, liver [in animals: liver & lymph node tumors]
Skin: Frostbite **Eyes: Frostbite** **Wash skin: N.R.** **Remove: When wet (flamm)** **Change: N.R.** **Provide: Frostbite** **[Vinyl chloride]**	**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: Frostbite** **Skin: Frostbite** **Breath: Resp support**		**Liver, CNS, blood, resp sys, lymphatic sys [liver cancer]**
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench [Vinyl cyclohexene dioxide]	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 sens; [carc]	Eye: Irr immed Skin: Water wash immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, blood, thymus, repro sys [in animals: skin tumors]
Skin: Frostbite **Eyes: Frostbite** **Wash skin: N.R.** **Remove: When wet (flamm)** **Change: N.R.** **Provide: Frostbite** **[Vinyl fluoride]**	**NIOSH** **10 ppm: CCROV/SA** **25 ppm: SA:CF/PAPROV** **50 ppm: CCRFOV/GMFOV/PAPRTOV/ SCBAF/SAF** **200 ppm: SAF:PD,PP** **§: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOV/SCBAE**	**Inh** **Con** **(liq)**	**Head, dizz, conf, inco, narco, nau, vomit; liq: frostbite**	**Eye: Frostbite** **Skin: Frostbite** **Breath: Resp support**		**CNS**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Vinylidene chloride $CH_2=CCl_2$ 75-35-4 KV9275000 1303 129P	1,1-DCE; 1,1-Dichloroethene; 1,1-Dichloroethylene; VDC; Vinylidene chloride monomer; Vinylidene dichloride	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Colorless liquid or gas (above 89°F) with a mild, sweet, chloroform-like odor.	MW: 96.9 BP: 89°F Sol: 0.04% Fl.P: -2°F IP: 10.00 eV Sp.Gr: 1.21 Class IA Flammable Liquid	VP: 500 mm FRZ: -189°F UEL: 15.5% LEL: 6.5%	Aluminum, sunlight, air, copper, heat [Note: Polymerization may occur if exposed to oxidizers, chlorosulfonic acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.]	Char; CS_2; GC/FID; IV [#1015]
Vinylidene fluoride $CH_2=CF_2$ 75-38-7 KW0560000 1959 116P	Difluoro-1,1-ethylene; 1,1-Difluoroethene; 1,1-Difluoroethylene; Halocarbon 1132A; VDF; Vinylidene difluoride 1 ppm = 2.62 mg/m³	NIOSH 1 ppm C 5 ppm [use 1910.1017] OSHA none	N.D.	Colorless gas with a faint, ethereal odor. [Note: Shipped as a liquefied compressed gas.]	MW: 64.0 BP: -122°F Sol: Insoluble Fl.P: NA (Gas) IP: 10.29 eV RGasD: 2.21 Flammable Gas	VP: 35.2 atm FRZ: -227°F UEL: 21.3% LEL: 5.5%	Oxidizers, aluminum chloride [Note: Violent reaction with hydrogen chloride when heated under pressure.]	None available
Vinyl toluene $CH_2=CHC_6H_4CH_3$ 25013-15-4 WL5075000 2618 130P	Ethenylmethylbenzene, Methylstyrene, Tolyethylene 1 ppm = 4.83 mg/m³	NIOSH/OSHA 100 ppm (480 mg/m³)	400 ppm	Colorless liquid with a strong, disagreeable odor.	MW: 118.2 BP: 339°F Sol: 0.009% Fl.P: 127°F IP: 8.20 eV Sp.Gr: 0.89 Class II Combustible Liquid	VP: 1 mm FRZ: -106°F UEL: 11.0% LEL: 0.8%	Oxidizers, peroxides, strong acids, iron or aluminum salts [Note: Usually inhibited with tert-butyl catechol to prevent polymerization.]	Char; CS_2; GC/FID; IV [#1501, Aromatic Hydrocarbons]
VM & P Naphtha 8032-32-4 OI6180000 1271 128	Ligroin, Painters naphtha, Petroleum ether, Petroleum spirit, Refined solvent naphtha, Varnish makers' & painters' naphtha	NIOSH 350 mg/m³ C 1800 mg/m³ [15-min] OSHA† none	N.D.	Clear to yellowish liquid with a pleasant, aromatic odor.	MW: 87-114 (approx) BP: 203-320°F Sol: Insoluble Fl.P: 20-55°F IP: ? Sp.Gr(60°F): 0.73-0.76 Class IB Flammable Liquid	VP: 2-20 mm FRZ: ? UEL: 6.0% LEL: 1.2%	None reported [Note: VM&P Naphtha is a refined petroleum solvent predominantly C_7-C_{11}, which is typically 55% paraffins, 30% monocycloparaffins, 2% dicycloparaffins & 12% alkylbenzenes.]	Char; CS_2; GC/FID; IV [#1550, 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 5)
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R. Provide: Eyewash, Quick drench	NIOSH *: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Abs Ing Con	Irrit eyes, skin, throat; dizz, head, nau; dysp; liver, kidney dysfunc; pneuitis; [carc]	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, liver, kidneys [in animals: liver & kidney tumors]
Vinylidene chloride]						
Skin: Frostbite Eyes: Frostbite Wash skin: N.R. Remove: When wet (flamm) Change: N.R. Provide: Frostbite	NIOSH 10 ppm: CCROV/SA 25 ppm: SA:CF/PAPROV 50 ppm: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF 200 ppm: SAF:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Con (liq)	Dizz, head, nau; liq: frostbite	Eye: Frostbite Skin: Frostbite Breath: Resp support		CNS
Vinylidene fluoride]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R.	NIOSH/OSHA 400 ppm: CCROV*/PAPROV*/GMFOV/SA*/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, skin, upper resp sys; drow; in animals: narco	Eye: Irr immed Skin: Soap flush prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
Vinyl toluene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: N.R.	NIOSH 3500 mg/m³: CCROV/SA 8750 mg/m³: SA:CF/PAPROV 17,500 mg/m³: CCRFOV/GMFOV/PAPRTOV/SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: GMFOV/SCBAE	Inh Ing Con	Irrit eyes, upper resp sys; derm, CNS depres; chemical pneu (aspir liq)	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS
VM & P naphtha]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Warfarin $C_{19}H_{16}O_4$ 81-81-2 GN4550000	3-(α-Acetonyl)-benzyl-4-hydroxycoumarin, 4-Hydroxy-3-(3-oxo-1-phenyl butyl)-2H-1-benzopyran-2-one, WARF	NIOSH/OSHA 0.1 mg/m³	100 mg/m³	Colorless, odorless, crystalline powder. [rodenticide]	MW: 308.3 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/UVD; IV [#5002]
Welding fumes ZC2550000	Synonyms vary depending upon the specific component of the welding fumes.	NIOSH Ca See Appendix A OSHA† none	Ca [N.D.]	Fumes generated by the process of joining or cutting pieces of metal by heat, pressure, or both.	Properties vary depending upon the specific component of the welding fumes.		Varies	Filter; Acid; ICP; IV [#7300, Elements]
Wood dust ZC9850000	Hard wood dust, Soft wood dust, Western red cedar dust	NIOSH Ca See Appendix A 1 mg/m³ OSHA† 15 mg/m³ (total) 5 mg/m³ (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; IV [#0500, Particulates NOR (total)]
o-Xylene $C_6H_4(CH_3)_2$ 95-47-6 ZE2450000 1307 130	1,2-Dimethylbenzene; ortho-Xylene; o-Xylol 1 ppm = 4.34 mg/m³	NIOSH 100 ppm (435 mg/m³) ST 150 ppm (655 mg/m³) OSHA† 100 ppm (435 mg/m³)	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: 6.7% LEL: 0.9%	Strong oxidizers, strong acids	Char; CS_2; GC/FID; IV [#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: Prevent skin contact Eyes: N.R. Wash skin: When contam Remove: When wet or contam Change: Daily [Warfarin]	NIOSH/OSHA 0.5 mg/m³: DM 1 mg/m³: DMXSQ/SA 2.5 mg/m³: SA:CF/APRDM 5 mg/m³: HIEF/SAT.CF/PAPRTHIE/SCBAF/SAF 100 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Abs Ing Con	Hema, back pain; hematoma arms, legs; epis, bleeding lips, muc memb hemorr; abdom pain, vomit, fecal blood; petechial rash; abnor hematologic indices	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Blood, CVS
Skin: N.R. **Eyes: N.R.** **Wash skin: N.R.** **Remove: N.R.** **Change: N.R.** **[Welding fumes]**	**NIOSH** **#: SCBAF:PD,PP/SAF:PD,PP:ASCBA** **Escape: GMFOVHIE/SCBAE**	**Inh** **Con**	**Symptoms vary depending upon the specific component of the welding fumes; metal fume fever: flu-like symptoms, dysp, cough, musc pain, fever, chills; interstitial pneu; [carc]**	**Eye: Irr immed** **Skin: Soap wash** **Breath: Resp support**		**Eyes, skin, resp sys, CNS [lung cancer]**
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. Wood dust]	NIOSH #: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HIEF/SCBAE	Inh Con	Irrit eyes; epis; derm; resp hypersensitivity; granulomatous pneuitis; asthma; cough, wheez, sinusitis; prolonged colds; [carc]	Eye: Irr immed Skin: Soap wash Breath: Fresh air		Eyes, skin, resp sys [nasal cancer]
Skin: **Prevent skin contact** Eyes: **Prevent eye contact** Wash skin: **When contam** Remove: **When wet (flamm)** Change: N.R. [o-Xylene]	**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; corn vacuolization; anor, nau, vomit, abdom pain; derm**	**Eye: Irr immed** **Skin: Soap wash prompt** **Breath: Resp support** **Swallow: Medical attention immed**		**Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys**

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FLP, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
m-Xylene $C_6H_4(CH_3)_2$ 108-38-3 ZE2275000 1307 130	1,3-Dimethylbenzene; meta-Xylene; m-Xylol 1 ppm = 4.34 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: 282°F Sol: Slight FLP: 82°F IP: 8.56 eV Sp.Gr: 0.86 Class IC Flammable Liquid	VP: 9 mm FRZ: -54°F UEL: 7.0% LEL: 1.1%	Strong oxidizers, strong acids	Char; CS$_2$; GC/FID; IV [#1501, Aromatic Hydro-carbons]
p-Xylene $C_6H_4(CH_3)_2$ 106-42-3 ZE2625000 1307 130	1,4-Dimethylbenzene; para-Xylene; p-Xylol 1 ppm = 4.34 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. [Note: A solid below 56°F.]	MW: 106.2 BP: 281°F Sol: 0.02% FLP: 81°F IP: 8.44 eV Sp.Gr: 0.86 Class IC Flammable Liquid	VP: 9 mm FRZ: 56°F UEL: 7.0% LEL: 1.1%	Strong oxidizers, strong acids	Char; CS$_2$; GC/FID; IV [#1501, Aromatic Hydro-carbons]
m-Xylene α, α'-diamine $C_6H_4(CH_2NH_2)_2$ 1477-55-0 PF8970000	1,3-bis(Aminomethyl)benzene; 1,3-Benzenedimethanamine; MXDA; m-Phenylenebis(methylamine); m-Xylylenediamine	NIOSH C 0.1 mg/m^3 [skin] OSHA† none	N.D.	Colorless liquid.	MW: 136.2 BP: 477°F Sol: Miscible FLP: 243°F IP: ? Sp.Gr: 1.032 Class IIIB Combustible Liquid	VP(77°F): 0.03 mm FRZ: 58°F UEL: ? LEL: ?	None reported	None available
Xylidine $(CH_3)_2C_6H_3NH_2$ 1300-73-8 ZE8575000 1711 151	Aminodimethylbenzene, Aminoxylene, Dimethylaminobenzene, Dimethylaniline, Xylidine isomers (e.g., 2,4-Dimethylaniline) [Note: Dimethylaniline is also used as a synonym for N,N-Dimethylaniline.] 1 ppm = 4.96 mg/m^3	NIOSH 2 ppm (10 mg/m^3) [skin] OSHA† 5 ppm (25 mg/m^3) [skin]	50 ppm	Pale-yellow to brown liquid with a weak, aromatic, amine-like odor.	MW: 121.2 BP: 415-439°F Sol: Slight FLP: 206°F (2,3-) IP: 7.65 eV (2,4-) 7.30 eV (2,6-) Sp.Gr: 0.98 Class IIIB Combustible Liquid (2,3-)	VP: <1 mm FRZ: -33°F UEL: ? LEL: 1.0% (2,3-)	Strong oxidizers, hypochlorite salts	Si gel; Ethanol; GC/FID; IV [#2002]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — 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.	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; corn vacuolization; anor, nau, vomit, abdom pain; derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys
m-Xylene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet (flamm) Change: 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; corn vacuolization; anor, nau, vomit, abdom pain; derm	Eye: Irr immed Skin: Soap wash prompt Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, CNS, GI tract, blood, liver, kidneys
p-Xylene]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench,	TBAL	Inh Abs Ing Con	In animals: irrit eyes, skin; liver, kidney, lung damage	Eye: Irr immed Skin: Water flush immed Breath: Resp support Swallow: Medical attention immed		Eyes, skin, resp sys, liver, kidneys
m-Xylene α, α'-diamine]						
Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contam Remove: When wet or contam Change: N.R. Provide: Eyewash, Quick drench	NIOSH 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: Irr immed Skin: Soap wash immed Breath: Resp support Swallow: Medical attention immed		Resp sys, blood, liver, kidneys, CVS
Xylidine]						

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL Fl.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
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_2O Fl.P: 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; IV [#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): 435% Fl.P: NA IP: NA Sp.Gr: 2.91 Noncombustible Solid	VP: 0 mm (approx) MLT: 554°F UEL: NA LEL: NA	Potassium	Filter; Water; FAAS; OSHA [#ID121]
Zinc oxide ZnO 1314-13-2 ZH4810000 1516 143	Zinc peroxide	NIOSH 5 mg/m^3 (fume/dust) ST 10 mg/m^3 (fume) C 15 mg/m^3 (dust) OSHA† 5 mg/m^3 (fume) 15 mg/m^3 (total dust) 5 mg/m^3 (resp dust)	500 mg/m^3	White, odorless solid.	MW: 81.4 BP: ? Sol(64°F): 0.0004% Fl.P: NA IP: NA 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; IV [#7502]
Zinc stearate $Zn(C_{18}H_{35}O_2)_2$ 557-05-1 ZH5200000	Dibasic zinc stearate, Zinc distearate, Zinc salt of stearic acid	NIOSH 10 mg/m^3 (total) 5 mg/m^3 (resp) OSHA† 15 mg/m^3 (total) 5 mg/m^3 (resp)	N.D.	Soft, white powder with a slight, characteristic odor.	MW: 632.4 BP: ? Sol: Insoluble Fl.P(oc): 530°F IP: NA Sp.Gr: 1.10 Combustible Solid	VP: 0 mm (approx) MLT: 266°F UEL: ? LEL: ? MEC: 20 g/m^3	Oxidizers, dilute acids [Note: Hydrophobic (i.e., repels water).]	Filter; none; Grav; IV [Particulates NOR: #0500 (total), #0600 (resp)]

Personal protection and sanitation (See Table 3)	Recommendations for respirator selection — maximum concentration for use (MUC) (See Table 4)	Health hazards				
		Route	Symptoms (See Table 5)	First aid (See Table 6)		Target organs (See Table 5)
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Yttrium]	NIOSH/OSHA 5 mg/m³: DM 10 mg/m³: DMXSQ/SA 25 mg/m³: SA:CF/PAPRDM 50 mg/m³: HiEF/SAT:CF/PAPRTHiE/ SCBAF/SAF 500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Ing Con	Irrit eyes; in animals: pulm irrit; eye inj; possible liver damage	Eye: Skin: Breath: Swallow:	Irr immed Soap wash prompt Resp support Medical attention immed	Eyes, resp sys, liver
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Zinc chloride fume]	NIOSH/OSHA 10 mg/m³: DMFu*/SA* 25 mg/m³: SA:CF*/PAPRDMFu* 50 mg/m³: HiEF/PAPRTHiE*/ SCBAF/SAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Irrit eyes, skin, nose, throat; conj; cough, copious sputum; dysp, chest pain, pulm edema, bronconeu; pulm fib, cor pulmonale; fever; cyan; tachypnea; skin burns	Breath:	Resp support	Eyes, skin, resp sys, CVS
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Zinc oxide]	NIOSH/OSHA 50 mg/m³: DMFu/SA 125 mg/m³: SA:CF/PAPRDMFu 250 mg/m³: HiEF/SAT:CF/PAPRTHiE SCBAF/SAF 500 mg/m³: SA:PD,PP §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh	Metal fume fever: chills, musc ache, nau, fever, dry throat, cough, weak, lass; metallic taste; head; blurred vision; low back pain; vomit; flg; mal; tight chest, dysp, rales, decr pulm func	Breath:	Resp support	Resp sys
Skin: N.R. Eyes: N.R. Wash skin: N.R. Remove: N.R. Change: N.R. [Zinc stearate]	TBAL	Inh Ing Con	Irrit eyes, skin, upper resp sys; cough	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Fresh air Medical attention immed	Eyes, skin, resp sys

Chemical name, structure/formula, CAS and RTECS Nos., and DOT ID and guide Nos.	Synonyms, trade names, and conversion factors	Exposure limits (TWA unless noted otherwise)	IDLH	Physical description	Chemical and physical properties: MW, BP, SOL FI.P, IP, Sp, Gr, flammability	Chemical and physical properties: VP, FRZ UEL, LEL	Incompatibilities and reactivities	Measurement method (See Table 1)
Zirconium compounds (as Zr) Zr (Metal) 7440-67-7 (Metal) ZH7070000 (Metal) 1358 170 (powder, wet) 1932 135 (scrap) 2008 135 (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†: 5 mg/m^3	50 mg/m^3 (as Zr)	Metal: Soft, malleable, ductile, solid or gray to gold, amorphous powder.	MW: 91.2 BP: 6471°F Sol: Insoluble FI.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; IV [#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 5)	First aid (See Table 6)		Target organs (See Table 5)
Recommendations vary depending upon the specific compound.	NIOSH/OSHA 25 mg/m^3: DM 50 mg/m^3: DMXSQ/PAPRDM/HiEF/SA/SCBAF §: SCBAF:PD,PP/SAF:PD,PP:ASCBA Escape: HiEF/SCBAE	Inh Con	Skin, lung granulomas; in animals: irrit skin, muc membr; X-ray evidence of retention in lungs	Eye: Skin: Breath: Swallow:	Irr immed Soap wash Resp support Medical attention immed	Skin, resp sys
[Zirconium compounds (as Zr)]						

APPENDICES

APPENDIX A — NIOSH POTENTIAL OCCUPATIONAL CARCINOGENS

New Policy

For the past 20 plus years, NIOSH has subscribed to a carcinogen policy that was published in 1976 by Edward J. Fairchild, II, Associate Director for Cincinnati Operations, which called for "no detectable exposure levels for proven carcinogenic substances" (Annals of the New York Academy of Sciences, 271:200-207, 1996). This was in response to a generic OSHA rulemaking on carcinogens. Because of advances in science and in approaches to risk assessment and risk management, NIOSH has adopted a more inclusive policy. NIOSH recommended exposure limits (RELs) will be based on risk evaluations using human or animal health effects data, and on an assessment of what levels can be feasibly achieved by engineering controls and measured by analytical techniques. To the extent feasible, NIOSH will project not only a no-effect exposure, but also exposure levels at which there may be residual risks. This policy applies to all workplace hazards, including carcinogens, and is responsive to Section 20(a)(3) of the Occupational Safety and Health Act of 1970, which charges NIOSH to ". . .describe exposure levels that are safe for various periods of employment, including but not limited to the exposure levels at which no employee will suffer impaired health or functional capacities or diminished life expectancy as a result of his work experience."

The effect of this new policy will be the development, whenever possible, of quantitative RELs that are based on human and/or animal data, as well as on the consideration of technological feasibility for controlling workplace exposures to the REL. Under the old policy, RELs for most carcinogens were

non-quantitative values labeled "lowest feasible concentration (LFC)." [Note: There are a few exceptions to LFC RELs for carcinogens (e.g., RELs for asbestos, formaldehyde, benzene, and ethylene oxide are quantitative values based primarily on analytical limits of detection or technological feasibility). Also, in 1989, NIOSH adopted several quantitative RELs for carcinogens from OSHA's permissible exposure limit (PEL) update.]

Under the new policy, NIOSH will also recommend the complete range of respirators (as determined by the *NIOSH Respirator Decision Logic*) for carcinogens with quantitative RELs. In this way, respirators will be consistently recommended regardless of whether a substance is a carcinogen or a non-carcinogen.

Old Policy

In the past, NIOSH identified numerous substances that should be treated as potential occupational carcinogens even though OSHA might not have identified them as such. In determining their carcinogenicity, NIOSH used 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.

When thresholds for carcinogens that would protect 100% of the population had not been identified, NIOSH usually recommended that ***occupational exposures to carcinogens be limited to the lowest feasible concentration***. To ensure maximum protection from carcinogens through the use of respiratory protection, NIOSH also recommended that only the most reliable and protective respirators be used. These respirators 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.

Recommendations to be Revised

The RELs and respirator recommendations for carcinogens listed in this edition of the *Pocket Guide* still reflect the old policy. This edition, which contains other updated information, is long overdue; hence, it is published now rather than later. Changes in the RELs and respirator recommendations that reflect the new policy will be included in future editions.

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, meth-yl chloromethyl ether, alpha-naphthylamine, beta-naphthylamine, 4-nitrobiphenyl, N-nitrosodimeth-ylamine, 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), propiolaldehyde (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/m^3), which is equal to 0.1 fiber per cubic centimeter of air (0.1 fiber/cm^3), 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.

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/m^3. 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/m^3 (measured as the cyclohexane-extractable fraction). The OSHA PEL (8-hour TWA) for carbon black is 3.5 mg/m^3.

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.

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

The OSHA PEL is 0.1 mg CrO_3/m^3 (ceiling) for chromic acid and chromates (including tert-butyl chromate with a "skin" designation and zinc chromate); 0.5 mg Cr/m^3 (8-hour TWA) for chromium(II) and chromium(III) compounds; and 1 mg Cr/m^3 (8-hour TWA) for chromium metal and insoluble salts.

Coal Tar Pitch Volatiles

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

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

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Coke Oven Emissions

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

Cotton Dust (raw)

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

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

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

Lead

NIOSH considers "Lead" to mean metallic lead, lead oxides, and lead salts (including organic salts such as lead soaps but excluding lead arsenate). The NIOSH REL for lead (10-hour TWA) is 0.100 mg/m^3; 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/m^3; 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/m^3.

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 "%SiO_2 + 5" or 10 mg/m^3 divided by the value "%SiO_2 + 2". The OSHA PEL (8-hour TWA) for crystalline silica (as total quartz) is 30 mg/m^3 divided by the value "%SiO_2 + 2". The OSHA PELs (8-hour TWAs) for cristobalite 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/m^3 divided by the value "%SiO_2", or 20 mppcf.

The OSHA PELs (8-hour TWAs) for mica, soapstone, and talc (not containing asbestos) are 20 mppcf.

APPENDIX C — SUPPLEMENTARY EXPOSURE LIMITS (Continued)

The OSHA PEL (8-hour TWA) for Portland cement is 50 mppcf. The OSHA PEL (8-hour TWA) for 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/m^3 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/m^3 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/m^3; the applicable OSHA PEL is 0.1 mg Co/m^3 (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/m^3 (10-hour TWA). The OSHA PEL for Insoluble Nickel (i.e., a 1 mg Ni/m^3 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% SiO_2) [2 mg/m³ (as the respirable dust fraction)], coal dust (≥ 5% SiO_2) [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/m^3: CCRS†/SA
1.25 mg/m^3: SA:CF/PAPRS†(canister)
2.5 mg/m^3: CCRFS†/GMFS†/SAT:CF/
PAPRTS†(canister)/
SCBAF/SAF
10 mg/m^3: SA:PD,PP
§: SCBAF:PD,PP/SAF:PD,PP:ASCBA
Escape: GMFS†/SCBAE

Other non (organo) alkyl mercury compounds:
NIOSH/OSHA
1 mg/m^3: CCRS†/SA
2.5 mg/m^3: SA:CF/PAPRS†(canister)
5 mg/m^3: CCRFS†/GMFS†/SAT:CF/
PAPRTS†(canister)/
SCBAF/SAF
10 mg/m^3: 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

ɔcetaldehyde:	TWA 100 ppm (180 mg/m³) ST 150 ppm (270 mg/m³)
ɔcetic anhydride:	C 5 ppm (20 mg/m³)
ɔcetone:	TWA 750 ppm (1800 mg/m³) ST 1000 ppm (2400 mg/m³)
ɔcetonitrile:	TWA 40 ppm (70 mg/m³) ST 60 ppm (105 mg/m³)
ɔcetylsalicyclic acid:	TWA 5 mg/m³
ɔcrolein:	TWA 0.1 ppm (0.25 mg/m³) ST 0.3 ppm (0.8 mg/m³)
ɔcrylamide:	TWA 0.03 mg/m³ [skin]
ɔcrylic acid:	TWA 10 ppm (30 mg/m³) [skin]
Allyl alcohol:	TWA 2 ppm (5 mg/m³) ST 4 ppm (10 mg/m³) [skin]
Allyl chloride:	TWA 1 ppm (3 mg/m³) ST 2 ppm (6 mg/m³)
Allyl glycidyl ether:	TWA 5 ppm (22 mg/m³) ST 10 ppm (44 mg/m³)
Allyl propyl disulfide:	TWA 2 ppm (12 mg/m³) ST 3 ppm (18 mg/m³)
α-Alumina:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Aluminum (pyro powders & welding fumes, as Al):	TWA 5 mg/m³
Aluminum (soluble salts & alkyls, as Al):	TWA 2 mg/m³
Amitrole:	TWA 0.2 mg/m³
Ammonia:	ST 35 ppm (27 mg/m³)
Ammonium chloride fume:	TWA 10 mg/m³ ST 20 mg/m³
Ammonium sulfamate:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Aniline (and homologs):	TWA 2 ppm (8 mg/m³) [skin]
Atrazine:	TWA 5 mg/m³
Barium sulfate:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Benomyl:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Benzenethiol:	TWA 0.5 ppm (2 mg/m³)
Bismuth telluride (doped with selenium sulfide, as Bi_2Te_3):	TWA 5 mg/m³
Borates, tetra, sodium salts (Anhydrous):	TWA 10 mg/m³
Borates, tetra, sodium salts (Decahydrate):	TWA 10 mg/m³
Borates, tetra, sodium salts (Pentahydrate):	TWA 10 mg/m³
Boron oxide:	TWA 10 mg/m³
Boron tribromide:	C 1 ppm (10 mg/m³)
Bromacil:	TWA 1 ppm (10 mg/m³)
Bromine:	TWA 0.1 ppm (0.7 mg/m³) ST 0.3 ppm (2 mg/m³)
Bromine pentafluoride:	TWA 0.1 ppm (0.7 mg/m³)
n-Butane:	TWA 800 ppm (1900 mg/m³)
2-Butanone:	TWA 200 ppm (590 mg/m³) ST 300 ppm (885 mg/m³)
2-Butoxyethanol:	TWA 25 ppm (120 mg/m³) [skin]
n-Butyl acetate:	TWA 150 ppm (710 mg/m³) ST 200 ppm (950 mg/m³)
Butyl acrylate:	TWA 10 ppm (55 mg/m³)
n-Butyl alcohol:	C 50 ppm (150 mg/m³) [skin]
sec-Butyl alcohol:	TWA 100 ppm (305 mg/m³)
tert-Butyl alcohol:	TWA 100 ppm (300 mg/m³) ST 150 ppm (450 mg/m³)
n-Butyl glycidyl ether:	TWA 25 ppm (135 mg/m³)
n-Butyl lactate:	TWA 5 ppm (25 mg/m³)
n-Butyl mercaptan:	TWA 0.5 ppm (1.5 mg/m³)
o-sec-Butylphenol:	TWA 5 ppm (30 mg/m³) [skin]
p-tert-Butyltoluene:	TWA 10 ppm (60 mg/m³) ST 20 ppm (120 mg/m³)
Calcium cyanamide:	TWA 0.5 mg/m³

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)
Captafol:	TWA 0.1 mg/m^3
Captan:	TWA 5 mg/m^3
Carbofuran:	TWA 0.1 mg/m^3
Carbon dioxide:	TWA 10,000 ppm (18,000 mg/m^3) ST 30,000 ppm (54,000 mg/m^3)
Carbon disulfide:	TWA 4 ppm (12 mg/m^3) ST 12 ppm (36 mg/m^3) [skin]
Carbon monoxide:	TWA 35 ppm (40 mg/m^3) C 200 ppm (229 mg/m^3)
Carbon tetrabromide:	TWA 0.1 ppm (1.4 mg/m^3) ST 0.3 ppm (4 mg/m^3)
Carbon tetrachloride:	TWA 2 ppm (12.6 mg/m^3)
Carbonyl fluoride:	TWA 2 ppm (5 mg/m^3) ST 5 ppm (15 mg/m^3)
Catechol:	TWA 5 ppm (20 mg/m^3) [skin]
Cesium hydroxide:	TWA 2 mg/m^3
Chlorinated camphene:	TWA 0.5 mg/m^3 ST 1 mg/m^3 [skin]
Chlorine:	TWA 0.5 ppm (1.5 mg/m^3) ST 1 ppm (3 mg/m^3)
Chlorine dioxide:	TWA 0.1 ppm (0.3 mg/m^3) ST 0.3 ppm (0.9 mg/m^3)
Chloroacetyl chloride:	TWA 0.05 ppm (0.2 mg/m^3)
o-Chlorobenzylidene malononitrile:	C 0.05 ppm (0.4 mg/m^3) [skin]
Chlorodifluoromethane:	TWA 1000 ppm (3500 mg/m^3)
Chloroform:	TWA 2 ppm (9.78 mg/m^3)
1-Chloro-1-nitropropane:	TWA 2 ppm (10 mg/m^3)
Chloropentafluoroethane:	TWA 1000 ppm (6320 mg/m^3)
ß-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/m³ [skin]
Coal dust:	TWA 2 mg/m³ (<5% SiO_2) (resp dust) TWA 0.1 mg/m³ (≥5% SiO_2) (respquartz)
Cobalt metal dust & fume, as Co):	TWA 0.05 mg/m³
Cobalt carbonyl (as Co):	TWA 0.1 mg/m³
Cobalt hydrocarbonyl (as Co):	TWA 0.1 mg/m³
Crag® herbicide:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Crufomate:	TWA 5 mg/m³
Cyanamide:	TWA 2 mg/m³
Cyanogen:	TWA 10 ppm (20 mg/m³)
Cyanogen chloride:	C 0.3 ppm (0.6 mg/m³)
Cyclohexanol:	TWA 50 ppm (200 mg/m³) [skin]
Cyclohexanone:	TWA 25 ppm (100 mg/m³) [skin]
Cyclohexylamine:	TWA 10 ppm (40 mg/m³)
Cyclonite:	TWA 1.5 mg/m³ [skin]
Cyclopentane:	TWA 600 ppm (1720 mg/m³)
Cyhexatin:	TWA 5 mg/m³
Decaborane:	TWA 0.3 mg/m³ (0.05 ppm) ST 0.9 mg/m³ (0.15 ppm) [skin]
Diazinon®:	TWA 0.1 mg/m³ [skin]
2-N-Dibutylaminoethanol:	TWA 2 ppm (14 mg/m³)
Dibutyl phosphate:	TWA 1 ppm (5 mg/m³) ST 2 ppm (10 mg/m³)
Dichloroacetylene:	C 0.1 ppm (0.4 mg/m³)
p-Dichlorobenzene:	TWA 75 ppm (450 mg/m³) ST 110 ppm (675 mg/m³)
1,3-Dichloro-5,5-dimethylhydantoin:	TWA 0.2 mg/m³ ST 0.4 mg/m³
Dichloroethyl ether:	TWA 5 ppm (30 mg/m³) ST 10 ppm (60 mg/m³) [skin]
Dichloromonofluoromethane:	TWA 10 ppm (40 mg/m³)
1,1-Dichloro-1-nitroethane:	TWA 2 ppm (10 mg/m³)
1,3-Dichloropropene:	TWA 1 ppm (5 mg/m³) [skin]

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

2,2-Dichloropropionic acid:	TWA 1 ppm (6 mg/m^3)
Dicrotophos:	TWA 0.25 mg/m^3 [skin]
Dicyclopentadiene:	TWA 5 ppm (30 mg/m^3)
Dicyclopentadienyl iron:	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
Diethanolamine:	TWA 3 ppm (15 mg/m^3)
Diethylamine:	TWA 10 ppm (30 mg/m^3) ST 25 ppm (75 mg/m^3)
Diethylenetriamine:	TWA 1 ppm (4 mg/m^3)
Diethyl ketone:	TWA 200 ppm (705 mg/m^3)
Diethyl phthalate:	TWA 5 mg/m^3
Diglycidyl ether:	TWA 0.1 ppm (0.5 mg/m^3)
Diisobutyl ketone:	TWA 25 ppm (150 mg/m^3)
N,N-Dimethylaniline:	TWA 5 ppm (25 mg/m^3) ST 10 ppm (50 mg/m^3) [skin]
Dimethyl-1,2-dibromo-2,2-dichlorethyl phosphate:	TWA 3 mg/m^3 [skin]
Dimethyl sulfate:	TWA 0.1 ppm (0.5 mg/m^3) [skin]
Dinitolmide:	TWA 5 mg/m^3
Di-sec octyl phthalate:	TWA 5 mg/m^3 ST 10 mg/m^3
Dioxane:	TWA 25 ppm (90 mg/m^3) [skin]
Dioxathion:	TWA 0.2 mg/m^3 [skin]
Diphenylamine:	TWA 10 mg/m^3
Dipropylene glycol methyl ether:	TWA 100 ppm (600 mg/m^3) ST 150 ppm (900 mg/m^3) [skin]
Dipropyl ketone:	TWA 50 ppm (235 mg/m^3)
Diquat (Diquat dibromide):	TWA 0.5 mg/m^3
Disulfiram:	TWA 2 mg/m^3
Disulfoton:	TWA 0.1 mg/m^3 [skin]
2,6-Di-tert-butyl-p-cresol:	TWA 10 mg/m^3
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/m³ (total) TWA 5 mg/m³ (resp)
Endosulfan:	TWA 0.1 mg/m³ [skin]
Epichlorohydrin:	TWA 2 ppm (8 mg/m³) [skin]
Ethanolamine:	TWA 3 ppm (8 mg/m³) ST 6 ppm (15 mg/m³)
Ethion:	0.4 mg/m³ [skin]
Ethyl acrylate:	TWA 5 ppm (20 mg/m³) ST 25 ppm (100 mg/m³) [skin]
Ethyl benzene:	TWA 100 ppm (435 mg/m³) ST 125 ppm (545 mg/m³)
Ethyl bromide:	TWA 200 ppm (890 mg/m³) ST 250 ppm (1110 mg/m³)
Ethylene chlorohydrin:	C 1 ppm (3 mg/m³) [skin]
Ethylene dichloride:	TWA 1 ppm (4 mg/m³) ST 2 ppm (8 mg/m³)
Ethylene glycol:	C 50 ppm (125 mg/m³)
Ethylene glycol dinitrate:	ST 0.1 mg/m³ [skin]
Ethyl ether:	TWA 400 ppm (1200 mg/m³) ST 500 ppm (1500 mg/m³)
Ethylidene norbornene:	C 5 ppm (25 mg/m³)
Ethyl mercaptan:	TWA 0.5 ppm (1 mg/m³)
N-Ethylmorpholine:	TWA 5 ppm (23 mg/m³) [skin]
Ethyl silicate:	TWA 10 ppm (85 mg/m³)
Fenamiphos:	TWA 0.1 mg/m³ [skin]
Fensulfothion:	TWA 0.1 mg/m³
Fenthion:	TWA 0.2 mg/m³ [skin]
Ferbam:	TWA 10 mg/m³
Ferrovanadium dust:	TWA 1 mg/m³ ST 3 mg/m³
Fluorotrichloromethane:	C 1000 ppm (5600 mg/m³)
Fonofos:	TWA 0.1 mg/m³ [skin]
Formamide:	TWA 20 ppm (30 mg/m³) ST 30 ppm (45 mg/m³)
Furfural:	TWA 2 ppm (8 mg/m³) [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]
Gasoline:	TWA 300 ppm (900 mg/m^3) ST 500 ppm (1500 mg/m^3)
Germanium tetrahydride:	TWA 0.2 ppm (0.6 mg/m^3)
Glutaraldehyde:	C 0.2 ppm (0.8 mg/m^3)
Glycerin (mist):	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
Glycidol:	TWA 25 ppm (75 mg/m^3)
Graphite (natural):	TWA 2.5 mg/m^3 (resp)
Graphite (synthetic):	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
n-Heptane:	TWA 400 ppm (1600 mg/m^3) ST 500 ppm (2000 mg/m^3)
Hexachlorobutadiene:	TWA 0.02 ppm (0.24 mg/m^3)
Hexachlorocyclopentadiene:	TWA 0.01 ppm (0.1 mg/m^3)
Hexafluoroacetone:	TWA 0.1 ppm (0.7 mg/m^3) [skin]
n-Hexane:	TWA 50 ppm (180 mg/m^3)
Hexane isomers (except n-Hexane):	TWA 500 ppm (1800 mg/m^3) ST 1000 ppm (3600 mg/m^3)
2-Hexanone:	TWA 5 ppm (20 mg/m^3)
Hexone:	TWA 50 ppm (205 mg/m^3) ST 75 ppm (300 mg/m^3)
Hexylene glycol:	C 25 ppm (125 mg/m^3)
Hydrazine:	TWA 0.1 ppm (0.1 mg/m^3) [skin]
Hydrogenated terphenyls:	TWA 0.5 ppm (5 mg/m^3)
Hydrogen bromide:	C 3 ppm (10 mg/m^3)
Hydrogen cyanide:	ST 4.7 ppm (5 mg/m^3) [skin]
Hydrogen fluoride (as F):	TWA 3 ppm ST 6 ppm
Hydrogen sulfide:	TWA 10 ppm (14 mg/m^3) ST 15 ppm (21 mg/m^3)
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)

Indium:	TWA 0.1 mg/m³
Iodoform:	TWA 0.6 ppm (10 mg/m³)
Iron pentacarbonyl (as Fe):	TWA 0.1 ppm (0.8 mg/m³) ST 0.2 ppm (1.6 mg/m³)
Iron salts (soluble, as Fe):	TWA 1 mg/m³
Isoamyl alcohol (primary & secondary):	TWA 100 ppm (360 mg/m³) ST 125 ppm (450 mg/m³)
Isobutane:	TWA 800 ppm (1900 mg/m³)
Isobutyl alcohol:	TWA 50 ppm (150 mg/m³)
Isooctyl alcohol:	TWA 50 ppm (270 mg/m³) [skin]
Isophorone:	TWA 4 ppm (23 mg/m³)
Isophorone diisocyanate:	TWA 0.005 ppm ST 0.02 ppm [skin]
2-Isopropoxyethanol:	TWA 25 ppm (105 mg/m³)
Isopropyl acetate:	TWA 250 ppm (950 mg/m³) ST 310 ppm (1185 mg/m³)
Isopropyl alcohol:	TWA 400 ppm (980 mg/m³) ST 500 ppm (1225 mg/m³)
Isopropylamine:	TWA 5 ppm (12 mg/m³) ST 10 ppm (24 mg/m³)
N-Isopropylaniline:	TWA 2 ppm (10 mg/m³) [skin]
Isopropyl glycidyl ether:	TWA 50 ppm (240 mg/m³) ST 75 ppm (360 mg/m³)
Kaolin:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Ketene:	TWA 0.5 ppm (0.9 mg/m³) ST 1.5 ppm (3 mg/m³)
Magnesium oxide fume:	TWA 10 mg/m³
Malathion:	TWA 10 mg/m³ [skin]
Manganese compounds and fume (as Mn):	Compounds: C 5 mg/m³ Fume: TWA 1 mg/m³ ST 3 mg/m³
Manganese cyclopentadienyl tricarbonyl (as Mn):	TWA 0.1 mg/m³ [skin]

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Manganese tetroxide (as Mn):	TWA 1 mg/m³
Mercury compounds, as Hg [except(organo) alkyls]:	Hg Vapor: TWA 0.05 mg/m³ [skin] Non-alkyl compounds: C 0.1 mg/m³ [skin]
Mercury (organo) alkyl compounds (as Hg):	TWA 0.01 mg/m³ ST 0.03 mg/m³ [skin]
Mesityl oxide:	TWA 15 ppm (60 mg/m³) ST 25 ppm (100 mg/m³)
Methacrylic acid:	TWA 20 ppm (70 mg/m³) [skin]
Methomyl:	TWA 2.5 mg/m³
Methoxychlor:	TWA 10 mg/m³
4-Methoxyphenol:	TWA 5 mg/m³
Methyl acetate:	TWA 200 ppm (610 mg/m³) ST 250 ppm (760 mg/m³)
Methyl acetylene-propadiene mixture	TWA 1000 ppm (1800 mg/m³) ST 1250 ppm (2250 mg/m³)
Methylacrylonitrile:	TWA 1 ppm (3 mg/m³) [skin]
Methyl alcohol:	TWA 200 ppm (260 mg/m³) ST 250 ppm (325 mg/m³) [skin]
Methyl bromide:	TWA 5 ppm (20 mg/m³) [skin]
Methyl chloride:	TWA 50 ppm (105 mg/m³) ST 100 ppm (210 mg/m³)
Methyl chloroform:	TWA 350 ppm (1900 mg/m³) ST 450 ppm (2450 mg/m³)
Methyl-2-cyanoacrylate:	TWA 2 ppm (8 mg/m³) ST 4 ppm (16 mg/m³)
Methylcyclohexane:	TWA 400 ppm (1600 mg/m³)
Methylcyclohexanol:	TWA 50 ppm (235 mg/m³)
o-Methylcyclohexanone:	TWA 50 ppm (230 mg/m³) ST 75 ppm (345 mg/m³) [skin]
Methyl cyclopentadienyl manganese tricarbonyl (as Mn):	TWA 0.2 mg/m³ [skin]
Methyl demeton:	TWA 0.5 mg/m³ [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-cyclo-hexylisocyanate):	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]
Nonane:	TWA 200 ppm (1050 mg/m^3)
Octachloronaphthalene:	TWA 0.1 mg/m^3 ST 0.3 mg/m^3 [skin]
Octane:	TWA 300 ppm (1450 mg/m^3) ST 375 ppm (1800 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)
Oxalic acid:	TWA 1 mg/m^3 ST 2 mg/m^3
Oxygen difluoride:	C 0.05 ppm (0.1 mg/m^3)
Ozone:	TWA 0.1 ppm (0.2 mg/m^3) ST 0.3 ppm (0.6 mg/m^3)
Paraffin wax fume:	TWA 2 mg/m^3
Paraquat:	TWA 0.1 mg/m^3 (resp) [skin]
Pentaborane:	TWA 0.005 ppm (0.01 mg/m^3) ST 0.015 ppm (0.03 mg/m^3)
Pentaerythritol:	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
n-Pentane:	TWA 600 ppm (1800 mg/m^3) ST 750 ppm (2250 mg/m^3)
2-Pentanone:	TWA 200 ppm (700 mg/m^3) ST 250 ppm (875 mg/m^3)
Perchloryl fluoride:	TWA 3 ppm (14 mg/m^3) ST 6 ppm (28 mg/m^3)
Petroleum distillates (naphtha):	TWA 400 ppm (1600 mg/m^3)
Phenothiazine:	TWA 5 mg/m^3 [skin]
Phenyl glycidyl ether:	TWA 1 ppm (6 mg/m^3)
Phenylhydrazine:	TWA 5 ppm (20 mg/m^3) ST 10 ppm (45 mg/m^3) [skin]
Phenylphosphine:	C 0.05 ppm (0.25 mg/m^3)
Phorate:	TWA 0.05 mg/m^3 ST 0.2 mg/m^3 [skin]
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/m³) ST 1 ppm (1 mg/m³)
Phosphoric acid:	TWA 1 mg/m³ ST 3 mg/m³
Phosphorus oxychloride:	TWA 0.1 ppm (0.6 mg/m³)
Phosphorus pentasulfide:	TWA 1 mg/m³ ST 3 mg/m³
Phosphorus trichloride:	TWA 0.2 ppm (1.5 mg/m³) ST 0.5 ppm (3 mg/m³)
Phthalic anhydride:	TWA 6 mg/m³ (1 ppm)
m-Phthalodinitrile:	TWA 5 mg/m³ TWA 10 mg/m³ (total)
Picloram:	TWA 5 mg/m³ (resp)
Piperazine dihydrochloride:	TWA 5 mg/m³
Platinum metal (as Pt):	TWA 1 mg/m³
Portland cement:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Potassium hydroxide:	TWA 2 mg/m³
Propargyl alcohol:	TWA 1 ppm (2 mg/m³) [skin]
Propionic acid:	TWA 10 ppm (30 mg/m³)
Propoxur:	TWA 0.5 mg/m³
n-Propyl acetate:	TWA 200 ppm (840 mg/m³) ST 250 ppm (1050 mg/m³)
n-Propyl alcohol:	TWA 200 ppm (500 mg/m³) ST 250 ppm (625 mg/m³)
Propylene dichloride:	TWA 75 ppm (350 mg/m³) ST 110 ppm (510 mg/m³)
Propylene glycol dinitrate:	TWA 0.05 ppm (0.3 mg/m³)
Propylene glycol monomethyl ether:	TWA 100 ppm (360 mg/m³) ST 150 ppm (540 mg/m³)
Propylene oxide:	TWA 20 ppm (50 mg/m³)
n-Propyl nitrate:	TWA 25 ppm (105 mg/m³) ST 40 ppm (170 mg/m³)
Resorcinol:	TWA 10 ppm (45 mg/m³) ST 20 ppm (90 mg/m³)
Ronnel:	TWA 10 mg/m³

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Rosin core solder, pyrolysis products (as formaldehyde):	TWA 0.1 mg/m³
Rouge:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Silica, amorphous:	TWA 6 mg/m³ TWA 0.1 mg/m³ (fused)
Silica, crystalline (as respirable dust):	TWA 0.05 mg/m³ (cristobalite) TWA 0.05 mg/m³ (tridymite) TWA 0.1 mg/m³ (quartz) TWA 0.1 mg/m³ (tripoli)
Silicon:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Silicon carbide:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Silicon tetrahydride:	TWA 5 ppm (7 mg/m³)
Soapstone:	TWA 6 mg/m³ (total) TWA 3 mg/m³ (resp)
Sodium azide:	C 0.1 ppm (as HN_3) [skin] C 0.3 mg/m³ (as NaN_3) [skin]
Sodium bisulfite:	TWA 5 mg/m³
Sodium fluoroacetate:	TWA 0.05 mg/m³ ST 0.15 mg/m³ [skin]
Sodium hydroxide:	C 2 mg/m³
Sodium metabisulfite:	TWA 5 mg/m³
Stoddard solvent:	TWA 525 mg/m³ (100 ppm)
Styrene:	TWA 50 ppm (215 mg/m³) ST 100 ppm (425 mg/m³)
Subtilisins:	ST 0.00006 mg/m³ [60-minute]
Sulfur dioxide:	TWA 2 ppm (5 mg/m³) ST 5 ppm (13 mg/m³)
Sulfur monochloride:	C 1 ppm (6 mg/m³)
Sulfur pentafluoride:	C 0.01 ppm (0.1 mg/m³)
Sulfur tetrafluoride:	C 0.1 ppm (0.4 mg/m³)

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Sulfuryl fluoride:	TWA 5 ppm (20 mg/m^3) ST 10 ppm (40 mg/m^3)
Sulprofos:	TWA 1 mg/m^3
Talc:	TWA 2 mg/m^3 (resp)
Temephos:	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
Terphenyl (o-, m-, p-isomers):	C 5 mg/m^3 (0.5 ppm)
1,1,2,2-Tetrachloroethane:	TWA 1 ppm (7 mg/m^3) [skin]
Tetrachloroethylene:	TWA 25 ppm (170 mg/m^3)
Tetrahydrofuran:	TWA 200 ppm (590 mg/m^3) ST 250 ppm (735 mg/m^3)
Tetrasodium pyrophosphate:	TWA 5 mg/m^3
4,4'-Thiobis(6-tert-butyl-m-cresol):	TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp)
Thioglycolic acid:	TWA 1 ppm (4 mg/m^3) [skin]
Thionyl chloride:	C 1 ppm (5 mg/m^3)
Tin (organic compounds, as Sn):	TWA 0.1 mg/m^3 [skin]
Tin(II) oxide (as Sn):	TWA 2 mg/m^3
Tin(IV) oxide (as Sn):	TWA 2 mg/m^3
Titanium dioxide:	TWA 10 mg/m^3
Toluene:	TWA 100 ppm (375 mg/m^3) ST 150 ppm (560 mg/m^3)
Toluene-2,4-diisocyanate:	TWA 0.005 ppm (0.04 mg/m^3) ST 0.02 ppm (0.15 mg/m^3)
m-Toluidine:	TWA 2 ppm (9 mg/m^3) [skin]
p-Toluidine:	TWA 2 ppm (9 mg/m^3) [skin]
Tributyl phosphate:	TWA 0.2 ppm (2.5 mg/m^3)
Trichloroacetic acid:	TWA 1 ppm (7 mg/m^3)
1,2,4-Trichlorobenzene:	C 5 ppm (40 mg/m^3)
Trichloroethylene:	TWA 50 ppm (270 mg/m^3) ST 200 ppm (1080 mg/m^3)
1,2,3-Trichloropropane:	TWA 10 ppm (60 mg/m^3)
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)
Trimellitic anhydride:	TWA 0.005 ppm (0.04 mg/m^3)
Trimethylamine:	TWA 10 ppm (24 mg/m^3) ST 15 ppm (36 mg/m^3)
1,2,3-Trimethylbenzene:	TWA 25 ppm (125 mg/m^3)
1,2,4-Trimethylbenzene:	TWA 25 ppm (125 mg/m^3)
1,3,5-Trimethylbenzene:	TWA 25 ppm (125 mg/m^3)
Trimethyl phosphite:	TWA 2 ppm (10 mg/m^3)
2,4,6-Trinitrotoluene:	TWA 0.5 mg/m^3 [skin]
Triorthocresyl phosphate:	TWA 0.1 mg/m^3 [skin]
Triphenylamine:	TWA 5 mg/m^3
Tungsten (insoluble compounds, as W):	TWA 5 mg/m^3 ST 10 mg/m^3
Tungsten (soluble compounds, as W):	TWA 1 mg/m^3 ST 3 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)
Uranium (insoluble compounds, as U):	TWA 0.2 mg/m^3 ST 0.6 mg/m^3
n-Valeraldehyde:	TWA 50 ppm (175 mg/m^3)
Vanadium dust:	TWA 0.05 mg V_2O_5/m^3 (resp)
Vanadium fume:	C 0.05 mg V_2O_5/m^3
Vinyl acetate:	TWA 10 ppm (30 mg/m^3) ST 20 ppm (60 mg/m^3)
Vinyl bromide:	TWA 5 ppm (20 mg/m^3)
Vinyl cyclohexene dioxide:	TWA 10 ppm (60 mg/m^3) [skin]
Vinylidene chloride:	TWA 1 ppm (4 mg/m^3)
VM & P Naphtha:	TWA 1350 mg/m^3 (300 ppm) ST 1800 mg/m^3 (400 ppm)
Welding fumes:	TWA 5 mg/m^3

APPENDIX G—VACATED 1989 OSHA PELs (Continued)

Wood dust (all wood dusts except Western red cedar):	TWA 5 mg/m³ ST 10 mg/m³
Wood dust (Western red cedar):	TWA 2.5 mg/m³
Xylene (o-, m-, p-isomers):	TWA 100 ppm (435 mg/m³) ST 150 ppm (655 mg/m³)
m-Xylene α,α'-diamine:	C 0.1 mg/m³ [skin]
Xylidine:	TWA 2 ppm (10 mg/m³) [skin]
Zinc chloride fume:	TWA 1 mg/m³ ST 2 mg/m³
Zinc oxide:	TWA 5 mg/m³ (fume) ST 10 mg/m³ (fume) TWA 10 mg/m³ (total dust) TWA 5 mg/m³ (resp dust)
Zinc stearate:	TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp)
Zirconium compounds (as Zr):	TWA 5 mg/m³ ST 10 mg/m³

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☆ U.S. GOVERNMENT PRINTING OFFICE: 1997 J551-571

National Institute for Occupational Safety and Health

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